AMENDMENT 2 TO THE

FISHERY MANAGEMENT PLAN FOR THE

SUMMER FLOUNDER FISHERY

Volume 1

May 1991

Mid-Atlantic Fishery Management Council

in cooperation with the

Atlantic States Marine Fisheries Commission,

the

National Marine Fisheries Service,

the

New England Fishery Management Council,

and the

South Atlantic Fishery Management Council

Draft adopted by MAFMC: 29 May 1991
Final adopted by MAFMC: 17 October 1991
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2. SUMMARY

This Amendment 2 to the Fishery Management Plan for the Summer Flounder Fishery (FMP), prepared by the Mid-Atlantic Fishery Management Council (Council), is intended to manage the summer flounder (*Paralichthys dentatus*) fishery pursuant to the Magnuson Fishery Conservation and Management Act of 1976, as amended (MFCMA). The management unit remains unchanged and is summer flounder in US waters in the western Atlantic Ocean from the southern border of North Carolina northward to the US - Canadian border. The objectives of the FMP are:

1. Reduce fishing mortality in the summer flounder fishery to assure that overfishing does not occur.

2. Reduce fishing mortality on immature summer flounder to increase spawning stock biomass.

3. Improve the yield from the fishery.

4. Promote compatible management regulations between State and Federal jurisdictions.

5. Promote uniform and effective enforcement of regulations.

6. Minimize regulations to achieve the management objectives stated above.

Overfishing is defined as fishing in excess of the F_{max} level. F_{max} is a biological reference point that corresponds to the level of fishing mortality (F) that produces the maximum yield per recruit. Based on current analysis, F_{max} is 0.23. Recent stock assessment information indicates that summer flounder stocks are severely overfished. Current fishing mortality rates (F) are at least 1.4 and could be as high as 2.1. Thus, there is at least a six fold difference between the F_{max} and the current F. In order to achieve F_{max}, current exploitation rates would have to be reduced by 73%. The Council and Atlantic States Marine Fisheries Commission (ASMFC) Management Board considered a large number of strategies to reduce the fishing mortality rate to F_{max}, ranging from achieving F_{max} in the first year of FMP implementation to equal fishing mortality rate reductions over ten years. The Council and ASMFC adopted the following strategy: fishing mortality on summer flounder should be reduced to 0.53 in the first year of the management program and be maintained at that level through year 3. This requires a reduction in exploitation of approximately 47% in the first year. In year 4 and subsequent years, the target F would be F_{max} (0.23).

The adopted strategy gives primary consideration to a high probability of reaching F_{max}, balanced against reasonable impacts on the fishermen.

Following is a summary of the management measures adopted by the Council and ASMFC in order to implement this strategy (a complete description of the adopted management measures is in section 9.1):

Moratorium

The FMP establishes a moratorium in the commercial fishery for up to 5 years following implementation.

Permits

Any owner of a vessel desiring to fish for summer flounder within the US EEZ for sale, or transport or deliver for sale, any summer flounder taken within the EEZ, must obtain a moratorium permit from NMFS for that purpose. A vessel is eligible for a moratorium permit if it meets any of the following criteria:

1. The owner or operator of the vessel landed and sold summer flounder in the management unit for summer flounder between 26 January 1985 and 26 January 1990; or

2. The vessel was under construction for, or was being rerigged for, use in the directed fishery for summer

flounder on 26 January 1990 and provided the vessel has landed summer flounder for sale prior to implementation of this Amendment. For the purpose of this paragraph, "under construction" means that the keel has been laid, and "being rerigged" means physical alteration of the vessel or its gear had begun to transform the vessel into one capable of fishing commercially for summer flounder; or

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

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

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

Any owner or operator of a party and charter boats (vessels for hire) desiring to fish for summer flounder within the US EEZ must obtain a permit from NMFS for that purpose. A party or charter boat may have both a commercial moratorium permit to catch and sell and a party or charter boat permit if the vessel qualifies as a commercial vessel under the moratorium. However, such a vessel may not fish under the commercial rules if it is carrying passengers for a fee. When a party or charter boat is operating as a commercial vessel, the crew size must not be more than 5 when it is operating as a party boat and not more than 3 when it is operating as a charter boat.

A recreational vessel, other than a party or charter boat (vessel for hire), is exempt from the permitting requirement if it catches no more than the recreational possession limit, multiplied by the number of persons on board, of summer flounder per trip.

Any dealer of summer flounder must have a permit. A dealer of summer flounder is defined as a person or firm that receives summer flounder from the owner or operator or a vessel issued a moratorium permit pursuant to this FMP.

Applicants for a permit under this FMP must agree, as a condition of issuance of the permit, to fish in accordance with Federal rules whether they are fishing in the EEZ or State waters. For vessels with moratorium permits, this includes agreeing to not land summer flounder in any State where the Regional Director has determined that the State's commercial quota has been landed.

Reports

Owners or operators of vessels with commercial moratorium permits must submit logbooks on a monthly basis.

Owners or operators of party and charter boats with Federal permits must submit logbooks monthly.

Implementation of the vessel reporting shall begin no later than January 1, 1994.

Dealers with permits issued pursuant to this FMP must submit weekly reports. Buyers that do not purchase directly from vessels are not required to submit reports under this provision. Dealers should report only those purchases from owners or operators of vessels with commercial moratorium permits.

Summer Flounder FMP Monitoring Committee

The Summer Flounder Monitoring Committee will be made up of staff representatives of the Mid-Atlantic, New England, and South Atlantic Fishery Management Councils, the Northeast Regional Office, the Northeast Fisheries Center, and the Southeast Fisheries Center, and ASMFC representatives. The MAFMC Executive Director or his designee will chair the Committee.

The Summer Flounder Monitoring Committee will annually review the best available data including, but not limited to, commercial and recreational catch/landing statistics, current estimates of fishing mortality, stock status, the most recent estimates of recruitment, VPA results, target mortality levels, beneficial impacts of size/mesh regulations, as well as the level of noncompliance by fishermen or States and recommend to the Council Committee and ASMFC Interstate Fishery Management Program (ISFMP) Policy Board commercial (annual quota, minimum fish size, and minimum mesh size) and recreational (possession and size limits and seasonal closures) measures designed to assure that the target mortality level on summer flounder to is not exceeded [0.53 in the first year of FMP implementation and maintaining it at that level through year three; in year four and subsequent years, the target fishing mortality rate will be F_{max} (0.23)]. The Committee will also review State regulatory programs for consistency with the FMP. The Committee will also review the gear used to catch summer flounder to determine whether gear other than otter trawls needs to be regulated to help assure attainment of the fishing mortality rate target and propose such regulations as appropriate.

The steps from the Monitoring Committee to action by the Regional Director are:

1. The Monitoring Committee reviews the data and makes its recommendations to the Demersal Species Committee and ASMFC ISFMP Policy Board.

2. The Demersal Species Committee and ASMFC ISFMP Policy Board consider the recommendations of the Monitoring Committee and makes their recommendations to the Council and ASMFC.

3. The Council and ASMFC consider the recommendations of the Demersal Species Committee and ASMFC ISFMP Policy Board and make their recommendations to the Regional Director.

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

COMMERCIAL MANAGEMENT MEASURES

Commercial Quota

The annual commercial quota will be set at a range of between 0 and the maximum allowed by the adopted fishing mortality rate reduction strategy. The commercial quota includes all landings for sale by *any* gear.

Quotas will be distributed to the States based on their share of commercial landings for the period 1980-1989 (Table 72) minus any landings in that State in excess of the previous year's quota.

All landings by any vessel that has a commercial moratorium permit (required to sell) counts against the quota, whether the summer flounder are caught with an otter trawl, a scallop dredge, hook and line, or any other gear. If the vessel does not have a commercial moratorium permit, the fish may not be sold and the recreational rules on size, possession, and season apply.

The quota applies throughout the management unit, that is, in both State and Federal waters. All commercial landings in a State count toward that State's quota. When a State's quota has been caught, fishing for and/or landing summer flounder will be prohibited in that State.

NMFS will monitor the fishery and inform each of the States of the State's landings relative to that State's quota.

It is the responsibility of each State to assure that its quota is not exceeded. Each State shall close their State's waters to commercial fishing for summer flounder when their quota is reached and prohibit landing by commercial vessels. Each State must submit to the Council and Regional Director a plan setting forth the means by which the State will manage the quota, size limit, and mesh regulation. Each State's plan will be reviewed by the Monitoring Committee.

The Regional Director shall close the EEZ to fishing for summer flounder by commercial vessels if he determines

that the inaction of one or more States will cause the target fishing mortality levels to be exceeded.

The Regional Director shall close the EEZ to fishing for summer flounder by commercial vessels if the commercial fisheries in all States have been closed.

Commercial Fish Size Limitations.

It is illegal for owners or operators of vessels issued moratorium permits, except party and charter boats carrying passengers for hire, to possess summer flounder less than 13" total length (TL). It is also illegal to possess parts of summer flounder less than 13" to the point of landing.

Vessels with commercial moratorium permits issued pursuant to this FMP are required to fish and land pursuant to the provisions of this FMP unless the vessels land in States with larger minimum fish sizes than those provided in the FMP, in which case the minimum fish size would be required to meet the State limits.

The minimum fish size may be changed annually, if appropriate.

Minimum Mesh Requirement.

Vessels using otter trawls that land or possess more than 100 lbs of summer flounder may only fish with 5.5" minimum diamond mesh or 6" minimum square mesh, inside measure, applied throughout the cod end for at least 75 continuous meshes forward of the terminus of the net, or, if the net is not long enough for such a measurement, the terminal 1/3 of the net, measured from the terminus of the cod end to the head rope. If the fish are landed in a State that has a larger minimum net mesh size, the State limit would prevail.

Any combination of mesh or liners that effectively decreases the mesh below the minimum size is prohibited.

The owner or operator of a fishing vessel shall not use any device, gear, or material, including, but not limited to, nets, net strengtheners, ropes, lines, or chaffing gear, on the top of the regulated portion of a trawl net; except that, one splitting strap and one bull rope (if present), consisting of line or rope no more than 2" in diameter, may be used if such splitting strap and/or bull rope does not constrict in any manner the top of the regulated portion of the net; and one rope no greater than 0.75 inches in diameter extending the length of the net from the belly to the terminus of the cod end along each of the following: the top, bottom, and each side of the net. "Top of the regulated portion of the net" means the 50% of the entire regulated portion of the net which (in a hypothetical situation) would not be in contact with the ocean bottom during a tow if the regulated portion of the net were laid flat on the ocean floor. For the purpose of this paragraph, head ropes shall not be considered part of the top of the regulated portion of a trawl net.

There are two exceptions to the minimum mesh rule:

1. Vessels fishing in the fly net fishery are exempt from the minimum mesh size requirement. A fly net is a two seam otter trawl with the following configuration:

a. The net has large mesh webbing in the wings with a stretch mesh measure of 8" to 64".

b. The first body (belly) section of the net consists of 35 meshes or more of 8" (stretch mesh) webbing or larger.

c. In the body section of the net the stretch mesh decreases in size relative to the wings and continues to decrease throughout the extensions to the cod end, which generally has a webbing of 2" (stretch mesh).

2. Vessels fishing for summer flounder in the EEZ (taking and retaining more than 100 lbs of summer flounder) seaward of the line described below from 1 November through 30 April and not using a 5.5" minimum mesh (diamond) net, are required to obtain a special permit from NMFS. Application for this permit must be made 7 days prior to entering this exempted fishery and NMFS must be notified 7 days before the vessel exits the exempted fishery. The commercial minimum size limit (13") applies in the exempted area. Vessels with this

special permit are exempted from the minimum net mesh regulations, but are prohibited from fishing west (landward) of the line. NMFS is authorized to establish procedural rules necessary to process applications for and cancellation of these special permits in order to facilitate enforcement.

The line follows 71°30′ west longitude south to 40°53.1′ N, 71°30′ W; thence northeasterly 41° 00.0′ N, 70°49.5′ W, thence easterly to 41°00.0′ N, 70°30.0′ W, thence southerly to 40°50.0′ N., 70°30.0′ W., thence easterly to 40°50.0′ N., 69°40.0′ W., thence southerly to 40°33.5′ N., 69°40.0′ W., thence southwesterly to 40°26.5′ N., 70°40.0′ W., thence northerly to 40°40.5′ N., 70°40.0′ W., then southwesterly to 40°30.0′ N., 72°00.0′ W., thence southerly to 40°17.8′ N., 72°00.0′ W., thence southwesterly to 40°15.5′ N., 72° 20.0′ W., thence southerly along 72°20.0′ W. until it intersects the outer boundary of the EEZ.

Vessels fishing with an exempted fishery permit may transit the area south and west of the exempted fishery area to leave and return to port so long as all fishing gear is stowed in a manner that it cannot be used outside the exempted fishery area.

RECREATIONAL FISHERY MEASURES

The recreational fishery throughout the management unit will be managed through an annual evaluation of a framework system (section 9.1.2.2) of possession limits, size limits, and seasonal closures. Recreational landings will be compared to annual target harvest levels established through the FMP Monitoring Committee process to determine if modifications to the recreational possession limit and size limit are required for the following year or if the fishery needed to be closed for certain periods.

The annual recreational possession limit, size limit, and season will be set at a range of between 0 and the maximum allowed by the adopted fishing mortality rate reduction strategy. It will be illegal to possess parts of summer flounder less than the minimum size to the point of landing.

During the first year of FMP operation there will be a 14" TL minimum fish size, 6 fish possession limit, and a fishing season from 15 May through 30 September.

On vessels with several passengers, where catches are pooled in one or more containers, the number of summer flounder contained on the vessel may not exceed the possession limit multiplied by the number of people aboard the vessel.

It is the responsibility of each State to assure that it implements measures equivalent with the Federal FMP. The Regional Director may prohibit landing summer flounder from the EEZ by recreational vessels (party, charter, and private boats) of any State not in compliance with this FMP (possession limit, size limit, and season). If the inaction of one or more States leads the Regional Director to conclude that the FMP will be adversely affected, he may close the entire EEZ to summer flounder fishing. To be equivalent with the FMP, the States' measures must have the same length and possession limits as the FMP, but may incorporate a different equivalent open season provided such open season remains within the same MRFSS waves (bimonthly sampling periods) used in the coastwide season.

SALE-PURCHASE

Only persons with a dealer permit may buy summer flounder at the point of first sale landed by a vessel that has a commercial moratorium permit issued pursuant to this FMP.

Owners or operators of vessels with moratorium permits may sell summer flounder at the point of first sale only to a dealer that has a dealer permit issued pursuant to this FMP.

OTHER MEASURES

The amount of summer flounder on board a vessel using small mesh trawl gear other than exempted gear may not exceed 100 pounds.

Owners or operators of vessels with moratorium permits may not land summer flounder in a State when the Regional Director has determined that the State's commercial quota has been landed.

All summer flounder on vessels fishing with a mesh smaller than the legal minimum size must have any summer flounder on board boxed in a manner that will facilitate enforcement personnel knowing whether the vessel has more than 100 pounds of summer flounder on board to meet the minimum mesh size criterion. Any unboxed summer flounder on board a vessel fishing with a net smaller that the legal minimum is considered a violation of this FMP. A box holds 100 pounds of summer flounder and is approximately 36" long, 15" wide, and 12" high (approximately 3.75 cubic feet).

The Regional Director may place sea samplers aboard vessels if he determines a voluntary sea sampling system is not giving a representative sample from the summer flounder fishery.

The Regional Director, Northeast Region, NMFS is authorized to monitor sea turtles in the Exclusive Economic Zone from the mouth of the Chesapeake Bay to the southern border of North Carolina, through aerial surveys and sea sampling, in concert with similar efforts by the State of North Carolina, and to institute measures in this area within 10 miles (16.1 kilometers) of the shore to minimize the take of sea turtles in the summer flounder fishery between 15 October and 15 January, compatible with such measures instituted by North Carolina. If measures are considered necessary and North Carolina has not acted appropriately, the Regional Director may limit tow times to 60 minutes or close the area to trawlers that do not use nets equipped with turtle excluder devices with bars spaced no greater than 6" (15.2 centimeters) apart, or other devices that may be authorized by the Regional Director.

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In earlier editions of Amendment 2, Appendix 2 was the Environmental Assessment (EA). However, on 12 February, NMFS ruled that an Environmental Impact Statement (EIS) was needed to replace the EA. Because of its volume, the EIS is printed as a separate volume and the remaining appendices have been renumbered accordingly.

4. INTRODUCTION

4.1 DEVELOPMENT OF THE PLAN

The Council first considered the development of a fishery management plan for summer flounder in late 1977. During the early discussions, the fact that a significant portion of the catch was taken from State waters was considered. As a result, on 17 March 1978 a questionnaire was sent by the Council to east coast State fishery administrators seeking comment on whether the plan should be prepared by the Council or by the States acting through the Atlantic States Marine Fisheries Commission (ASMFC).

It was decided that the initial plan would be prepared by ASMFC. The Council arranged for NMFS to make some of the Council's programmatic grant funds available to finance preparation of the ASMFC plan. New Jersey was designated as the State with lead responsibility for the plan. The State/Federal draft was adopted by the Atlantic States Marine Fisheries Commission at its annual meeting in October 1982. The original Council FMP (MAFMC 1988) was based on the ASMFC management plan.

The Council adopted the original FMP for public hearings on 29 October 1987. The public hearings were held in January 1988 in Fairhaven, MA; Galilee, RI; Riverhead, NY; Rockville Center, NY; Wall, NJ; Cape May Court House, NJ; Lewes, DE; Annapolis, MD; Norfolk, VA; Morehead City, NC; and Manteo, NC.

Following public hearings, the original FMP was adopted by the Mid-Atlantic Council on 16 April 1988. The South Atlantic Fishery Management Council endorsed the FMP on 28 April 1988 (Joseph pers. comm.). The New England Council, also in April 1988, adopted a motion supporting a 13" minimum fish size and no mesh size initially, with an automatic minimum size limit increase to 14" at the end of three years, rather than the framework measure adopted by the Mid-Atlantic and South Atlantic Councils (Marshall pers. comm.).

NMFS approved the original FMP on 19 September 1988.

Amendment 1 to the FMP was developed in the summer of 1990 solely to protect the 1989 and 1990 year classes by imposing a minimum net mesh size comparable to the 13" minimum fish size included in the original FMP. Amendment 1 was adopted for hearings on 29 September 1990. Hearings were held in October 1990 in Fairhaven, MA, Galilee, RI, Riverhead and Rockville Center, NY, Wall and Cape May Court House, NJ, Dover, DE, Salisbury, MD, Hampton, VA, and Manteo and Morehead City, NC. It was revised based on comments received and the final was adopted by by the Council 31 October 1990. The Council also requested that NMFS implement the minimum mesh size by emergency regulations to regulate the 1990-1991 winter fishery. This request was also made by the New England and South Atlantic Councils and by the Atlantic States Marine Fisheries Commission.

On 15 February 1991 the Council was notified that NMFS had approved the overfishing definition for summer flounder contained in Amendment 1, but had disapproved the minimum net mesh provision. On 28 February NMFS notified the Council it was not going to implement emergency regulations.

The Council adopted the hearing draft of Amendment 2 on 29 May 1991. The Amendment was also adopted for hearings at the May meeting of the ASMFC Interstate Fishery Management Program Policy Board. Hearings were held in Fairhaven, MA (31 July), Galilee, RI (1 August), East Lyme, CT (7 August), Riverhead, NY (30 July), Brooklyn, NY (29 July), Wall, NJ (6 August), Cape May Court House, NJ (6 August), Salisbury, MD (1 August),Norfolk, VA (29 July), Manteo, NC (30 July), and Morehead City, NC (31 July). Following close of the comment period the Council's Demersal Species Committee met (22 August) to review the summaries of the hearings and written comments received by the Council. At that meeting the Committee was notified by NMFS that Amendment 2 would need to address the capture of endangered sea turtles in the summer flounder fishery in the fall-winter off southern Virginia and North Carolina. The Council reviewed the basic provisions of Amendment 2 and the results of the hearings at its regular 4-5 September 1991 meeting. The Council made a number of changes as a result of the hearing and comment process as recommended by the Demersal Species Committee and submitted the revised management measures to the ASMFC for consideration at the

Commission's annual meeting 7-11 October 1991.

At its September meeting the Council also authorized supplemental hearings to deal with the flounder/turtle interaction issue. A proposal was drafted by personnel from the State of North Carolina, NMFS Headquarters, NMFS Northeast Regional Office, NMFS Southeast Regional Office, and the Council. This proposal, and one subsequently advanced by NMFS, were taken to a set of supplemental public hearings in Morehead City, NC (30 September), Manteo, NC (1 October), and Norfolk, VA (2 October).

The Council's action on the basic Amendment was submitted to a meeting of the ASMFC Summer Flounder Board on 23-24 September. The summary of the supplementary hearings, along with the Summer Flounder Board's recommendations were submitted to the ASMFC Interstate Fishery Management Program Board at the annual meeting on 8 October. The full membership of ASMFC unanimously adopted the Amendment on 10 October.

The outcome of the ASMFC deliberations were presented to a meeting of the Council's Demersal Species Committee on 16 October (a meeting at which all Council members were designated members of the Committee so they could be aware of the provisions of the Amendment and participate in the decision making). Following adoption by the Committee at that meeting, the Council officially adopted the Amendment by unanimous roll call vote (the Regional Director abstaining) on 17 October 1991.

4.2. PROBLEMS ADDRESSED BY THE FMP

4.2.1. Summer Flounder are Overexploited

Summer flounder are overexploited. The best currently published indicators, on which the Amendment is based, show that instantaneous fishing mortality (F) is at least 1.4, while the rate which maximizes the harvest (F_{max}) is 0.23. Thus, fishing mortality is six times the rate which would produce the maximum yield per recruit. The instantaneous fishing mortality rate is easily translated into an annual survival estimate. With a fishing mortality rate of 1.4, only about 20% of all summer flounder that are alive now will be alive one year later. The level that corresponds to the F_{max} rate is 65%. Obviously, gains in long term yield from the fishery and increases in stock size could be realized by significantly reducing fishing mortality from current levels. Significant and timely reductions in fishing mortality are also needed to avoid stock collapse. Overfishing is defined in this FMP as fishing in excess of the F_{max} level (adopted by the Council and approved by NMFS in Amendment 1).

Long term trends in abundance and recruitment of summer flounder were derived from several local and coastwide surveys at the October 1990 workshop (USDC 1990b). In general, these indices indicated that summer flounder were approximately 5 times more abundant in the mid to late 1970's than in the late 1980's. These surveys also indicated that the 1988 year class was poor and the 1989 and 1990 year classes "no better than average". In addition, the coastwide NEFC survey did not collect any summer flounder older than age 3 in the 1990 survey, although a decade ago summer flounder as old as 10 years were collected.

Spawning biomass per recruit declines markedly with increasing fishing mortality on females (Figure 9). An F_{max} level (0.23) of fishing corresponds to a spawning stock biomass per recruit level of 20%. Current levels of F (greater than 1.4) would be equivalent to a spawning stock biomass per recruit level of about 2 - 3% of the maximum level.

At present, as a direct result of high rates of fishing mortality, both commercial and recreational catches of summer flounder are comprised primarily of 0 to 2 year old fish. Individuals of this species have previously been known to live up to 20 years, yet older and larger fish are now infrequent in the landings. This indicates a severely compressed age composition of the summer flounder stock. Such age class compression poses a great risk to recruitment because the older, more fecund spawning adults are being too rapidly removed from the population and nearly all of the new fish are being spawned by individuals that only get to spawn once or at most twice before they are caught and killed by fishermen.

4.2.2. Mixed Species Fisheries

The Mid-Atlantic mixed species trawl fishery, which relies principally on summer flounder, scup, and black sea bass, also harvests significant quantities of *Loligo* squid, winter flounder, witch flounder, yellowtail flounder, and other species either as bycatch or in directed fisheries. Many of these species are also principal components of the southern New England trawl fisheries since stock migrations occur between the Mid-Atlantic Bight and this area.

Generally, fishing activity follows this species as it makes annual migrations from south to north, and back to the south, and from offshore to inshore waters, and back offshore. Fishing effort is concentrated northerly and inshore in summer when a wide range of vessels have access to the stocks. In winter, effort is concentrated southerly and offshore, primarily with larger vessels. Although the majority of landings (96%) are taken by fish otter trawls (Table 19; note that certain commercial landing numbers were changed from those in the hearing draft as a result of the decision by the Council and ASMFC to use North Carolina State data to remove southern flounder landings from the total flounder landings reported by NMFS; this is considered a refinement rather than the introduction of new data), summer flounder are landed by other types of fishing gear, including: pound nets, crab otter trawls, shrimp otter trawls, gill nets, and scallop dredges. At any particular time, fishermen may target a single species with certain gear, but significant bycatch of other species usually occurs in conjunction with the targeted species, depending on the fishing technique. As a result discarded bycatch in the commercial fisheries is probably underestimated as a component of total mortality for summer flounder.

The occurrence of summer flounder and other species, in commercial catches of the Mid-Atlantic and southern New England regions complicates the identification of appropriate and effective management strategies. Close coordination of regulatory measures is therefore necessary to properly manage this species assemblage.

4.2.3. Increased Fishing Pressure

Nearly all the major groundfish fisheries in New England (haddock, yellowtail flounder, redfish, cod, etc.) have had their stocks severely depleted or have current catch levels which exceed long term potential catch (USDC 1990a). There have also been declines in South Atlantic and Gulf of Mexico fishery resources. Consequently, it is probable that more effort will be directed towards the southern New England/Mid-Atlantic species of summer flounder, exacerbating current problems of high exploitation rates. Because of the potential for an increased number of entrants into the fisheries, increases in effort by present participants, as well as technological advances that have increased the efficiency of gear, there is a need to limit and reduce effort in the summer flounder fisheries.

4.2.4. Lack of Uniform Management

The highly migratory nature of summer flounder complicate the development of management strategies since fishing activities in the EEZ or waters of a few States could adversely impact the stocks. For example, nearly all the Atlantic coastal States have different regulations pertaining to the harvest of summer flounder.

Federal regulations could guide implementation of complimentary regulations in State waters. Compliance with National Standard 3 (" ... an individual stock of fish shall be managed as a unit throughout its range ... ") is improved with consistent regulations for these species.

4.2.5. Inconsistent and Inadequate Enforcement

There is a lack of uniform enforcement affecting the summer flounder fisheries which is partly due to the inconsistent regulations among States and between States and Federal jurisdictions. FMP advisors report a lack of consistency in enforcement between States, the EEZ, and/or parts thereof, due to various interpretations of the rules by enforcement officers, which leads to confusion and has resulted in fishermen seeking ways to avoid the rules. Adequate funding at the State and Federal level for enforcement personnel, training, and equipment is problematic. In addition, sanctions resulting from noncompliance with regulations may be insufficient to encourage conformity to State and Federal laws.

Effective enforcement requires that fishery participants perceive both the likelihood of enforcement contact and the application of standards to be uniform throughout the management unit. The perception of fairness is essential in the promotion of voluntary compliance. Proper training of fishery enforcement officers is important in this regard.

4.2.6. Education

In general, the lack of information and education programs on the status and management of this fishery resource has contributed to overharvest and waste. The promotion of conservation education pursuant to the implementation of this FMP will enable resource users to better understand the severity of the problem and the long term benefits of conservation and management programs. A proper conservation ethic will assure wise resource use and avoid the excessive costs associated with overharvest.

4.2.7. Lack of Data

National Standard 2 states: "Conservation and management measures shall be based upon the best scientific information available". Although recreational and commercial catch data for summer flounder are adequate to formulate and implement management measures, data collection should be improved. An improved data base will allow the Council to more finely tune the management system to the needs of the fishery. These data are necessary to assess the impact and effectiveness of management measures, as well as monitor reductions in fishing mortality and increases in stock size to determine if additional amendments to the FMP will be necessary. For example, the absence of a permit to sell requirement in some States, which allows direct sale of catch to retail establishments by fishermen, may result in under reporting of commercial landings that complicates the development, implementation, and enforcement of fishery management strategies.

4.3. MANAGEMENT OBJECTIVES

The objectives of the FMP are to:

1. Reduce fishing mortality in the summer flounder fishery to assure that overfishing does not occur.

2. Reduce fishing mortality on immature summer flounder to increase spawning stock biomass.

3. Improve the yield from the fishery.

4. Promote compatible management regulations between State and Federal jurisdictions.

5. Promote uniform and effective enforcement of regulations.

6. Minimize regulations to achieve the management objectives stated above.

4.4. MANAGEMENT UNIT

The management unit is summer flounder (*Paralichthys dentatus*) in US waters in the western Atlantic Ocean from the southern border of North Carolina northward to the US-Canadian border.

5. DESCRIPTION OF THE STOCK

5.1. SPECIES DISTRIBUTION

The summer flounder is one of the lefteye flounders in the family Bothidae. The geographical range of the summer flounder (*Paralichthys dentatus*) encompasses the estuarine and coastal waters from Nova Scotia to Florida (Leim and Scott 1966 and Gutherz 1967). Briggs (1958) has given their range as extending into the northern Gulf of Mexico. The center of its abundance lies within the Middle Atlantic Bight. North of Cape Cod, Massachusetts, and south of Cape Fear, North Carolina, summer flounder numbers begin to diminish rapidly (Grosslein and Azarovitz 1982). South of Virginia, two closely related species, the southern flounder

(*Paralichthys lethostigma*) and the gulf flounder (*Paralichthys albigutta*) occur and sometimes are not distinguished from summer flounder.

In the Middle Atlantic Bight, summer flounder can be found from the outer portion of the continental shelf to shallow inshore waters, and they exhibit strong seasonal inshore - offshore movements as observed in trawl survey data (Figures 1 and 2). Summer flounder normally inhabit shallow coastal and estuarine waters during the warmer months of the year and remain offshore during the fall and winter (Bigelow and Schroeder 1953).

Summer flounder are serial spawners (multiplicity of egg batches which are continuously matured and shed) with a relatively protracted reproductive season (Morse 1981). Ichthyoplankton survey data show the general spawning areas in the Middle Atlantic Bight (Figure 1). Summer flounder spawn during the fall and winter while the fish are moving offshore or on their wintering grounds. The well defined seasonal migratory/spawning pattern varies with latitude; (Smith 1973) fish spawn and move offshore earlier in the northern part of the range. The offshore migration is presumably keyed to declining water temperature and decreases in photoperiod during the autumn.

Larvae and post larvae migrate inshore, entering coastal and estuarine nursery areas from October to May. The smallest larvae (<2") are most abundant October through December based on MARMAP surveys (Able *et al.* 1990). The fry become demersal on reaching coastal waters and the first year is spent in bays or inshore areas along the coast over the entire range of the species.

Summer flounder are distributed widely over the continental shelf during the spring, from 1 to 1,000 ft in depth (Sissenwine *et al.* 1979). During summer and autumn, summer flounder are primarily captured in depths of less than 300 ft. During winter, they generally are not found at depths of less than 200 ft. The distribution of summer flounder by depth is related to their temperature distribution (Sissenwine *et al.* 1979). During spring they are primarily found between 46° and 61° F. During summer the distribution is between 59° and 82° F. The autumn distribution is between 54° and 82° F and the winter distribution is between 41° and 52° F. Prerecruit summer flounder are most abundant at temperatures in excess of 59° F, during the months in which they are caught by the trawl surveys (Sissenwine *et al.* 1979).

Examination of the distribution pattern of prerecruit (less than or equal to 12" TL) summer flounder indicate a striking absence of small fish in northern areas (Fogarty 1981). Both spring (Figure 3) and autumn (Figure 4) bottom trawl survey data indicate that the concentration of young of year summer flounder is south of 39° latitude. The importance of the Chesapeake Bight to this species is demonstrated by the fact that almost all of the young of year caught during the 1968 through 1979 spring surveys (Figure 3) were from this area. The primary nursery grounds for juveniles are the sounds of North Carolina, Chesapeake Bay, and the bays of the eastern shore of Virginia; however, juveniles are distributed to some extent during spring, summer, and fall in many estuaries from Massachusetts to North Carolina.

Juveniles in southern waters generally overwinter in bays and sounds whereas in the north there is some movement offshore with the adult migration, although many larval and juvenile summer flounder still remain inshore through the winter months (Smith and Daiber 1977 and Wilk *et al.* 1977). The offshore population returns to the coast and bays in the spring with a tendency to return to the same estuary as the year before or to move to the north and east (Poole 1962; Murawski 1970; Westman and Neville 1946; and Hamer and Lux 1962). Those which enter bays and estuaries generally stay the entire summer. In the northern part of the range, fish which spend their summer in a particular bay tend largely to return to the same bay in the subsequent year. For example, although the northeast dispersal is considerable, the majority of summer flounder from inshore New Jersey return to inshore New Jersey the following year. This homing is evident also in the summer flounder which return to New York waters, with some movement to waters off Connecticut, Rhode Island and Massachusetts (Poole 1962).

Considerable attention has been devoted in recent years to determining the population structure of summer flounder in the Middle and South Atlantic Bights. Wilk *et al.* (1980), on the basis of stepwise linear discriminant analysis of morphometric and meristic features of summer flounder samples collected along the eastern seaboard from New York to Florida, concluded that a significant difference exists between summer flounder samples north and south of Cape Hatteras. Summer flounder collected throughout the Middle Atlantic Bight

were statistically similar, as were fish sampled in the South Atlantic Bight. Population intermixing was most prevalent off North Carolina. Wilk *et al.* (1980) suggested that Cape Hatteras forms a zoogeographical barrier resulting in reproductive isolation of summer flounder. Fogarty *et al.* (1983) supported the findings of Wilk *et al.* (1980), that summer flounder north and south of Cape Hatteras are statistically separable on the basis of morphometric characters, with apparent intermixing of northern and southern contingents in the vicinity of Cape Hatteras. The most recent summer flounder stock assessment (USDC 1990b) is based on the assumption of a unit stock existing from the southern border of North Carolina, northeast to the US-Canadian border.

The summer flounder stock discrimination workshop reported on in Fogarty *et al.* (1983) was unable to examine adequately the hypothesis of multiple stocks in the Middle Atlantic Bight. Smith (1973) identified concentrations of summer flounder eggs off Long Island, Delaware-Virginia, and North Carolina. The workshop concluded, however, that distribution of summer flounder eggs and larvae was continuous throughout the Middle Atlantic Bight and that apparent concentrations identified by Smith (1973) may have been due to sampling variability.

This FMP is based on the agreement of the Stock Assessment Workshop's Summer Flounder Working Group, the ASMFC Summer Flounder Scientific and Statistical Committee, the MAFMC Scientific and Statistical Committee, and the most reliable biological data available which all dictate that management options be based on a unit stock.

5.2. ABUNDANCE AND PRESENT CONDITION

Total US commercial landings (note that landings are reflective of a combination of effort and abundance) of summer flounder (North Carolina and north) peaked in 1979 at nearly 40 million lbs (Table 1). The reported landings in 1989 of slightly under 18 million lbs were the lowest landings in the past 15 years and less than one half the peak amount. Commercial landings have been consistently high since the mid 1970's but absolutely plummeted coastwide in 1989. Preliminary data for 1990 indicate an even more drastic decline in that only about 10.0 million lbs of summer flounder appear to have been landed commercially between Maine and North Carolina (Holliday pers. comm.). Increased commercial landings in the 1980's are attributable mainly to increased levels of effort rather than directly to abundance. Note that section 7 more fully describes the commercial and recreational fisheries.

Since 1980, 77% of the reported commercial landings of summer flounder have come from the EEZ (Table 2). The percentage of landings attributable to the EEZ was at its lowest in 1983 with 68% and was the highest in 1989 at 92% (Table 2). In 1988, over 25 million lbs of summer flounder were landed from the EEZ, whereas in 1989 the EEZ amount had fallen to less than 17 million lbs. Preliminary data for 1990 indicate that only about 7.5 million lbs were from the EEZ (Holliday pers. comm.). Tremendous variability in summer flounder landings exist among the States, over time, and the percent of total summer flounder landings taken from the EEZ has varied widely among the States (section 7 more fully describes some of these differences).

Estimated recreational catch (which includes both landed and discarded fish) of summer flounder in 1989 was only 5.0 million lbs (Table 3). Preliminary data for 1990 indicate that the recreational catch increased slightly to around 10 million lbs, but that only 5.4 million lbs were landed (Essig pers. comm.). Estimated recreational catch derived from the 1980 through 1989 Marine Recreational Fishery Statistics Surveys (MRFSS) has averaged 30 million lbs and has ranged from 5.0 to 54.5 million lbs. No consistent annual pattern is discernible except that the 1989 and 1990 catches plummeted. Summer flounder are generally the second most frequently caught species by marine recreational fishermen along the East coast and comprise roughly 7% of the total weight of all fish caught (Table 3).

A stratified random bottom trawl survey has been conducted in the spring and autumn by NEFC (Clark 1978). The continental shelf between Cape Hatteras and Nova Scotia has been sampled since 1967 during the autumn survey and was also sampled between New Jersey and Nova Scotia during 1963 and 1966. The spring survey began in 1968 and has sampled from Cape Hatteras to Nova Scotia. The survey area is stratified into geographical zones (Figure 5) primarily on the basis of depth and latitude. Approximately 300 stations are sampled during each survey (Clark 1978). A 30 minute tow is taken at each station at an average speed of 3.5 knots. Summer flounder have consistently been aged since 1976 from these surveys.

Bottom trawl surveys, conducted during the spring in offshore waters, were used to provide indices of abundance for summer flounder. Spring surveys were considered the most reliable indicators of biomass because summer flounder are concentrated in offshore areas during spring surveys and are more consistently available to the gear than in the fall (USDC 1986). A smoothed index (Pennington 1986) for the survey catch per tow was constructed and used as the index of relative abundance.

Recent spring NEFC survey indices appear to be about one-fifth the level of indices from the mid- to late 1970's. Age composition data indicate a substantial reduction in the number of ages in the stock between 1976 and 1990 (Table 4), where by 1990 the maximum observed age was 3 years.

Several States have been running fisheries surveys for the past decade (Table 5). These surveys may allow for the detection of trends in abundance and for the detection of relatively poor or good year classes. Nearly every State had poor recruitment in 1988 (Table 5). Preliminary indices indicate that the 1989 and 1990 year classes appeared no better than average. The VIMS young-of-the-year survey is the only available predictor of recruitment for the 1989 and 1990 year classes that is consistent with past VPA estimates (USDC 1990b, and discussion of VPA in section 5.4).

5.3. STOCK CHARACTERISTICS AND ECOLOGICAL RELATIONSHIPS

5.3.1. Spawning

Summer flounder spawn during the fall and winter as they migrate offshore or are at their wintering grounds. Smith (1973) found that spawning starts in mid-September between southern New England and New Jersey. As the season progresses spawning moves southward, and by October spawning takes place nearly as far south as Chesapeake Bay. Spawning has been reported to continue into March (Morse 1981). Spawning habitat occurs over the entire shelf between Cape Cod, Massachusetts, and Cape Lookout, North Carolina.

Morse (1981) documented that summer flounder are serial spawners (Figure 6). The multiplicity of modes indicate egg batches are continuously matured and shed during a protracted spawning season.

Morse (1981) calculated the percent of ovary weight to total fish weight as an index for maturity. The mean maturity index increased rapidly from August to September, peaked in October- November, then gradually decreased to a low in July (Table 6). The wide range in the maturity indices during the spawning season indicates nonsynchronous maturation of females and a relatively extended spawning season. The length and peak spawning time as indicated by the maturity index agree with results determined by egg and larvae occurrence (Smith 1973 and Herman 1963).

Fertilized eggs are buoyant, floating at or near the surface, and are spherical with a transparent rigid shell of about 0.04". The heaviest concentrations of eggs and larvae are found between Long Island and Cape Hatteras (Smith 1973); most eggs were taken within 17 mi of shore and larvae were most abundant 12 to 45 mi from shore. Larvae were found in the northern part of the Middle Atlantic Bight from September to February, and in the southern part from November to May. MARMAP survey data (Able *et al.* 1990) indicate that peak egg abundance occurs in October through December with October and November being the two months when most eggs were collected. Unfortunately, very limited sampling, only 5 stations, occurred in December south of New England, and thus it is believed that December may not be adequately described.

Smith (1973) found that eggs were most abundant (approximately 77% of the total) in the water column where bottom temperatures were between 53° and 66° F. However, eggs were found in temperatures as cold as 48° F and as warm as 73° F. Larvae have been found in temperatures ranging from 32° to 74° F, but are most abundant between 48° and 64° F. The incubation period from fertilization to hatching is estimated to vary with temperatures as follows: about 142 hours at 48° F; 72 to 75 hours at 64° F; and 56 hours at 73° F (Smith 1973). The smallest larvae (<2") are most abundant in October through December based on MARMAP surveys (Able *et al.* 1990).

5.3.2. Age and Growth

Several authors have investigated length at age relationships for summer flounder (Poole 1961; Eldridge 1962; Smith and Daiber 1977; Shepherd 1980 and Richards 1970).

In June of 1990, ASMFC and NMFS sponsored an ageing workshop at NEFC. This 1990 workshop (Almeida pers. comm.) concluded that the convention derived at a previous 1980 workshop, that the first mark on the structures represented the second year, was in error. Summer flounder biologists now agree more closely with the information presented by Poole (1961) in that summer flounder exhibit very rapid growth in their first year and reach mean lengths at age 1 of 10 - 13". Although the report of this workshop is not yet finalized, the preliminary results indicate that there were little overall differences in the von Bertalanffy parameters (L_{inf}, t_o, or K) values previously presented (Almeida pers. comm.).

Mean lengths at age from samples collected during NEFC bottom trawl surveys in the spring and autumn, following the standard convention of a common 1 January birth date, demonstrate the rapid growth of the species (Table 7). Females grow faster and attain greater lengths than males (Almeida pers. comm.).

The length-weight relationship for summer flounder has been well described by Morse (1981). The results of this study showed that there are both seasonal and slight sexual differences in the relationship (Table 8). This difference between the sexes was also noted by Smith and Daiber (1977), Eldridge (1962), Lux and Porter (1966), and Wilk *et al.* (1978).

Parameters of the von Bertalanffy growth equation (Table 9) were determined for summer flounder (USDC 1986) using length at age data for 1,947 males and 2,030 females collected from bottom trawl surveys between 1976 and 1983. The maximum size of male and female summer flounder was estimated as 26" and 33", respectively, based on these growth equations. Previous estimates of the maximum size for summer flounder ranged from 35 to 37" (Smith and Daiber 1977; Richards 1970). Henderson (1979) provided an estimate of 36" for both sexes combined based on analysis of commercial samples. Bigelow and Schroeder (1953) reported a maximum verified length of 37". Recent values (USDC 1986) of the Brody growth coefficient (k) are comparable to those calculated in Fogarty (1981) using data which included both inshore and offshore collections.

5.3.3. Catch at Age

Age frequency distributions from NEFC spring and autumn bottom trawl survey data from 1975-1989 (Figures 7 and 8) indicate that individuals older than age 5 have rarely been encountered by the survey gear. During the spring surveys, ages 1 and 2 have dominated the catches with age 3 and older summer flounder rarely comprising greater than 5 % of the total. Age 1 has generally been the dominant age in the autumn surveys, however, age 0 has made up a large proportion of the catch in some years.

Catch at age matrices were developed for other population analyses from the MRFSS, North Carolina winter trawl fishery and the weighout landings, and were then summed to produce a total fishery catch at age matrix (Table 10). For the total catch at age during 1982-88, the average catch composition at age was: 0 = 13%, 1 = 49%, 2 = 30%, and 3 = 6%. Summer flounder age 4 and older constituted an average of less than 3%. Mean weight at age varied little over the time series (Table 11).

5.3.4. Sex Ratio

No significant difference from a 1:1 sex ratio was found by Morse (1981) in his examination of 4,551 summer flounder greater than 8" collected during 1974 through 1979 (Table 12). However, a significant trend was evident when sex ratios were calculated in roughly 2" intervals. Males dominated the intervals between 8" and 14" and were essentially absent in samples greater than 22". Females were more abundant in all groups greater than 18".

Morse (1981) calculated sex ratios by year and season to determine possible variations related to sampling intensity or differential distribution of sexes during the spring and fall migrations. There appeared to be no

annual or seasonal effects on observed sex ratios (Table 12) even though sample sizes varied greatly between years and seasons.

The observed size related trend in sex ratios does not appear to be the result of behavioral differences between the sexes or gear selectivity according to Morse (1981). Similar results were found in Great South Bay (Poole 1966) and Delaware Bay (Smith and Daiber 1977) where different collecting gear were used. There is no evidence to suggest segregation of the sexes during any phase of their annual cycle of distribution (Morse 1981). The paucity of males greater than 22" is the result of a differential growth rate between the sexes and a greater maximum age for females (Poole 1964; Smith and Daiber 1977). Female summer flounder may live up to 20 years, but males rarely exceed 7 years (USDC 1986).

5.3.5. Length at Maturity

The length at which 50% of the fish are mature (L_{50}) was estimated by Morse (1981) as 9.7" for males and 12.7" for females (Table 13). The smallest mature male was 7.5" and the largest immature was 15.7". Females began maturing at 9.8" and the largest immature was 17.3". The range of L_{50} for males and females indicate sexual maturity is attained by age 2 (Morse, 1981).

The L_{50} of males and females varied during the six year study of Morse (1981). No consistent general trend in L_{50} was evident as males and females appeared to exhibit independent changes (Table 13).

The NEFC is currently developing maturity indices from all the recent bottom trawl surveys, and although the data are preliminary, Shepherd (pers. comm.) provided information which was used in the GENMOD analysis of impacts for this FMP (section 9). Lengths (inches) at maturity (for corresponding ages) for female summer flounder based on these analyses are: 9.1" = 38% mature, 13.2" = 72% mature, 16.6" = 90% mature, 19.4" = 97% mature, 21.7" = 99% mature, and 23.6" and larger are 100% mature.

5.3.6. Fecundity and Reproductive Strategy

Fecundity of summer flounder is relatively high. Morse (1981) calculated fecundity estimates ranging from 463,000 to 4,188,000 eggs for fish between 14" and 27". Fecundity and length exhibit a curvilinear relationship, but with logarithm transformations, Morse (1981) expressed the relationship as:

$$\log_{10} \text{Fecundity} = \log_{10} a + b (\log_{10} \text{length})$$

The relationships between fecundity and weight and ovary weight were expressed by Morse (1981) as:

$$\text{Fecundity} = a + bX$$

The intercept (a) and slope (b) values for the equations are listed in Table 14.

The relative fecundity, number of eggs produced per gram of total weight of spawning female, ranged from 1,077 to 1,265 in Morse's (1981) study. The increase of variability in fecundity estimates as weight increases tends to obscure the true relationship. The high egg production to body weight is maintained by serial spawning, that is, batches of eggs are shed rather than all eggs shed at one time. In fact, the weight of annual egg production, assuming an egg diameter of 0.04" and 1.0 specific gravity, equals approximately 40 to 50% of the biomass of spawning females (Morse 1981).

The reproductive strategy of summer flounder tends to maximize reproductive potential and avoid catastrophe. The strategy is a combination of extended spawning season with variable duration, early maturation (age 1 or 2), high fecundity, serial spawning, and extensive migrations across the continental shelf during spawning. The half year spawning season reduces larval crowding and decreases the impact of predators and adverse environmental conditions on egg and larval survival. The migration pattern disperses the eggs over large areas of the shelf and probably aids in maintaining spawning fish in areas where bottom temperatures are between 54 and 66° F (Smith 1973). The October/November spawning peak coincides with the breakdown of thermal stratification on the continental shelf and the maximum production of autumn plankton which is characteristic

of temperate ocean waters of the northern hemisphere. Thus the timing of peak spawning assures a high probability of adequate larval food supplies (Morse 1981).

5.3.7. Mortality

The instantaneous natural mortality rate (M) is assumed to be 0.2 for age 1 and older fish (USDC 1990b). This equates to an annual rate of 18%. Total mortality estimates based on State and Federal surveys increased steadily from 1976 to 1986. Pooled cohorts (survey data) showed a less clear pattern, but mortality rate in recent years appears to be higher than in earlier years: total mortality averaged 2.3 between 1985 and 1989 compared to 1.2 between 1978 and 1984. Estimates of Z from the MRFSS ranged from 0.81 to 1.58. However, these estimates of total mortality rate may not be as reliable as estimates from virtual population analysis (USDC 1990b).

A virtual population analysis was performed on ages 0 to 4 and ages 5 plus in late 1990 (USDC 1990b). The fishing mortality rate on fully recruited ages was around 1.4 between 1982 and 1988 (Table 15). The analysis indicated that the stock has been overexploited for several years. The 1988 year class, the last in the time series, and the total estimated stock size in 1988 are the lowest values (Table 15).

5.3.8. Yield Per Recruit

Calculations of YPR (yield per recruit) were made using the Thompson-Bell (Ricker 1975) method (USDC 1990b). Maturity estimates as presented in 5.3.5 were used. A constant instantaneous natural mortality rate of 0.2 was used. Recruitment was calculated to be age 0 = 0.05, age 1 = 0.50 and ages 2 plus = 1.0. With the revised input parameters, $F_{0.1}$ = 0.14 and F_{max} = 0.23 were obtained as new estimates of the biological reference points (Figure 9).

Spawning stock biomass per recruit declines markedly with increasing fishing mortality (Figure 9). The spawning stock biomass per recruit concept allows egg production for the population to be directly linked with F. Egg production is highest without any F and can be increased by decreasing or delaying mortality. Current levels of F (1.4) would correspond to a spawning stock biomass level of about only 2 to 3% of the maximum level (Figure 9).

5.3.9. Predator/Prey and Species Coexistence

Summer flounder are active, voracious feeders with fish making up a very significant part of their diet. They are most active during daylight hours and may be found well up in the water column as well as on the bottom (Olla *et al.* 1972). Included in their diet are: winter flounder, northern pipefish, Atlantic menhaden, bay anchovy, red hake, Atlantic silverside, American sand lance, bluefish, weakfish, mummichog, rock crabs, squids, shrimps, small bivalve molluscs, small crustaceans and snails, marine worms and sand dollars (Bigelow and Schroeder 1953 and Poole 1964).

All of the natural predators of adult summer flounder are not fully documented, but larger predators such as large sharks, rays, and goosefish probably include summer flounder in their diets. Larval and juvenile summer flounder undoubtedly are preyed upon until they grow large enough to fend for themselves. Results of food habit studies by NMFS from 1969-72 showed that Pleuronectiformes occurred in the stomachs of the following fish eating species: spiny dogfish, goosefish, cod, silver hake, red hake, spotted hake, sea raven, longhorn sculpin, and fourspot flounder (Bowman *et al.* 1976). These data do not indicate the proportion of summer flounder among the flatfish prey but it is likely they are represented.

The composition and distribution of fish assemblages in the Middle Atlantic Bight was described by Colvocoresses and Musick (1979) by subjecting NMFS bottom trawl survey data to the statistical technique of cluster analyses. Summer flounder, scup, northern sea robin, and black sea bass, all warm temperate species, were regularly classified in the same group during spring and fall. In the spring this group was distributed in the warmer waters on the southern shelf and along the shelf break at depths of approximately 500 ft. During the fall this group was distributed primarily on the inner shelf at depths of less than 200 ft where they were often joined by smooth dogfish.

The ecological relationship between juvenile summer flounder and southern flounder was studied by Powell and Schwartz (1977) in North Carolina estuaries. The spatial distribution of the two species relative to each other appeared to be related to the salinity gradient. Southern flounder were dominant at low salinities (less than 11 ppm) while summer flounder were dominant at intermediate to high salinities (12-35 ppm). In a study of meroplankton in North Carolina estuaries, Williams and Deubler (1968) found that the distribution of gulf flounder was also controlled by salinity to some degree, finding the species only in salinities ranging from 22-35 ppm. Benthic substrate also appeared to influence summer flounder and southern flounder distributions. Summer flounder were dominant in sandy substrates while southern flounder were dominant in muddy substrates (Powell and Schwartz 1977).

5.3.10. Parasites, Diseases, Injuries, and Abnormalities

The parasites of the summer flounder have not been studied extensively (MacPhee, 1975), but Wilson (1932) mentions that they are afflicted with the fish lice *Argulus laticauda* and *Argulus megalops* and the copepods *Acanthocandrea galerita* (Rathbun) and *Lepioptheirus edwardsi.*

Mahoney *et al.* (1973) described a fin rot disease which affected summer flounder in the New York Bight. External signs of the disease were fin necrosis, skin hemorrhages, skin ulcer, and occasional blindness. In summer flounder necrosis usually began on dorsal and anal fins. The agent of the disease was apparently bacterial. Summer flounder in captivity also suffer from vibriosis, occurring when they are exposed to stressful conditions such as high temperatures, overcrowding, and dirty water (MacPhee 1975).

Abnormalities in summer flounder include incomplete ambicoloration, total ambicoloration, incomplete eye rotation, and hooked dorsal fin (Hussakof 1914; Gudger 1935 and 1936; Pearson 1932; Deubler and Fahy 1958; White and Hoss 1964; and Powell and Schwartz 1972).

5.4. MAXIMUM SUSTAINABLE YIELD

There are no generally accepted, current, numeric estimates of maximum sustainable yield (MSY) for summer flounder.

Several of the reasons for not fully supporting the 45 million lb MSY estimate (Chang and Pacheco 1975) developed more than a decade and a half ago were addressed in the original FMP. Chang and Pacheco (1975) fully recognized these limitations to their data and recommended: "Better information of effort and age characteristics from both commercial and recreational landings is needed".

Although no attempts are being made here to totally dismiss the general concept of MSY, it was believed at the time of the original FMP that there was no merit in embracing the only published numeric estimate of MSY (Chang and Pacheco, 1975). Methodologically, Chang and Pacheco (1975) used a valid stock assessment approach and used the only data available to them. While the original Summer Flounder FMP did not use the MSY of Chang and Pacheco (1975) and the NEFC cannot support that specific numeric estimate, mainly because the fishery and the populations were not in equilibrium when the estimates were developed (Anthony pers. comm.), it is possible the MSY estimate is not in gross error. Over the past two decades (1970-1989) commercial landings have averaged 25.1 million lbs (Table 1). The recreational catch during the past decade has averaged 30.4 million lbs (Table 3). If the mortality from the two fisheries had been restricted to the 45 million lb (20,000 mt) MSY estimate, certainly the stock would not be in as extensive of an overfished condition as it is today. With the current condition of the stock, the management measures that are being proposed (section 9) would restrict mortality to levels that are close to the Chang and Pacheco estimate.

The paper by Chang and Pacheco (1975) also presented a stock recruitment (S-R) relationship which has generated significant controversy. Because an S-R relationship is necessary for any analysis of risk associated with various fishing reduction strategies and because of the controversy associated with the use of the Chang and Pacheco S-R relationship, attempts were made to estimate alpha using alternative techniques based on the life history parameters (Table 16). Specifically, these methods estimate alpha, the slope of the origin of the S-R curve. Alpha can also be defined as the rate at which the population could grow if there was no inhibition due to parent stock size. Based on the five separate methods (Table 16), a mean alpha of 2.53 was

calculated and used in the GENMOD simulations (section 9). The beta term of the S-R relationship was estimated by incrementally adjusting the S-R relationship to derive an MSY value of approximately 45 million pounds.

5.5. PROBABLE FUTURE CONDITION

The future condition of a stock is dependent upon the recruitment, growth, natural mortality and fishing mortality that the current stock is undergoing. The following paragraphs summarize the important parameters from the above discussion and project where the future stock will be in relation to the current fishery.

The 602 guidelines to the Magnuson Act state that "overfishing is a level or rate of fishing mortality that jeopardizes the long term capacity of a stock or stock complex to produce MSY on a continuing basis. Each FMP must specify, to the maximum extent possible, an objective and measurable definition of overfishing for each stock or stock complex covered by that FMP, and provide an analysis of how the definition was determined and how it relates to reproductive potential."

Overfishing in the Summer Flounder FMP (MAFMC 1991) is defined as fishing in excess of the F_{max} level. F_{max} is a biological reference point that corresponds to the level of fishing mortality (F) that produces the maximum yield per recruit. Based on current analysis (USDC 1990b), F_{max} is 0.23.

Recent stock assessment information indicates that summer flounder stocks are severely overfished. Current fishing mortality rates (F) are at least 1.4 and could be as high as 2.1. Thus, there is at least a six fold difference between the F_{max} and the current F. In order to achieve F_{max}, current exploitation rates would have to be reduced by 73%.

Long term trends in abundance and recruitment of summer flounder, derived from several local and coastwide surveys, indicate that the summer flounder stock has been so reduced that current levels of abundance are less than 20% of the stock size measured in the late 1970's. Based on current levels of exploitation, spawning stock biomass (SSB) levels are 2-3% of the virgin or unfished biomass level. SSB levels should be at least 20% of the unfished level, based on analysis conducted on other species, to allow the stock to sustain itself over an extended period of time.

Survey indices also indicate that the 1988 year class was almost a complete failure and the 1989 and 1990 year classes "no better than average." In addition, age composition of the summer flounder stock is severely compressed. In fact, the coastwide NEFC survey did not collect any summer flounder older than age 3 in the 1990 survey although a decade ago summer flounder as old as age 10 were collected (Table 4).

Because of high fishing mortality rates, both the commercial and recreational fisheries depend primarily on recruitment each year to support the fisheries. Preliminary landings information indicates that commercial landings were 10.0 million pounds in 1990. Landings in 1990 represented a significant decline from 1989 landings (17.9 million pounds) and an even larger decline compared to the ten year average, 1980 to 1989 (27.9 million pounds).

Preliminary MRFSS data indicate recreational landings were approximately 5.4 million pounds in 1990. Compared to 1989 landings (3.2 million pounds; an 83% decline compared to 1988 landings), which were the lowest in the time series, 1990 landings were 41% greater. However, 1990 landings were still well below the ten year average of 19.0 million pounds.

The Council and ASMFC Management Board considered a large number of strategies to reduce the fishing mortality rate to F_{max}, ranging from achieving F_{max} in the first year of FMP implementation to equal fishing mortality rate reductions over ten years. The Council and ASMFC Board adopted the following strategy: "Fishing mortality on summer flounder should be reduced to 0.53 in the first year of the management program and be maintained at that level through year 3. This requires a reduction in exploitation of approximately 47% in the first year. In year 4 and subsequent years, the target F would be F_{max} (0.23)." The adopted strategy gives primary consideration to a high probability of reaching F_{max}, balanced against reasonable impacts on the fishermen.

6. DESCRIPTION OF HABITAT

6.1. DISTRIBUTION OF THE SPECIES, HABITAT REQUIREMENTS, AND HABITAT OF SUMMER FLOUNDER

6.1.1. Distribution of the Species and Habitat Requirements

Summer flounder range from the Gulf of Maine to Florida with the greatest concentration of fish south of Cape Cod (section 5.1). Morphometric and meristic characteristics of summer flounder suggest at least two distinct populations (Wilk *et al.* 1980 and Fogarty *et al.* 1983). The Middle Atlantic Bight population (it is possible there may be subpopulations within this population) includes fish found between Cape Cod and Cape Hatteras generally, whereas the South Atlantic Bight population consists of fish south of Cape Hatteras.

Summer flounder migrate seasonally, though their movement is often not extensive relative to highly migratory species such as bluefish and swordfish. Adults migrate during late fall and winter months from their summer grounds close along ocean beaches and estuaries. They remain in shelf waters (Bigelow and Schroeder 1953), primarily on the wintering grounds located between Norfolk and Veatch Canyons east of Virginia and Rhode Island, respectively, although they are known to migrate as far northeast as Georges Bank. The southern population is believed to undertake less extensive offshore migrations (Fogarty *et al.* 1983). Tagging studies reveal that some adult fish migrate little and remain permanent residents in the northern segment of the Mid-Atlantic Bight (Lux and Nichy 1980), as well as possible year round residents in Delaware Bay (Smith and Daiber 1977). Tagging studies currently being conducted in Virginia (Desfosse *et al.* 1988) preliminarily indicate the contention of two subpopulations of summer flounder in Virginia inshore waters.

Adult summer flounder return inshore to coastal waters in April through June. In Delaware Bay, the greatest number of fish were captured from the shoreline to a maximum depth of 75 feet from May through September (Smith and Daiber 1977). Optimal habitat areas are shallow coastal waters having salinities higher than 28%, sandy bottoms, especially near inlets, and locations having fast flowing current or wave action (Powell and Schwartz 1977). Tagging studies conducted by Poole (1962) and Lux and Nichy (1980) on summer flounder released off Long Island and southern New England revealed that fish usually began seaward migrations in September and October. Recaptures demonstrated that adults migrated as far as 140 miles eastward to Veatch Canyon and 210 miles southward to the Baltimore Canyon area.

Spawning habitat occurs over the entire shelf between Cape Cod, Massachusetts, and Cape Lookout, North Carolina. Spawning begins in September in the northern most area and progresses through February south of Chesapeake Bay (Smith 1973). Optimal spawning areas have bottom water temperatures between 53 and 66° F. There is no evidence that salinity has any effect on spawning or distribution on eggs. Based upon the sampling of eggs, Smith (1973) concluded that spawning peaked in October north of Chesapeake Bay and in November south of the Bay. The great majority of eggs were taken over depths ranging from 60 to 100 feet (Smith 1973).

Spawning peaks in fall but extends from September through February (Able *et al.* 1990). While eggs and larval stages are found only at sea, juveniles are found only in or near the mouths of estuaries, indicating that the young are estuarine dependent. Summer flounder larvae enter estuarine areas soon after hatching, generally from February through April. Peak immigration periods of summer flounder larvae through Beaufort Inlet and into North Carolina estuaries were from late February through March for the years 1986 - 1988 (Monaghan pers. comm.). Estuaries along the Virginia and North Carolina coastline are believed to be principal nursery habitat for young of year flounder. Orth and Heck (1980) determined that post larvae utilize eel grass (Zostera) beds of the lower Chesapeake Bay as principal habitat areas. Juvenile flounder were found to concentrate in sea grass beds during late summer and fall, whereas earlier in the year the fish were more randomly dispersed in the bays (Weinstein and Brooks 1983). Post larval summer flounder, collected in North Carolina estuaries, have been found in waters ranging in salinities from 0.02 to 35°, with optimal conditions at 18° (Williams and Deubler 1968). Norcross and Wyanski (1988) presented evidence that juvenile summer flounder require shallow, mud bottom habitats during their first months of life. These nursery areas often are found adjacent to, and within, salt marshes. In estuaries north of Chesapeake Bay, juveniles remain in their estuarine habitat for about 10 to 12 months before migrating offshore their second fall and winter. In North Carolina sounds, they often remain for 18 to 20 months.

6.1.2. Habitats of Summer Flounder

Open ocean areas of the continental shelf that are used for summer flounder spawning (Figure 1) are critical for the survival of this species. Estuaries and inshore oceanic water habitats are also critically important to the life cycle of summer flounder. These areas are also utilized for summer feeding by summer flounder adults and as nurseries by juveniles. Major alterations to the habitat could be disruptive to the species' life cycle.

Summer flounder larvae begin development at sea, then are moved into estuaries by wind and currents because the larvae are pelagic (Williams and Deubler 1968). Spawning success and, therefore, recruitment, is often determined during the larval and early juvenile stages, and these life stages are greatly impacted by the prevailing environmental conditions. Poole (1966) stated that published and unpublished reports indicate primary nursery grounds for juveniles are the sounds of North Carolina, Chesapeake Bay, and the bays of the eastern shore of Virginia; however, juveniles are distributed in spring, summer, and fall in estuaries from Massachusetts to North Carolina. Early juvenile stages of summer flounder have been captured only in estuaries, suggesting estuarine dependence. Their tolerance to wide ranging temperatures (36 - 72° F) and salinities (0.02 - 35‰) further suggests that they are physiologically adapted to estuarine nursery grounds (Smith 1973).

The Council, attempting to coordinate and obtain the best information available, requested each State from North Carolina to Maine to identify the essential summer flounder habitat under their jurisdiction. The following paragraphs are paraphrased from the responses of the States' summer flounder experts.

Summer flounder habitats vary with life stage; the most important habitats are the spawning areas on the continental shelf for summer flounder (Figure 1). The coastal areas that also serve as nursery and feeding areas for summer flounder are essential to their survival. Migratory pathways are recognized as important habitat because of the range of environmental conditions and contaminants to which summer flounder are exposed.

Important habitat in North Carolina for summer flounder was identified by Monaghan (pers. comm.), who agreed with the studies of Powell and Schwartz (1977). They found that small juvenile summer flounder were most abundant in the relatively high salinities in the eastern and central parts of Pamlico Sound, all of Croatan Sound, and around inlets. Powell and Schwartz (1977) also noted that small juvenile summer flounder were most abundant in areas with a predominantly sandy substrate, or where there was a transition from fine sand to silt and clay. Street (pers. comm.) mentioned that summer flounder distribution varied in response to salinity changes. In dry years the area of higher salinity greatly expands in Pamlico Sound, and nursery areas similarly expand. Certainly, substrate and salinity preferences are valuable as this species grows.

The most important nursery areas for summer flounder in Virginia appear to be in the lagoon system behind the barrier islands on the seaside of the Eastern Shore, and the shoal water flat areas of higher salinity (greater than 18 ppm) in lower Chesapeake Bay (Musick pers. comm.). Young of the year enter these nursery areas in early spring (March and April) and remain there until fall when water temperatures drop. Then these yearlings move into the deeper channel areas and down to the lower Bay and coastal areas. In most winters these age 1+ fish migrate out in the ocean but in warmer years some may remain in deep water in lower Chesapeake Bay (Musick pers. comm.). In addition to the use of Virginia habitats by summer flounder for nursery areas, subadults and adult flounder use the Eastern Shore seaside lagoons and inlets and the lower Chesapeake Bay as summer feeding areas. These fish usually concentrate in shallow warm water at the upper reaches of the channels and larger tidal creeks on the Eastern Shore in April, then move toward the inlets as spring and summer progress. They are most abundant in the ocean near inlets by July and August. In Chesapeake Bay, the summer flounder first arrive in numbers in mid-April then remain in the Bay till late September or early October (Musick per. comm.).

Virginia's Artificial Reef Program provides additional suitable habitat for summer flounder, with four Atlantic Ocean reef sites and three Chesapeake Bay reef sites. Reef materials include discarded vessels, automobile tires, and fabricated concrete structures. Colonization of reef materials by encrusting marine and estuarine life forms provides food and shelter for many finfish species. Summer flounder were taken in fair abundance (Travelstead pers. comm.).

Maryland's coastal bays, rich in benthic invertebrates which form the bulk of young of year food sources, are excellent summer flounder habitat (Casey, pers. comm.). Casey (pers. comm.) indicated that in areas where notable pollution exists, a lack of proper food sources preclude the presence of summer flounder. Areas which lack sufficient water circulation appear to have considerably reduced populations. Shoreside development and resultant runoff also appear to have reduced some local populations (Casey, pers. comm.). Since the early 1970s, Maryland has been conducting trawl and seine surveys around Ocean City inlet. Casey (pers. comm.) reports that over the past few years, however, sharp declines in young of year flounder have been noted in coastal bay trawl samples. The majority of the summer flounder taken in this sampling are between 3" and 4", with larger fish basically absent. Summer flounder are sometimes found in Maryland's portion of the Chesapeake Bay with the majority of these fish in the 8" to 12" range.

Delaware Bay is an important nursery and summering area for both juvenile and adult summer flounder (R. Smith pers. comm.). Post larvae find their way into Delaware's waters during early spring, they remain and grow, some throughout the warm months, some even into their second year. Juvenile summer flounder (ages 1 and 2) have been captured in Delaware Bay during all months of the year, however they are most common from April to November, as are the adults (R. Smith pers. comm.). Delaware's coastal bays are used by summer flounder as nursery and summering areas, but their overall importance is not well documented. Young of year flounder are often found in shallow near shore areas, and thus, shoreline development potentially could have negative impacts.

The total contribution of New Jersey's estuaries from Sandy Hook Bay to Delaware Bay as nursery areas cannot presently be quantified, but these estuaries provide viable nursery habitat during most years (Freeman pers. comm.). Tagging studies by Murawski (1970) provided recaptured summer flounder from the entire New Jersey coastline (Figure 10). Summer flounder overwinter offshore of New Jersey in 100 to 600 ft of water. Freeman (pers. comm.) therefore states that all of the ocean waters off New Jersey to the 600 foot line should be considered essential habitat for migratory pathways, spawning, and overwintering.

The intertidal areas and shallow bays of the south shore of Long Island are of unknown importance to young of year summer flounder. Young of year under 3" are found in beach seines in low numbers every year (striped bass survey on the Hudson River and around Long Island). Commercial trawlers have collected samples of yearling summer flounder in the inner New York bight during January and February, supporting the offshore juvenile hypothesis of Able (Castenada pers. comm.). Based on the recently revised ageing protocol, supported by the work of Able and others, it is yearling summer flounder which enter New York waters from early May through October. Long Island's coastal bays and the Hudson - Raritan estuary support major concentrations of fast growing juveniles, which in turn support a May through October intensive sport fishery. In most years more fish are released as undersized than kept, especially early in the season. With the exception of 1987 and 1988 young of year summer flounder from 8" to 12" are recruited to hooks in the sport fishery by August (Castenada pers. comm.). The sandy bottoms of the inshore and near shore waters of New York, particularly areas around inlets and bay mouths, are critical to juvenile (yearling) summer flounder. The importance of State waters to larval and young of year summer flounder is not known. It may be that the habitat critical to the early life states of summer flounder lies in the EEZ, particularly in the northern end of its range (Castenada pers. comm.).

Summer flounder migrate from offshore, overwintering grounds to inshore waters of Connecticut in late April and early May (E. Smith pers. comm.). Summer flounder are present in Long Island Sound throughout the April - November trawl survey period, and probably occur in limited numbers in winter as well (Simpson pers. comm.). Peak abundance is from August to October. Summer flounder are ubiquitous in summer, occurring on all bottom types, in the deepest sites sampled by trawl (150 ft) as well as in water as shallow as three feet. Survey indices indicate a tendency toward shallow water (<30 ft). Salinity range appears to be at least to 15‰ and greater. The trawl survey usually takes 400 to 700 fish in 320 tows per year. In 1989, only 47 fish were taken (Simpson pers. comm.). From the Marine Angler Survey, about two-thirds of the sport summer flounder catch is from east of the Connecticut River, while the trawl survey catches indicate that the greater New Haven area is also important (Figure 11).

Adult and juvenile summer flounder have been observed within the full range of Narragansett Bay (Lynch pers. comm.). In addition the coastal waters of Rhode Island, the immediate waters surrounding Block Island, and

the waters of Little Narragansett Bay, all provide critical habitat for these three species. Larval occurrence within Rhode Island waters have been documented for these species. Lynch (pers. comm.) concludes that all the territorial waters of the State of Rhode Island are critical to the various life stages of these three species.

Summer flounder in Massachusetts migrate inshore in early May to their spring and summer feeding grounds that consist of the entire shoal area south of Cape Cod and Buzzards Bay, Vineyard Sound, Nantucket Sound, and the coastal waters around Martha's Vineyard (Figure 12). In some years summer flounder are found along the eastern side of Cape Cod and as far north as Provincetown by early May. Summer feeding grounds also include the shoal waters in Cape Cod Bay (Howe pers. comm.). Massachusetts considers the shoal waters of Cape Cod Bay and the region east and south of Cape Cod, including all estuaries, bays, and harbors thereof, as critically important habitat (Howe pers. comm.). Summer flounder begin moving offshore in late September and October. Howe (pers. comm.) believes that spawning occurs within territorial waters south of Cape Cod because occasional ripe and running fish have been taken there (Figure 12). Summer flounder are regularly taken in southern Massachusetts waters as late as December, presumably as fish are dispersing to offshore wintering grounds. In most years the wintering grounds are well out on the continental shelf from approximately Veatch Canyon to Baltimore Canyon. The winter of 1985-86 was unusual with anomalous overwintering occurring near shore (Figure 12). Howe (pers. comm.) states that in years following a build up in the local adult summer flounder population (1974-76 and 1982-85), comparatively "strong" cohorts, represented by age 0+ flounder, have been captured in early summer in estuaries along the southern shore of Cape Cod and in Buzzards Bay. Thus local nursery grounds are recipients of young fish from a northern spawning. Massachusetts considers their coastal embayments as primary nursery grounds and of critical importance in augmenting the more traditional sources of recruits from the "offshore stock".

Summer flounder in New Hampshire are not abundant (Nelson pers. comm.). New Hampshire does consider various estuaries important as food sources for visiting adults.

In Maine, summer flounder is regarded as a straggler in the Gulf of Maine (Honey pers. comm.).

6.2. HABITAT CONDITION

Summer flounder are exposed to a full range of human activities during their life history. Assessments made by the Ocean Pulse and Northeast Monitoring Programs indicate extensive, detrimental amounts of toxic organic and inorganic contaminants, such as heavy metals, PCBs, and petroleum hydrocarbons in the various physical compartments of the marine ecosystem (Boehm and Hirtzer, 1982; Boehm, 1983; Pearce, 1979; Reid *et al.* 1982). This is particularly true for sediments in the Mid-Atlantic Bight that receive contaminated dredged materials, sewage sludge, and industrial wastes. Elevated levels of petroleum hydrocarbons have even been found in all estuaries as far north as Maine. Elevated PCB levels have been found in sediments and biota in Buzzards Bay, in the New York Bight apex, as well as other locations (Reid *et al.* 1982).

Most research on the toxicological effects of various contaminants in fish is recent and ongoing. Many anomalies probably have not been described or their magnitude documented. The Councils encourage fishermen to report or provide fish with tumorous type growths to: Dr. John C. Harshberger, Director, Registry of Tumors in Lower Animals, Smithsonian Institution, Museum of Natural History, Washington, DC 20560 (202-357-2647) or to Mr. Martin Newman, NMFS, Oxford Laboratory, Railroad Ave., Oxford, MD 21654 (301-226-5193).

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

economic developments.

Toward this goal, NMFS issued its formal Habitat Conservation Policy in November 1983 (48 *FR* 53142-53147). The goal of the policy is: "to maintain or enhance the capability of the environment to ensure the survival of marine mammals and endangered species and to maintain fish and shellfish populations which are used, or are important to the survival and/or health of those used, by individuals and industries for both public and private benefits: jobs, recreation, safe and wholesome food and products". The Habitat Conservation Policy provided impetus to NMFS's Regional Action Plan (RAP) process which is to foster coordinated management and research responses to major habitat conservation issues and problems, and to develop better steps to address them in the future (USDC 1985).

The RAP process identified six water management units in the Northeast region (Figure 13). The boundaries of each water management unit (WMU) were established on the basis of the biogeographic consistency of the entire WMU and its distinctness from other WMUs. Each WMU is relatively consistent in its physical and chemical characteristics with normal latitudinal and seasonal variations in temperature, salinity, and nutrient content. The biota include both endemic and migratory species that exhibit normal seasonal fluctuations in species composition, individual population size, and geographic distribution. These six units are: Coastal Gulf of Maine, Gulf of Maine, Georges Bank West to Block Channel, Coastal Middle Atlantic, Middle Atlantic Shelf, and Offshelf (USDC 1985).

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

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

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

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

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

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

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

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

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

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

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

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

health is declining or threatened.

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

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

6.3. GENERAL CAUSES OF POLLUTION AND HABITAT DEGRADATION

6.3.1. General Habitat Degradation Threats

The Council, in efforts to coordinate with NMFS, has adopted the NMFS Regional Action Plan (USDC 1985), which identified environmental threats as potential issues that may affect the summer flounder habitat.

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

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

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

The following discussion identifies and describes each multiple use issue and the potential threats associated with that issue (USDC 1985). For the purposes of this discussion, an "issue" is a point of debate or controversy evolving from any human activity, or group of activities, that results in an effect, product, or consequence.

6.3.1.1. Waste disposal and ocean dumping

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

Ocean disposal of sewage sludge, industrial waste products, dredged material, and radioactive waste degrades water quality and associated habitats. The deep water dump site is 106 miles offshore, and is in the heart of the summer flounder spawning area. Concentrations of heavy metals, pesticides, insecticides, petroleum products, and other toxics all contribute significantly to degradation of waters off the northeastern States. All of the contaminants are likely to have significant affects on the survivalibility and genetic fitness of eggs and larvae in the spawning area. Organic loading of estuarine and coastal waters is an emerging problem.

Symptoms of elevated levels include excessive algae blooms, shifts in abundance of algal species, biological oxygen demand (BOD) increases in sediments of heavily affected sites, and anoxic events in coastal waters. Changes in biological components are a consequence of long term ocean disposal. Harmful human pathogens and parasites can be found in biota and sediments in the vicinity of ocean dump sites. In addition, shellfish harvesting grounds have been closed because of excessive concentrations of pathogenic and indicator species of bacteria.

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

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

6.3.1.2. Coastal urbanization

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

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

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

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

Water that is not lost through consumptive uses is returned to the rivers or streams as point source waste

water discharges. Although the waste water generally is treated, it still contains contaminants. Domestic waste water contains residual chlorine compounds, nutrients, suspended organic and inorganic compounds, trace metals and bacteria. Industrial discharges may contain many dissolved and suspended pollutants, including metals, toxic substances, halogenated hydrocarbons, petroleum products, nutrients, organics and heat.

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

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

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

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

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

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

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

6.3.1.3. Energy production and transport

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

The impacts on the marine and estuarine environment resulting from the various types of power plants include water consumption, heated water and reverse thermal shock, entrainment and impingement of organisms, discharge of heavy metals and biocides in blow down water, destruction and elimination of habitat, and

disposal of dredged materials and fly ash (USDC 1985).

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

6.3.1.4. Port development and utilization

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

6.3.1.5. Agricultural development

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

6.3.1.6. Marine mineral extraction

Mining for sand, gravel, and shell stock in near shore coastal and estuarine waters can result in the loss of infaunal benthic organisms, modifications of substrate, changes in circulation patterns, and decreased dissolved oxygen concentrations at deeply excavated sites where flushing is minimal. Sand and gravel mining tends to result in suspended materials at the mining sites, and turbidity plumes may move several miles from individual sites. Mining also results in ranges in sediment type or sediment quality, often over areas measurable in square miles. Deep borrow pits created by mining may become seasonally or permanently anaerobic (USDC 1985).

6.3.1.7. Coastal and wetland use and modification

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

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

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

In addition to residential and recreational development, other competing uses further contribute to the destruction or modification of wetland areas. Agricultural development can significantly affect wetlands. Common flood control measures in low lying coastal areas include dikes, ditches, and stream channelization.

Wetland drainage is practiced to increase tillable land acreage. Wildlife management techniques that also destroy or modify wetland habitat include the construction of dredged ponds, low level impoundments, and muskrat ditches and dikes (USDC 1985).

The NMFS priorities on the multiple use issues and threats to living marine resources were identified in the RAP document (USDC 1985). Activities identified as high priority included urban and port development, ocean disposal, dams and agricultural practices. Medium priority activities included industrial waste discharges, domestic waste discharges, and OCS oil and gas development (Table 17).

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

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

The MFCMA established Regional Fishery Management Councils that have the responsibility to prepare fishery management plans which address habitat requirements, describe potential threats to that habitat, and recommend measures to conserve those habitats critical to the survival and continued optimal production of the managed species. The NMFS Habitat Conservation Policy (48 *FR* 53142 - 53147), specifically Implementation Strategy 3, established the basis for a partnership between NMFS and the Councils to assess habitat issues pertaining to individually managed species.

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

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

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

Other legislation under which NMFS provides comments relative to potential impacts on living marine resources, their associated habitats, and the fisheries they support include, but are not limited to, the Coastal Zone Management Act of 1972; the Marine Protection, Research, and Sanctuaries Act of 1972; and the Endangered Species Act of 1973 (Section 7 consultation).

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

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

Individual States also regulate wetlands, which complements Federal habitat conservation programs.

6.5. HABITAT PRESERVATION, PROTECTION AND RESTORATION RECOMMENDATIONS

Management of fisheries requires both control of fishing mortality (by the Councils) and preservation and restoration of habitat (by EPA and the Corps of Engineers). The Council intends to work closely with these other agencies for habitat preservation.

As stated in section 4, summer flounder are overexploited. Recognizing that the stock of summer flounder is in poor shape, it is worthwhile to stress habitat conservation for increasing the survivability of juveniles, as well as management actions to control fishing mortality, which will strengthen the use of the habitat information in meeting the MAFMC mandates that "irreversible or long term adverse effects on fishery resources and the marine environment are avoided".

Commercial landings of summer flounder fell significantly during the 1980s, from the 40 million pound high in 1979 (section 5.2). Landings for 1989 were less than 18 million pounds. Numerous State survey indicators of summer flounder abundance showed extremely low abundance for 1988 (section 5.2). Fishing mortality rates are excessive (at least six times the F_{max} level) relative to desirable levels (section 4), but the loss of habitat is probably also a significant reason for the decline of summer flounder.

At present, both commercial and recreational catches of summer flounder are comprised primarily of ages 0-2 fish. Individuals of this species have previously been known to live up to 20 years, yet older, larger fish are now infrequent. Such age class compression poses great risk to recruitment because the older, more fecund spawning adults are being too rapidly removed from the population and nearly all of the new recruits are being spawned by individuals that only get to spawn once or twice before they are killed.

Summer flounder are highly dependent on estuarine habitats (section 6.1) for much of their prespawning life. It is precisely these habitats that are most vulnerable to anthropogenic impacts and loss. While fishing mortality may be the primary reason for these population declines, the essential habitat areas designated by the States (section 6.1.2) must be protected in order to allow summer flounder populations to rebuild and be maintained when fishing mortality is decreased.

In order to resolve the above problems and prevent overfishing, very significant reductions in fishing mortality will be required. The reductions in fishing mortality are needed to reduce the risk of stock failure. The Council has the ability to control the fishing mortality and reduce that component of risk through the Magnuson Act.

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

It is the policy of the Mid-Atlantic Fishery Management Council (MAFMC 1987 and 1989) to oppose any loss of essential aquatic habitat or wetlands which contributes to the conservation of fish stocks. Where loss of habitat is unavoidable locally, the Council endorses recreation of quantitatively and qualitatively equivalent habitat. The Council recognizes the multiple resource base of our coastal areas and recognizes the need to accommodate other natural resource management objectives with special sensitivity to goals that may be contrary to the objectives of fishery management. The intent of the Council is to support "no net loss" of fishery habitat while minimizing all detrimental alterations of these essential habitats.

This policy will allow the MAFMC to optimize the management of fisheries in the mid-Atlantic EEZ through a concerted effort to establish a quality habitat and to seek to reverse the serious problems affecting the reproduction, size frequency and distribution of fish. The Council will accomplish this through participation in the review of private and government projects which would adversely affect fish production. The Council will also become involved in review of activities which adversely affect the safety of fish products which are intended for direct or indirect human consumption.

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

1. All available or potential natural habitat for migratory summer flounder should be preserved by encouraging management of conflicting uses to assure access by the fish to important habitat and maintenance of high water quality standards to protect summer flounder migration, spawning, nursery, overwintering, and feeding areas.

2. Filling of wetlands should not be permitted in or near nursery summering areas. In particular, filling of wetlands should not be permitted in the lagoon system behind the barrier islands on the seaside of the Eastern Shore of Virginia and North Carolina because of its importance to summer flounder. Project proponents must demonstrate that project implementation will not negatively affect summer flounder, their habitat, or their food sources.

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

4. The disposal of sewage sludge, industrial waste, and contaminated (contaminated means any substance that could affect the fish directly, its habitat, the food chain, or the public's perception of those parts of the ecosystem) dredged material in summer flounder habitat, including the New York Bight, should not be allowed. Advanced garbage, industrial waste, and sludge handling techniques are now available and must be encouraged. Specifically:

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

b. It is urgent that appropriate agencies enforce all existing laws and regulations until ocean dumping ceases. Emphasis must be placed on prevention of short dumping and required release rates.

c. The Council requests EPA to require each permitted ocean dumping vessel be required to furnish detailed information concerning each trip to the dump site. This might be in the form of transponders; locked Loran C recorder plots of trip to and from the dump site; phone call to EPA when vessel leaves and returns to port; or other appropriate method to ascertain that vessels dump only in the 106 area and take legal action to abate illegal (short or improper) material dumping.

d. The Council requests fishermen and other members of the public to report to the EPA, Coast Guard and the Council any observance of vessels dumping other than in the approved dump sites. A list of permitted vessels would accompany this request with the additional request for reporting of any vessel not on the approved list. The report should include date, time, location (longitude, latitude, Loran bearings), vessel name of the dumping vessel, the nature of the material dumped, name of reporting individual and vessel. This would enable EPA to take appropriate action against illegal dumping.

e. The Council's Executive Director is directed to contact necessary Congressional delegations, as necessary, relative to strengthening current measures being considered to cease ocean dumping by a date certain.

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

g. The Council will take appropriate steps under the Magnuson Act and any other Federal laws and regulations to assure the required responses to its concerns and opposition to dump site 106.

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

6. The siting of industries requiring water diversion and large volume water withdrawals should be avoided in summer flounder critical areas. In particular, due to the link between higher salinity and summer flounder nursery areas, diversions which disrupt the local circulation or dilute existing conditions will adversely impact the use as a nursery area and should be avoided. Project proponents must demonstrate that project implementation will not negatively affect summer flounder, their habitat, or their food supply. Where such facilities currently exist, best management practices must be employed to minimize adverse effects on the environment.

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

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

9. The EPA, for the EEZ, and States, for the coastal zone, should review their water quality standards and make changes as needed with respect to the habitat requirements of summer flounder migratory passage and feeding and to maintain edible summer flounder; that is, flesh and organ buildup of contaminants must be considered.

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

11. Appropriate measures must be taken as soon as possible to reduce acid precipitation and runoff into estuaries and near shore waters.

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

6.6. HABITAT RESEARCH NEEDS

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

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

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

7. DESCRIPTION OF FISHING ACTIVITIES

7.1. DOMESTIC COMMERCIAL FISHERY

Summer flounder support an extensive commercial fishery along the Atlantic Coast, principally from Massachusetts through North Carolina. The most concentrated fishing activity takes place in the EEZ during the North Carolina winter trawl fishery (section 7.1.7), but significant catches are made off the southern New England States and the Delmarva Peninsula.

Landings have fluctuated widely over the last five decades (Table 1), increasing from less than 10 million pounds per year prior to World War II to average around 20 million pounds during the 1950's. Landings consistently decreased during the 1960's until a low of only 6.7 million pounds was reported in 1969. Commercial landings have been consistently high since the mid 1970's, attributable mainly to increased levels of effort in the southern winter trawl fishery. Landings of summer flounder from Maine to North Carolina peaked in 1979 at nearly 40 million pounds (Table 1). Reported landings in 1989 were less than 18 million pounds, a decline of 45% from 1988. These landings were well below the 1980-1989 average of 28 million pounds and are the lowest year in the 1980-1989 time series.

Preliminary data for 1990 show a continuation in the decline of commercial landings: a nearly 50% drop from 1989 levels to 10.0 million pounds landed (Schween 1991). In accordance with its increased scarcity and the effects of inflation, average exvessel value increased 13% from $1.56 to $1.76 per pound between 1989 and 1990.

7.1.1. Landings by State and Fishing Area

From 1980-1989, Virginia and North Carolina combined averaged about 49% of the total commercial landings, while Rhode Island and New Jersey each averaged between 16% and 17% (Table 1). There was significant variability among the States over this time, however. In 1980, Virginia and North Carolina accounted for over 70% of coastwide landings, making it a distinctly southern fishery. In 1985-1986, Massachusetts, Rhode Island, New York and New Jersey accounted for more than half the landings. By 1989, catch again shifted

to the southern States.

Since 1980, an average of 77% of the commercial landings of summer flounder have come from the EEZ. The percentage of landings taken in Federal waters was at its lowest in 1983 at 68% and increased to 92% in 1989 (Table 2). Most States averaged a high proportion of landings from the EEZ throughout the 1980's. In 1989, six States caught over 90% of their total summer flounder from the EEZ.

Though most landings came from the EEZ, the statistical reporting areas (Figure 14) which had the highest catches were nearly all adjoining the coast. Landings from areas 621, 626, and 631 all averaged nearly 2 million pounds between 1983 and 1989. Offshore areas 537 and 622 averaged over two million pounds each, mostly taken in the winter months before summer flounder migrate inshore.

On an individual State basis, Massachusetts and Rhode Island landings were made from areas 526, 537 and 538 or areas south of Cape Cod (Table 18). The majority of New York's landings came from Long Island Sound (area 611) or the two areas, 612 and 613, adjoining the south shore of Long Island. The majority of New Jersey's landings came from their adjoining area, 614 or in the two areas immediately south (areas 621 and 622). The vast majority of Maryland's landings also came from area 621. Major landings for Virginia were made from areas surrounding the Chesapeake Bay, 625, 626, 631, and 632 (Figure 16).

7.1.2. Landings by Fishing Gear

Most commercial landings are made from otter trawl vessels, while the second most important gear is sea scallop dredges (Table 19). Ninety six percent of the summer flounder landings between 1980 and 1989 came from fish otter trawls. When landings from other otter trawls are added to "fish" otter trawls, the average annual landings are over 97%. On average from 1980-1989, sea scallop dredges caught 338,900 pounds. Pound nets were the only other gear that averaged more than 100,000 pounds annually. Small catches of summer flounder were also made with haul seines, floating traps, lines, purse seines, pots and traps, and midwater/pair trawls (Table 19).

Between 1980 and 1989, over 90% of summer flounder were landed annually from otter trawls in all States except New Hampshire and Delaware (Table 20).

Commercial landings of summer flounder from the EEZ were almost exclusively made with fish otter trawls (Table 21). Otter trawls accounted for over 90% of all landings from the EEZ for all States from 1980-1989. This fact, coupled with the high proportion of landings taken from the EEZ for most States, makes otter trawl mesh regulation in the EEZ a very effective management tool for reducing mortality on juvenile summer flounder.

7.1.3. Landings by Season

On average from 1980-1989, 3 million pounds or more of summer flounder were landed for each of the months of November through February, making winter trawling the most significant component of the annual fishery (Table 22). An average of greater than 2 million pounds of summer flounder were landed in October and March also. Average landings of less than a million pounds occurred only during June and July. The months of November, December, January, and February all had more than 10% of the total commercial summer flounder landings (Table 23).

A seasonal pattern of landings is also evident from monthly data by distance from shore, where during January, February, March and April about 90% or more of the landings were EEZ derived (Table 24). Only from June through August were average monthly landings from State waters greater than those from the EEZ. Obviously, commercial fishing effort follows the migration of summer flounder inshore and in a northerly direction during the summer months, but trawling success is closely associated with the offshore concentrations of spawning fish during the winter months. Surprisingly, only New Hampshire, Massachusetts, and Rhode Island landings are far from equivalent from the first six months to the second six months of the year (Table 25).

7.1.4. Landings by Market Category

Classification of summer flounder into categories of "small," "medium," "large," and "jumbo" are available for nearly all States for the past several years, though about one-third of the coastwide landings are left as "unclassified". From 1980-1989, the States of Connecticut and New York classified only negligible amounts of summer flounder landings and North Carolina classified about 60% (Table 26).

While there may not be absolute consistency across States and years in the precise length associated with each size category (Christensen pers. comm.) attempts by NMFS port agents to improve consistency enables average lengths to be associated with each size category. Further analysis of the General Canvas data in this section will be based upon the lengths of 13", 15", 17", and 19" corresponding to the "small," "medium," "large", and "jumbo" categories (New Jersey 1985).

Excluding unclassified landings, the coastwide average size composition of landings from 1980-1989 was: 18% "small," 25% "medium," 21% "large," and 7% "jumbo" (Table 26). The New England States had a higher percentage of summer flounder of "medium" and larger size categories and the percentage of "small" fish generally increases southward. Overall, this would correspond to the seasonal inshore and northward migration of summer flounder. Smaller fish would first be available to the offshore winter trawl fisheries, while individual fish would gain in size before becoming available to the northern inshore fisheries in summer.

7.1.5. Otter Trawl Directed Fishery

Estimates of catch and fishing effort by area, gear, number of trips, and time are obtained by sampling fishing captains and the data are coded using a "weighout" form. The weighout data are a sample rather than a census and do not comprise the entire fishery. Even though the weighout data collection system is limited in geographical coverage (CT, DE, and NC are not included at this time), it is extremely important because the catch is related to particular vessels and effort can be evaluated.

A year by year comparison from 1983-89 between the General Canvas and the weighout data demonstrates that about 70% of the total summer flounder landings from Maine to North Carolina are picked up by the weighout system (Table 27). When Connecticut, Delaware and North Carolina landings are excluded from the 1989 General Canvass, there is almost 100% coverage by the weighout, thus the weighout data covers a large proportion of the complete summer flounder fishery.

Over 97% of the summer flounder that were reported landed between 1983 and 1989 in the weighout system were landed by fish otter trawls (Table 28).

Summer flounder are part of an overall mixed bottom trawl fishery which generally includes: winter flounder, yellowtail flounder, *Loligo*, scup, butterfish, and other species (section 7.1.6). According to 1983-1989 weighout data, mean catch of summer flounder per otter trawl trip was 2,404 pounds or 24% of total trip catch (Table 29). Since summer flounder are landed as bycatch from fisheries directed at other species as well as from directed effort, many small incidental catches can lower the mean catch estimate of summer flounder trips.

Given fishermen's skills in choosing time, area and method of fishing, otter trawl trips directed at summer flounder will likely have a higher proportion of trip catch represented by this species. The problem of incidental trips can be avoided by setting a landings threshold for classifying a trip as directed at summer flounder.

A threshold of 100 pounds per trip restricts analysis to about 56% of otter trawl trips landing summer flounder, yet these trips still account for 99% of the total summer flounder landed from 1983-89 (Table 30). An annual average of 7,950 otter trawl trips landing summer flounder met the 100 pound criteria from 1983-1989, while an annual average of 5,552 landed less than 100 pounds. Trips meeting the 100 pound threshold averaged 3,618 pounds of summer flounder; while trips landing less than 100 pounds averaged 28 pounds of summer flounder, comprising about one percent of total trip catch (Table 30).

7.1.6. Species Composition of the Catch

Generally, sorting of otter trawl caught fish is begun immediately after redeployment of the net. Marketable species are sorted by size category and placed on ice as rapidly as possible. Once the valuable catch is stored, undersized fish and non-marketable bycatch are generally shoveled overboard. Several hours may lapse before discarded fish are returned to the sea, resulting in high discard mortality rates.

Fishery discards (juvenile fish and unmarketable species) are difficult to monitor accurately since they are obviously unavailable to port samplers. The amount of discards in relation to landings is influenced by a variety of factors including: net mesh size, season, area fished, the age or size structure of the population, and the particular regulatory scheme in place. Factors significantly influencing the survival of discarded fish include: degree of net damage, duration of trawl tow, time on deck, handling stress, temperature, water depth and fish size (Murawski 1985).

Weighout data from 1983-89 were examined for species composition for the flounder fishery with landings of more than 100 pounds of summer flounder per trip (Table 31). In general, the species that coexist with summer flounder (section 5.3.9) were also the species that commonly appeared in the directed summer flounder fishery. For otter trawl trips landing at least 100 pounds of summer flounder, principal bycatch species consisted of black sea bass, scup, bluefish, butterfish, winter flounder, mackerel, whiting, and *Loligo*. Other species were also landed in fair quantities, amounting to 30% of the mean catch per trip. The large percent composition of miscellaneous species was mostly in New England waters, however, where other groundfish species such as cod, haddock and other flatfish are more abundant than in the Mid-Atlantic region.

The NMFS contracted with the Manomet Bird Observatory to place observers on US boats beginning in 1989 to collect a variety of data on the vessels, personnel, and catch. In 1990, the sea sampling program found summer flounder caught in 16 3-digit statistical areas (Table 32 and Figure 14), with 58% of the catch coming from areas 621 and 622 (off the mouth of Delaware Bay; Figure 14).

It is important to understand the significance of the sea sampling data. The weighout data discussed above are gathered from dealers and vessel operators by NMFS Port Agents. The weighout data set used to generate the preceding tables (Tables 29-31) contains monthly average landings by vessel sampled in the weighout system. Clearly, during any month a vessel can fish in several areas and experience differing catch compositions. However, the weighout data cannot be dismissed because those data represent the most complete coverage geographically and in number of vessels surveyed. The sea sampling data are tabulated tow by tow by trained personnel, so, while the number of trips covered is relatively small, the data per tow are highly accurate. For example, the weighout data used represent 94,510 trips during the 1983-1989 period (10,828 in 1989 alone; Table 30), while the sea sampling data cover 505 tows during which at least 1 pound of summer flounder was caught in 1990 and 153 tows in which more than 100 pounds of summer flounder were caught in 1990 (Table 33). Note that all of the sea sampling data presented here (Tables 32-34) show the total haulback; in other words, possible discards have not been subtracted. The weighout data set (Tables 29-31) does not include discards.

The sea sampling data were analyzed to identify species caught in conjunction with summer flounder (Tables 33 and 34). For tows when at least 1 pound of summer flounder was caught, summer flounder accounted for only 6% of the weight of the haulback. The most weight was accounted for by skates (22%), followed by dogfish and *Loligo* at 10% each, silver hake (whiting) at 9%, scup at 8%, sea robins at 7%, and yellowtail flounder at 6% (Table 33).

For tows catching 100 pounds or more of summer flounder, most of the haulback weight was sea robins (22%), with summer flounder second at 18% (Table 33). Other important species were skates (15%), *Loligo* (12%), and silver hake (8%).

The sea sampling data were also examined to identify the relationship of summer flounder as a bycatch in the *Loligo* and scup fisheries in order to provide a background for evaluation of possible minimum net mesh regulations (Table 34). For the 214 sampled tows when 100 pounds or more of *Loligo* was caught, *Loligo* accounted for 31% of the haulback weight, while summer flounder accounted for only 4%. For the 87 sampled

tows when 500 pounds or more of *Loligo* was caught, *Loligo* accounted for 49% of the haulback weight, while summer flounder accounted for only 2%. For the 97 sampled tows when 100 pounds or more of scup was caught, scup accounted for 37% of the haulback weight, while summer flounder accounted for only 2%. For the 39 sampled tows when 500 pounds or more of scup was caught, scup accounted for 59% of the haulback weight, while summer flounder accounted for only 1%.

7.1.7. Description of the North Carolina Fishery

A total of three separate species of the Paralichthid genus are landed in North Carolina by commercial fishermen, summer flounder, southern flounder, and gulf flounder. However, NMFS port agents in North Carolina do not separate landings of Paralicthid flounders into separate species categories; all three species are grouped into a "fluke" category.

Data supplied from the North Carolina Division of Marine Fisheries indicates that approximately 99% of the flounder caught by otter trawls in the Atlantic Ocean are summer flounder. However, only 0.1% of the flounder caught in inland bays are summer flounder. Based on this information, North Carolina landings were adjusted to account for landings of other species, i.e., only landings of flounder caught by otter trawls in the Atlantic Ocean were counted as summer flounder landings.

An average of 28% of the coastwide summer flounder landings were made in North Carolina from 1980-1989 (Table 35), yet data on the fishery are not incorporated into the weighout system. Fortunately, the North Carolina fishery has been extensively sampled during the winters of 1982-89 by the North Carolina Division of Marine Fisheries (North Carolina 1990). These data enable the comparison of the North Carolina winter trawl fisheries to the southern New England and Mid-Atlantic otter trawl fisheries.

The winter trawl fishery in North Carolina has three distinct components (Table 36). The bottom trawl fishery begins near shore in November, targeting primarily on summer flounder. By January, effort has moved offshore into a deep water otter trawl fishery lasting until April. Additionally, a fly net (high rise trawl fishing 10-12 ft off bottom) fishery occurs from September through April.

Catches of summer flounder dominated the near shore bottom trawl fishery for the seven seasons sampled, averaging 11,783 pounds per trip (Table 36) and comprising 62-94% of total trip catch (Table 37). This segment of the fishery accounted for the majority of the summer flounder landed in the North Carolina winter fishery from 1982-89 (North Carolina 1990). The deep water trawl fishery was less selective for summer flounder, with scup sometimes the dominant species landed, but contributed most of the remainder of summer flounder landings from the winter trawl fishery. Catches of summer flounder averaged 6,690 pounds per trip and ranged from 10-72% of total catch (Table 36). The fly net fishery is directed primarily at sciaenids and bluefish, hence summer flounder is landed as incidental catch only. From 1982-1989, fly net catches of summer flounder averaged only 315 pounds per trip and comprised from 1-3% of total trip catch, making this segment of the winter trawl fishery least significant for summer flounder (Table 36).

In order to describe the species catch composition in the North Carolina fishery, sea sampling data (average catch per trip) were obtained from the North Carolina Division of Marine Fisheries (North Carolina 1990). These data (Table 37) were collected by North Carolina Division of Marine Fisheries personnel from a sample of vessels in the summer flounder fishery. The results indicate that, on average for the 7 season period (1982-83 through 1988-89), summer flounder comprised 87% of the catch, with weakfish (7%), *Loligo* (2%), and bluefish (2%) the most significant bycatch species (Table 37). These results may be compared with the weighout data for trips landing 100 pounds or more of summer flounder where weakfish amounted to less than 0.5% of the landings, *Loligo* averaged 10%, and bluefish averaged 1% (Table 31). For any weighout trips when summer flounder were landed (Table 29) the weakfish average was less than 0.5%, the *Loligo* average was 11%, and the bluefish average was 1%. The bycatches of scup, winter flounder, and yellowtail present in the weighout data are absent in the North Carolina fishery.

7.1.8. Mesh Size

Although many types of fishing gear are employed to capture summer flounder, most landings can be attributed

to otter trawls (section 7.1.2). Fish otter trawls are not a uniform gear, however, since many variations are in use throughout the range of summer flounder. Individual fishermen choose a particular net type and configure various attributes of the rig based on the target species, season, area, depth, and bottom type. Mesh size is one attribute in particular which is selected according to the expected or desired size of the target species.

Size composition of summer flounder landings is greatly affected by the selectivity of a particular mesh size, but is also influenced by the availability of the various age classes at any time and place. Changes in absolute abundance, spatial distribution, and migration patterns by size classes will be reflected in landings, and most fishermen will adapt their gear to observed trends.

Although specific data for mesh size on a trip by trip basis are not available from the weighout system, length samples by port agents are available. Existing mesh selectivity studies can be used in conjunction with length samples to infer the effective mesh size in the summer flounder fishery. The selectivity of a 4.0" mesh would correspond to the observed size composition of summer flounder landings from Maine through Virginia from 1985- 1989 (Table 38). Thus, although many different mesh sizes are currently employed in the fishery, the size composition of summer flounder landings do reflect an average otter trawl mesh of 4.0".

Specific data by mesh size are available for the North Carolina winter trawl fishery, however. The trawl used in the near shore summer flounder fishery is typically a low profile net with 5 to 6" mesh in the wings tapering to 4.5" in the cod end. Deep water trawl nets taper from 5" in the wings to 3" in the cod end and fish a few feet off bottom. Fly nets fish about ten feet off bottom and taper from 16-64" mesh in the wings to 2" in the cod end (North Carolina 1990).

Mean size of summer flounder in the North Carolina winter trawl fishery varied with type of net, generally corresponding to mesh size. Individual summer flounder captured in near shore trawls averaged 1.8 pounds for trawls sampled over the 1988-1989 winter fishery, while fish averaged 1.5 pounds in the deep water trawl fishery and 1.1 pounds in the fly net fishery (North Carolina 1990). Given the current size limit of 13", the number of undersized summer flounder per trawl also corresponded to the mesh size of the three common net types. The 1988-1989 percent catch composition of undersized flounder for the near shore trawls was lowest at 4.5%, while deep water trawls had 8.4% and fly nets had 58.1% (North Carolina 1990). Although fly nets had a high percentage of undersized summer flounder of those summer flounder captured, the total number of summer flounder captured was low relative to the other two trawls used in the fishery. In fact, summer flounder occurred in less than half of the fly net trawls sampled over the 1988-89 season (North Carolina 1990).

7.2. DOMESTIC RECREATIONAL FISHERY

Summer flounder is one of the mainstays (Table 3) of the sport fishery along the Atlantic coast, accounting for a proportionately large catch from bridges, jetties, and small boats. The use of live bait is common, and summer flounder are also taken on squids, clams, jigs, small spoons, and spinners. Although not as strong a fighter per pound as some other sport fishes, the summer flounder provides lively action, especially on light tackle.

Recreational landings in 1989, at about 3.2 million pounds, were well below the 1980-1989 average of 19.0 million pounds. The share of total landings taken by the recreational sector was also below average in 1989, at 15% compared to the 1980-1989 average of 38% (Table 39). The decline in recreational landings is more precipitous than that noted in the commercial fisheries and underscores concern about the condition of the summer flounder stock.

Preliminary MRFSS data indicate recreational landings were approximately 4.6 million pounds in 1990. Compared to 1989 landings (3.2 million pounds), which were the lowest in the time series, 1990 landings were 44% greater. However, 1990 landings were still well below the ten year average of 19.0 million pounds.

7.2.1. Directed Summer Flounder Trips

Marine Recreational Fishery Statistics Surveys (MRFSS) have been conducted by NMFS on an annual basis since 1979. Random interviews are conducted with anglers at or near fishing sites over the course of each year. Information collected includes mode of fishing, area of fishing, species targeted, and species and quantity of catch. Data are presented as total catch (types A, B_1, & B_2) and total landings (types A & B_1).

Type A catch is actually observed by interviewers. Type B_1 represents catch utilized but not available for measurement and catch discarded dead. Type B_2 represents those fish released alive. Catch represents the total summer flounder fishing experience (some satisfaction is gained from catching a fish and releasing it) while landings represent the associated summer flounder mortality. All total weights are based on the mean weight of type A fish multiplied by the total number of fish. MRFSS data on catch and effort from angler intercepts are expanded to the State level following telephone surveys which determine participation rates for the general population.

The method of estimating directed trips for summer flounder is potentially biased since MRFSS interviewers ask anglers, upon completion of their trip, which species they targeted. This approach may cause anglers to report the species they caught, regardless of the species they originally sought. Data on recreational catch from 1979-88 suggest that summer flounder anglers do in fact direct effort, however. An annual average of 88% of the total catch of summer flounder was taken during angler days for which only summer flounder were caught (Terceiro pers. comm.).

From 1980-1989, summer flounder were the second most popular species sought and accounted for 7% of the total coastwide recreational catch by weight (Table 3). The average annual number of coastwide trips (1980-1988) targeting (directing) summer flounder was 8.3 million (Table 40). The number of trips is additive across States but the number of participants is not, due to out of State anglers. The total number of directed summer flounder trips is computed by multiplying the regional number of trips by the regional percentage of directed summer flounder trips. Directed summer flounder trips have accounted for between 31.9% (1987) and 46.5% (1984) of all recreational fishing trips coastwide, or a 10 year average of 37.6%.

Based on MRFSS groupings, the Mid-Atlantic region had the highest number of trips directed at summer flounder: on average 7 million trips annually from 1980-88, comprising 45% of all recreational trips. In New England and in North Carolina, summer flounder was not sought as often, probably due to its availability relative to other popular species. From 1980-88, the percentage of directed summer flounder trips averaged 14.3% in New England and 27.4% in North Carolina.

7.2.2. Catch by State and Fishing Area

Based on 1989 MRFSS expanded totals, 2.8 million summer flounder were caught from Maine through North Carolina with a weight of 4.8 million pounds or 1.7 pounds per fish (Table 41). These totals indicate a precipitous decline from the 20.8 million summer flounder caught in 1988.

In 1989, New Jersey caught the largest percentage of catch by number (23%) followed by Virginia (19%), Maryland (17%), New York (16%), and North Carolina (13%). The remaining States all caught near (Delaware) or less than 5% each (Table 42). Catch was more evenly distributed than in 1988, where New Jersey and New York accounted for 70% of the coastwide catch of summer flounder, but this reflects the decline in catch for these two States, rather than better fishing for the other States.

The 1989 estimated number of summer flounder caught by water area was 2.7 million (95.7%) in State waters, and 0.1 million (4.3%) in the EEZ (Table 41). Catch by weight was distributed similarly to catch by number relative to fishing area. On a regional basis, average weight was higher in the north Atlantic States (2.0 pounds) than in the Mid-Atlantic (1.8) and in North Carolina (1.3 lbs). This would correspond to the growth in individual fish during summer migration inshore and northward.

7.2.3. Catch by Fishing Mode

The number of summer flounder caught by fishing mode in 1989 was 2.2 million (78%) by private/rental boats, 285 thousand (10%) by party/charter boats, and 337 thousand (12%) from shore (Table 43). Despite the decline in catch from 1988, there was essentially no change in distribution of catch numbers by mode.

The 1989 average fish weight of catch by mode was 1.8 pounds by private/rental boats, 1.7 pounds by party/charter boats, 1.2 pounds from shore. Given the higher mean weight, distribution of catch by weight was further skewed towards private/rental boats which took 82% of the summer flounder.

Both party/charter boats and private/rental boats took the majority of their catch from State waters (82% and 97%, respectively). Though private/rental boats had a higher absolute catch in the EEZ, party/charter boats caught more of their total in the EEZ than did private/rentals. This is probably due to the greater accessibility of EEZ waters to larger vessels with navigation equipment.

7.2.4. Size distribution of Catch

Individual summer flounder lengths (type A fish) from the MRFSS survey of 1989 are summarized as percentages in Table 44. Coastwide, summer flounder under 13" accounted for 7.4% of those landed. Only 3.2% of the fish were under 12".

Of the legal sized summer flounder, the highest percentage available for measurement was at 15". The sizes of summer flounder were quite evenly distributed between 13" and 18" and 99.1% of fish were 21" or less.

7.3. FOREIGN FISHING ACTIVITIES

Given their importance to domestic commercial and recreational fishermen, summer flounder are listed as a prohibited species for foreign fisheries in US waters. Consequently, there are no directed foreign or joint venture fisheries for summer flounder and no retention of summer flounder is permitted. Bycatch of summer flounder has occurred in directed fisheries or joint ventures for other species, however.

Two sources of foreign catch data are available for determining bycatch of summer flounder: foreign fleet observers' reports and captains' logbooks from permitted foreign fishing categories. Incidental catch in foreign directed fisheries was estimated at over 100,000 pounds in the early 1980's, but has since been reduced to negligible amounts (Table 45). The reduction of summer flounder bycatch is most likely due to the phase out of the foreign directed *Loligo* squid fishery. An increased bycatch of summer flounder in joint venture fishing has corresponded to the phase out of directed foreign fisheries, but has been limited to a few thousand pounds (Table 45). Summer flounder caught in joint venture fisheries cannot be retained by foreign vessels, so must be returned to US catcher boats or discarded.

8. ECONOMIC CHARACTERISTICS OF THE FISHERY

Summer flounder constitutes a major component of Mid-Atlantic recreational catches and comprises a significant proportion of commercial landings from North Carolina through Maine. The commercial share averaged about 60% of the combined total landings of summer flounder from 1980-89 (Table 39). The economic characteristics of the commercial and recreational summer flounder fisheries are described in the following sections. Throughout this description, it is important to note the distinction between economic value and economic impact.

Economic value is a measure of willingness to pay for a good or service. Exvessel value in the commercial sector is thus a measure of processor and wholesaler willingness to pay for summer flounder in the dockside market. Likewise, retail value is a measure of final consumer willingness to pay for summer flounder at supermarkets, seafood shops and restaurants. Economic impact, on the other hand, is a measure of expenditures made by people engaged in a particular activity, and the employment, income, tax revenues, etc. which result from these expenditures. Often, it is said that recreational fishermen spend "x" dollars on gear, boats, travel, etc., and generate "y" amount of employment or "z" dollars in tax revenue.

Clearly, summer flounder are valuable to both recreational anglers and seafood consumers who do not or cannot fish for themselves. Also, individuals and firms engaged in the commercial harvesting, processing and marketing of summer flounder make expenditures and generate employment in the course of business activities, just as participants in the recreational fishery do. Summer flounder have economic value in both recreational and commercial uses and summer flounder related activities have economic impact in each use.

When considering the relative benefits of summer flounder to the two sectors, commercial values must be compared to recreational values and commercial impacts must be compared to recreational impacts. Unfortunately, recreational values are not easily measured and too often, economic impacts of recreational fishing are erroneously contrasted with exvessel value in the commercial sector. The reader is cautioned to avoid this confusion when impact and value estimates are presented in the following sections.

8.1. COMMERCIAL FISHERY

Commercial fisheries generally consist of three distinct sectors: harvesting, processing and marketing. Many individuals and firms specialize in a single sector, although some vertically integrated companies span all sectors, and diversified companies are often involved in food related industries besides seafood.

8.1.1. Harvesting Sector

8.1.1.1. Exvessel value and price

The exvessel value of summer flounder landings has increased from about $16 million in the early 1980's to a peak $41 million in 1988 (Table 46). Exvessel value dropped to $28 million in 1989, due to a nearly 13 million pound decline in landings, but a rise in average price to $1.56 per pound helped to temper the effect on revenues to harvesters. Inflation adjusted prices (1989 dollars) have more than doubled over the 1980-89 time period from $0.64 to $1.56 per pound. The price rise corresponds to a general increase in demand for seafood over the last decade, attributable to gains in personal income and consumer awareness of the healthfulness of seafood.

The value of summer flounder landings relative to the value of total landings in 1989 varied for each State from 1% or less (Maine, New Hampshire, Delaware and Maryland) to about 7% of the total value of landings (Rhode Island and Connecticut; Table 47). In North Carolina, summer flounder accounted for almost 8% of the total value of commercial fish landed, indicating the significance of the winter trawl fishery to the State.

Nationwide, the summer flounder percentage of overall US commercial flounder landings over the past 10 years has varied from 9% to 17% (Table 48). In terms of value, however, the summer flounder percentage has ranged from 16% to 29%, indicating the higher value placed on fresh flounder in US east coast markets.

At $1.56/lb, the average price (all sizes) of summer flounder reached a record high in 1989 in both nominal and inflation adjusted (1989) dollars (Table 46). In 1989, highest prices were received in the northern States with Connecticut the leader at $2.50 per pound (Table 49). Real price per pound for all size categories has fluctuated over the past seven years with noticeable drops in 1983-84 and 1988. Temporary price drops were likely attributable to supply responses since landings increased considerably in those years. The supply - price relationship is also observable on a monthly basis. Months with highest average exvessel prices tend to coincide with months of lowest landings, normally in June and July (Table 50). Prices received for summer flounder originating in the EEZ were generally higher than for State waters and tracked the seasonal supply relationship. The 1989 coastwide average exvessel price per pound for jumbo was $1.93, $1.57 for large, $1.44 for medium, $1.09 for small, and $1.71 for unclassified landings (Table 51). Price premiums for larger flounder reflect higher yielding fillet weight.

8.1.1.2. Fishing Vessel Activity

The Fishery Management Plan for Summer Flounder (MAFMC 1988) requires annual permits for commercial fishing vessels taking summer flounder within the US EEZ. Without individual logbooks, however, information on the total number of vessels actually landing summer flounder (or the extent of dependence on summer

flounder) is difficult to assemble. NMFS permit files indicate that 2,003 vessels have checked off summer flounder as an intended commercial fishing activity for 1990. Many vessel owners check off the summer flounder category to maintain flexibility of fishing operations pending the availability of species, or to maintain eligibility given concerns about a potential limited entry program. Other vessels anticipate taking summer flounder as bycatch during normal fishing activities for other species. Not all permit holders are participants in a full time directed fishery for summer flounder.

The NMFS weighout system records can be used to estimate the number of vessels landing summer flounder in covered States (CT, DE & NC are not currently included), but even so, the data do not constitute a complete census. Finfish otter trawl vessels comprise the vast majority of the vessels covered by the weighout system. Since 1983, between 599 and 704 otter trawl vessels have landed summer flounder on a year by year basis (Table 52) with a general trend downward. In 1983, 612 vessels landed 100 pounds or more of summer flounder (Table 52). By 1989, this number fell to 510 vessels.

The number of trips landing any summer flounder also decreased during the 1983-1989 period (Table 53), from 11,643 in 1983 to 10,828 in 1989. Trips landing 100 pounds or more of summer flounder fell from 6,509 in 1983 to 5,215 in 1989.

Summer flounder tend to have a higher value per pound, relative to other species caught with them. The average trip catch for 1983-89 for trips when any summer flounder was landed was 24% summer flounder (Table 29), whereas the summer flounder exvessel value for the same trips was 41% of the total (Table 54). The second most important category was "Miscellaneous species" (28%), which is largely yellowtail flounder and other groundfish species.

Average monthly data for the period 1985-1989 (Table 55) indicate that summer flounder are more important in value, in all months, than any other species, except "Miscellaneous species" in the month of May. Summer flounder accounted for more than 30% of average trip exvessel value in all months but May (26%), with other significant species including winter flounder (April - August), *Loligo* (December - May), and miscellaneous species (all months; Table 56).

If trips landing more than 100 pounds of summer flounder are examined (Tables 57 and 58), the 1985-1989 average exvessel summer flounder value per trip never falls below $1,955 (33%), and is as high as 74% in August.

There are vessels which land summer flounder in Connecticut, Delaware, and North Carolina which are missed by the weighout system. About 150 vessels participated in the 1985-86 North Carolina winter trawl fishery. Of these, about 80 landed fish north of North Carolina during the year (J. Ross pers. comm.). There are a substantial number of finfish otter trawl vessels which fish for summer flounder up and down the Atlantic coast. This mobile fleet is composed of vessels from North Carolina, Virginia, New Jersey, and other States (Stevenson pers. comm.). Some of these vessels direct on summer flounder in the winter and direct on scallops or other species in the summer. Other finfish otter trawl vessels fish for summer flounder in mixed fisheries with squid or other species, on the basis of local availability, or land them as bycatch in other directed fisheries.

8.1.1.3. Fishing Costs

Vessel costs are composed of fixed costs (insurance, debt, depreciation, routine maintenance, etc.) and variable costs (fuel, maintenance, wages, ice, food, sale and unloading fees, etc.). An increase or decrease in vessel activity will affect only variable costs.

Vessel variable costs are proportionate to the hours traveling and fishing (operating maintenance, fuel, ice) and the quantity of fish landed (wages, sales and unloading fees, ice). Costs vary in different locations and the cost components have changed over the years. Due to the variation in vessels landing summer flounder (home port, tonnage class, directed fishery, etc.), exact cost information is difficult to obtain and generally applicable only to a hypothetical "average" vessel. A general description based on unpublished NMFS data (Logan pers. comm.) follows.

Wages are almost always in the form of a share or "lay" system. The captain, crew, and vessel owner split the net revenue based on a set ratio. The particular ratio of the lay system utilized varies between vessels. Often the fuel and ice are deducted from the gross revenues with the remainder divided about 50-50 between the vessel owner and the captain and crew (Logan pers. comm). When one or the other of the parties is responsible for additional costs the share split normally reflects this.

Fuel costs have varied tremendously over the past decade. Diesel fuel was approximately $1 per gallon in the early 1980's but had dropped to $.50 per gallon in New England in August, 1985 (Logan pers. comm.). Given the uncertainties of world oil markets, it is likely that fuel prices will fluctuate unpredictably from year to year. Total vessel fuel costs are directly proportional to the amount of time spent steaming and fishing and the size and drag of the fishing gear used.

Ice costs about $30 per ton in New England but varies among ports further south (Logan pers. comm.). Ice costs are related to the amount of fish expected to be caught, the expected trip length, and the type and size of storage system utilized on board.

Variable maintenance costs are related to the hours the engines, fishing gear, etc. are used and the weather conditions. Much of the minor repair work is conducted by crew members and, on larger vessels, by an engineer. Since these crew members perform their labor as part of their normal responsibilities there is no added labor cost (Crutchfield 1986). However, most major engine, electronics, and gear repairs are contracted to specialists.

Selling costs consist of lumpers (unloaders) fees, transportation costs, auction fees, etc. Lumpers fees are variable among ports. In Point Judith, RI the cost is $3 per 1,000 lbs, $6 per hour in Cape May, NJ, and over $4 per 1,000 lbs in Massachusetts (Logan pers. comm.). There are no reports available regarding lumpers fees in Virginia. Almost all Long Island, NY landings are boxed at sea and shipped directly to Fulton market. The market charges about $.10 per pound for all costs. Some areas, notably in Massachusetts, also charge fees for lumpers pension funds, etc.

In addition to the shares earned from the sale of fish, crews often receive bycatch as "shack" (Gates pers. comm.). This is fish which is not sold on the official vessel record and the gross receipts are divided among the captain and crew and, sometimes, the vessel owner. Shack varies by season, fishery, and port (Logan pers. comm.). Otter trawlers often shack all or part of the finfish catch when scalloping. No records exist to estimate shack so it is not possible to consider it separately from wages.

The New England full time otter trawl fleet increased 66% between 1976 and 1985 while per vessel deflated gross revenue decreased 20% (Kurkul and Terrill 1986). This appears to be a result of decreased landings per vessel rather than increased expenses.

Vessels which use otter trawls other than finfish otter trawls are expected to be similar in their characteristics to finfish otter trawl vessels. Scallop dredgers are predominately the same type of vessel (often the same vessels) as those which use finfish or other otter trawls. Therefore, these vessels' fixed costs, with the exception of gear costs, would be the same as finfish otter trawlers while their variable costs will vary somewhat depending on weather, bottom topography and drag, etc. Summer flounder is considered to be a bycatch for these vessels for the purpose of these analyses.

Fishing costs for pound nets, fish traps, and hand line operations are much less than costs for otter trawlers. Fish trap fishermen typically use 70 ft vessels with major expenditures for wages (41%) followed by nets (15%) and taxes (12%) . Rhode Island is the only State which lands summer flounder in fish traps and in 1980 approximately six firms had permits (Norton *et al.* 1984). Hand line fishermen typically use a small boat (17 ft average), have major expenses of wages (35%), fuel (16%), and tackle (16%), and in past years made much of their income from striped bass (Norton *et al.* 1984).

8.1.2. Processing Sector

Almost all summer flounder are sold in fresh form. The catch is generally iced at the dock and then shipped

to market. Some filleting is done by primary processors, for instance four processors in New Jersey and Virginia reported in 1980 that they filleted 5 to 25% of the summer flounder they received (Scarlett 1981). All Long Island landings are currently boxed at sea and then transported to market (Mason pers. comm).

A study conducted in New England in 1982 (Hu *et al.* 1983) showed that labor costs would be reduced approximately $0.05 per pound by filleting large flounder instead of small flounder. This is the result of more fillet weight per flounder and the reduced time involved in the fillet process. The species of flounder examined and the size differences were not mentioned.

The cost of processing an average pound of New England groundfish was $0.67 in 1982 (Dressel and Hu 1983). The percentage by units of production were: 45% labor, 8% energy, 10% packaging, 4% other variable costs, 3% interest, 12% administration, and 18% other fixed costs. The processing cost increases had risen slightly less than the producer price increases in the 5 years previous to 1982. The net profit was determined to be $0.05 to $0.10 per pound depending on species. Georgianna and Dirlam (1982) determined the pretax profit on flounder processed in New England in 1979 to be between $0.03 and $0.33 per pound. Since summer flounder are sold fresh the processing costs should be less for packaging and for labor when there is no filleting. Summer flounder processing costs in Virginia and North Carolina are expected to be less due to lower wage rates. The overall marginal costs of production in New England were determined to be constant over a wide range of production (Georgianna and Hogan 1986).

Because processing plant data are not specific to summer flounder, the number of plants handling summer flounder is unknown. The number of processing plants handling all flounders from Maine through North Carolina has varied from 123 in 1981 to 138 in 1984 and 1987 (Table 59). The value of the flounder processed by these plants has varied from $70 million in 1980 to over $150 million in 1986 and 1987 (Table 60).

The major central wholesale market for fresh fish in the Mid- Atlantic region is the Fulton fish market. Summer flounder were received at Fulton market in 1984 and 1985 from the States of Massachusetts through North Carolina. The market handles approximately 6 to 8 percent of the total summer flounder landings (Table 61). If only those summer flounder landed north of Maryland are considered then the percentage rises to approximately 11%. Almost none of the summer flounder entering Fulton market is in the fillet form and little filleting is done there (Petrovich pers. comm.).

Summer flounder prices per pound for each size category vary from processor to processor and from day to day for each processor. The prices react to the market supply of summer flounder, other flounders available, imports, and wholesale/retail demand. The size categories of summer flounder are likewise not fixed. In the areas where more summer flounder less than 14" are landed there is a greater tendency to call smaller fish mediums than in areas where fewer summer flounder less than 14" are landed. The exact lengths which comprise a size category are known to vary from processor to processor and day to day. This variation in price leaves the fisherman with some sense of uncertainty in terms of what he will receive for his catch. Such uncertainty, however, is common in the fishing business.

In 1985 there were 20 processors handling flounder in North Carolina (MAFMC 1988). Since summer flounder is the primary flounder landed in that State, it is assumed that all processors handle summer flounder. There are 6 fish processors in Wanchese being supplied by 30 to 40 otter trawlers and 5 or 6 fish processors in Morehead City supplied by at least 10 to 15 full time otter trawlers (North Carolina 1986).

Because processing plant data are not specific to summer flounder, the number of plants handling summer flounder is unknown. The number of processing plants handling all flounders from Maine through North Carolina was 138 in 1984 and 132 in 1985 (MAFMC 1988). The value of the flounder processed by these plants was $137 million in 1984 and $138 million in 1985.

8.1.3. Marketing and Consumption

Recent and specific information on the distribution of processed summer flounder products to restaurants, specialty shops, institutional food service, and supermarkets is lacking. However, four surveys were conducted between 1970 and 1981 which determined per capita consumption of various species of fish or species

groups. The surveys did not collect usable data on home consumption of fish caught by recreational fishermen so results must be interpreted for seafood obtained through commercial channels only. Findings of the four surveys were collated and summarized by Hu (1985) in order to investigate how socio- demographic and economic factors related to seafood consumption over time.

Per capita consumption of flounder ranked highest for the Mid- Atlantic region, and higher for other coastal regions than for central regions. Urban dwellers generally consumed more than suburban/rural residents. Winter consumption ranked higher than summer and more flounder was purchased fresh than frozen. These spatial and temporal observations are consistent with marketing practices for fresh flounder and with seasonal supplies.

Regression results of the 1977-78 survey indicated positive income elasticities for both expenditures and quantity consumed (Hu 1985). Overall, a 10% increase in income would result in a 5% increase in expenditures for flounder and a 4% increase in consumption. A demand function for nationwide flounder consumption was derived by Hu *et al.* (1983). The linear regression equation considered annual per capita consumption of flounder as a function of a constant, the average price of flounder per pound, and the annual per capita disposable income in adjusted (real) dollars. The data covered the period 1960 through 1980. The results indicated that a 10% increase in the price of flounder had no significant effect on the consumption of flounder. Also, a 10% increase in income induced an 11.9% increase in the consumption of flounder.

Hu *et al.* (1983) results, if generalized to apply to summer flounder, suggest that demand is normal and is generally inelastic. An increase or decrease in the wholesale price of summer flounder would not affect sales significantly. The implication is that the major factor affecting sales appears to be disposable real income and this will affect sales regardless of the price level.

8.1.4. Economic Impact of the Commercial Fishery

A study by the National Fisheries Education and Research Foundation estimated sales, employment, and wage impacts for flounder harvesting, processing and distribution in the Mid- Atlantic region for 1986 (NFERF 1989). Since summer flounder comprised 84% of the total flounder landings in this region in 1986, specific estimates for summer flounder can be derived from the estimates for total flounders.

Cumulative direct impacts of the Mid-Atlantic summer flounder fishery (Table 62) amounted to 2,290 person years of employment, $21.6 million in income, and $50.2 million in output (sales). Over 60% of the employment was generated in the food service sector. Harvesting and processing made up most of the remainder, each accounting for just under 15%. Income per person - year was highest in the harvesting and distribution sectors and lowest for processing and food service, probably related to the labor intensive nature of the two latter sectors. Value of output was high for harvesting, processing and food service, indicating the large markup in these sectors. These direct impact estimates are comparable to direct impacts estimated for the summer flounder recreational fishery (section 8.2.2) and reflect the distribution (60/40) of landings between the commercial and recreational fisheries (Table 39).

8.2. RECREATIONAL FISHERY

Recreational fishing contributes to the general well being of participants by affording them opportunities for relaxation, experiencing nature, and socializing with friends. The potential to catch and ultimately consume fish is an integral part of the recreational experience, though studies have shown that non-catch related aspects of the experience are often as highly regarded by anglers as the number and size of fish caught. Since equipment purchase and travel related expenditures by marine recreational anglers have a profound affect on local economies, the maintenance of healthy fish stocks and development of access sites is as important to fishery managers as the status of commercial fisheries.

8.2.1. Recreational Fishing Activity

Summer flounder anglers are diverse in terms of participation mode, but MRFSS data indicate 78% of summer flounder (by number) were caught from private or rental vessels in 1989 (Table 43). Ownership of a private

vessel involves sizable investment and maintenance costs, thus contributing greatly to measures of economic impact. Private vessels are also used for non-fishing purposes, however, and are used to fish for many different species. Expenditure and cost data must be prorated for summer flounder trips to account for multipurpose use.

In addition to private and rental boats, 12% of summer flounder were caught from shore and 10% from party and charter boats. The Fishery Management Plan for Summer Flounder (MAFMC 1988) requires annual permits for party and charter boats (vessels for hire) which take anglers to fish for summer flounder within the US EEZ. NMFS permit files indicate that 213 vessels have requested a summer flounder party/charter permit for 1990. It is likely that many more vessels are actually dependent on summer flounder fishing for a significant fraction of passenger revenues. Without individual logbooks, however, the total number of party and charter vessels actually directing trips on summer flounder is difficult to determine.

In 1985, a total of 454 party and 1,626 charter boats operated out of Atlantic coast ports from Maine through North Carolina (Table 63). These vessels generated revenues of $101 million in 1985. Estimates of party and charter boat trips directed at summer flounder are lacking for specific regions along the coast, but a 1987 survey of New Jersey party and charter boat owner/captains (Brown and Ofiara 1989) may be indicative of the Mid-Atlantic region. Survey respondents reported that, in 1987, New Jersey party boats targeted 21.7% of trips towards summer flounder and New Jersey charter boats targeted 10.4% of trips for this species.

The NMFS estimated that 8,900,000 angler trips (all modes) were nominally directed at summer flounder in 1988, out of a total of 23,941,000 trips (Table 40). Over 80% of those directed summer flounder trips were made in the Mid-Atlantic region, further underscoring the importance of summer flounder to coastal counties in the region.

8.2.2. Economic Impact of the Recreational Fishery

In 1985, Mid-Atlantic region direct sales related to marine recreational fishing for all species amounted to over $1.0 billion (SFI 1988a). These sales and services required 17 thousand person-years of labor and generated wages of $213.8 million. Adjusting these expenditures to account for species preferences, angling for summer flounder was estimated to be the second most popular recreational fishing activity for the Mid-Atlantic region in 1985 (SFI 1988b). In the North and South Atlantic regions, summer flounder impacts were not specifically enumerated due to the greater relative popularity and abundance of other species.

The Sport Fishing Institute estimated that 10% to 15% of the $1.05 billion in retail sales directly related to Mid-Atlantic marine recreational fishing in 1985 could be attributed to summer flounder (Table 64), making it second only to bluefish in importance to anglers. The estimates disaggregate the regional economic impacts to summer flounder based on the percent of total trips where summer flounder were reported as the target species. The minimum estimate uses the target percent as given. The maximum estimate assumes that those individuals, who did not identify a target species, have the same distribution of species preferences as those who did express a preference. Estimates of the economic activity associated with recreational fishing for summer flounder on the Atlantic Coast in 1985 are: $110.1 to $152.8 million in retail sales; 1,795 to 2,494 person- years of employment; and $22.4 to $31.1 million in wages and salaries (Table 64). These estimates are comparable to the above estimates for the commercial fishery (section 8.1.4).

8.2.3. Value of Summer Flounder to Anglers

Clearly, the economic impacts associated with Atlantic coast recreational fishing for summer flounder are significant. Estimates of aggregate economic value are not currently available, however. The value of recreational fishing can be divided into actual expenditures and a non-monetary benefit associated with satisfaction (consumer surplus). Combined, these two values divide the area under a demand or willingness-to-pay curve up to the point of the quantity of trips taken at given levels of costs, catch rates, etc. (Figure 15).

The demand for recreational fishing trips is determined by the costs of equipment, travel expenditures, catch rates, accessibility of fishing sites, weather, social experiences, and many other factors affecting angler

enjoyment. Holding all other factors constant (expenditures, weather, etc.), a decrease in the catch (or retention rate) of fish should move the demand curve to the left (Figure 15). Likewise, an increase in the catch (or retention rate) of fish should move the demand curve to the right. Each move will have an associated decrease (increase) in angler expenditures and total benefits.

The above estimate of total expenditures made fishing for summer flounder (section 8.2.2) is useful for economic impact analysis, but it is impossible to estimate the total value (willingness to pay) of summer flounder without an estimate of the marginal value per trip. The determination of marginal value requires a demand curve for recreational fishing. In the case of summer flounder, as with many recreationally sought species, an aggregate demand curve is not available.

Several studies have estimated the value of a recreational fishing day for saltwater angling along the Atlantic coast. A University of Delaware study (Rockland 1983) presented value per trip for marine recreational fishing at nine sites in Delaware. This study used the travel cost method with a variety of estimation approaches. The range of average values for the boat fishing sites was $20.58 to $39.90 per day, whereas the range for shore fishing was $37.47 to $62.53 per day. A study of recreational striped bass fishing on the Atlantic Coast presented estimates of $39 to $169 per day (Norton *et al.* 1983). A 1982 study conducted for the State of Florida derived estimates of $18.97 to $57.99 per day for all marine species (Bell *et al.* 1982). Since the above studies are 7 to 8 years old, the dollar values are understated because of inflation.

It is important to note that the average cost of a summer flounder trip or fishing day is not equivalent to the marginal value of a recreationally caught summer flounder. Attributes of a recreational fishing day other than catching fish are valued by anglers, so all expenditures are not dependent on summer flounder catch. The marginal value of summer flounder catch must be estimated, and as with any normal good, marginal value declines with increasing quantity. Agnello (1989) determined the marginal value of recreationally caught summer flounder by considering fishing success as a shift factor in the demand for summer flounder trips. Using the travel cost method, estimates of marginal value for the first summer flounder caught by the average angler ranged from $4.00 to $17.73 (1987 dollars) depending on the specification of the regression model. Estimates for the average summer flounder, about four fish per angler, ranged from $2.06 to $9.24, indicating a declining marginal value for each successive summer flounder kept. (It must be noted that these studies are several years old, so the actual 1991 values may be higher.)

8.2.4. 1990 Survey of Charter and Party Boats

The charter and party boat industry is important in several States in the management unit of this FMP. On average for the 1985-1989 period, 16% of the summer flounder (in numbers) landed by anglers in New York was caught from party or charter boats (Table 65). For New Jersey the share was 17%, for Delaware 23%, and for North Carolina 13%. Charter and party boats in the other States accounted for less than 10% of the landings in each State. The North Carolina party and charter boat share was 28% in 1985, fell to 1% in 1986, and was less than 1% in every year since, through 1989 (Table 65). To provide additional information on this segment of the industry, the Council conducted a survey of charter and party boat owners in the summer of 1990 with the purpose of acquiring information in support of management efforts for the summer flounder, scup, and black sea bass fisheries. A mailing list was compiled from the NMFS vessel permit files, including all vessels which indicated they were involved in party and charter activities (permit Category 2). The list included 402 vessels.

Consultation with Council members yielded concerns that a number of vessels did not hold Federal permits, and would not be included in the survey. Representatives from New Jersey, New York, and Virginia supplied the Council with lists supplementing the NMFS permit files, and an additional 190 questionnaires were mailed.

A total of 592 surveys were sent out to 13 east coast States (Table 66). Massachusetts, New Jersey, New York, and Virginia were most heavily represented, together accounting for 80% of survey mailings.

A total of 202 surveys were returned to the Council, 172 of which were usable. The 30 returns which could not be used were inappropriate mailings that fell into the following general categories: did not charter/fish

in 1989; private boat, not for hire; dive boat, primarily after lobsters; returned as undeliverable by Post Office; or sold boat. Usable returns equaled 29% of total mailings, with the percentage ranging from approximately 20% - 50% for individual States.

Some of the analyses conducted on the survey divided the responses into "Party boat" versus "Charter boat" categories. Typically, charter vessels are thought of as hiring out for a day's fishing to a small number of individuals at a cost of over $100 per person. They provide a high level of personal attention to the passengers and will make special efforts to find the particular species for which their client's are interested.

"Party boats" are generally larger vessels which run on a fixed schedule and carry from 10 to 100 passengers, averaging around 20. They offer fewer options and less attention to passengers, yet charge much lower fares than charter boats (in the $20 - $40 range).

In order to have the ability to differentiate between these two groups, the data were partitioned based on the reported number of passengers each vessel could carry. Examination of the data showed a logical division between those vessels which reported carrying 8 or fewer passengers, and those able to carry more than 8. (The average fee charged per person dropped significantly for those vessels carrying more than 8 passengers.) For purposes of this analysis, then, "charter boats" are defined as those boats carrying 8 or fewer passengers, and "party boats" those which may carry 9 and above. It is recognized that charter boat licenses for generally for six passengers and, in fact, responses to another question indicated that the average charter boat carried 6 passengers (SD = 0.4), while the average party boat carried 53 (SD = 32), so it is quite likely that the respondents that indicated they owned a charter boat that carried eight people were including the captain and mate whereas in the subsequent question they were referring to the six paying passengers.

The first question on the survey attempted to gauge the interest or demand which party and charter boat customers exhibited for common species (or species groups). Given a five point scale, owners were asked to rank each species as being: 1 = Low, 2 = Somewhat Low, 3 = Moderate, 4 = Somewhat High, or 5 = High in interest to their customers. Calculating mean values of responses allows comparison of the different species using a single number for each.

Spot ranked as the most desirable fish for party boats (mean interest = 4.7), illustrating its importance to the well represented boats of Virginia (Table 67). It was followed by bluefish (4.6), then summer flounder (3.6), and striped bass (3.5). These desires only met with partial fulfillment, however, for the top four fish which party boats reported catching were: bluefish (4.0), Atlantic mackerel (3.5), spot (3.4), and black sea bass (2.9).

Perhaps the most important finding of the survey was the fact that, for party boats, summer flounder ranked as the fish anglers were least successful in catching; the absolute bottom of the list in 1989 (mean success = 1.5; Table 67).

An additional perspective can be gained on the situation by creating what might be termed a "frustration index," or simply the difference between fishermen's interest in catching a particular species and their success in doing so. Summer flounder again stands out by having the largest difference between interest and success values for party boat fishermen (2.1), followed by striped bass and weakfish.

Charter boat owners reported a preference ordering similar to that of party boats for their customers, with the exception that large pelagics took the second ranked spot. The top five species were: spot (4.6), large pelagics (3.9), bluefish (3.9), striped bass (3.7), and summer flounder (3.2; Table 67).

Summer flounder placed fourth from the bottom of charter boat success rankings, with a mean of 1.9. On the "frustration index," summer flounder in 1989 reached third from the top (1.4), exceeded only by large pelagics (1.5) and weakfish (1.4).

In 1989, the average party boat customer traveled 67 miles, with a standard deviation (SD) of 43 miles. The farthest party boat customer traveled 695 miles (SD = 1,125 mi.). In 1989, the average charter boat

customer traveled 123 miles (SD = 194 mi.). The farthest charter boat customer traveled 727 miles (SD = 914 mi.).

Charter boat respondents indicated that 38% of their customers were more interested in a particular species, 15% were more interested in fishing enjoyment, and 46% were about equally interested in each. For party boats, the responses were 43% for a particular species, 12% for the fishing experience, and 45% equally for each.

For charter boats, 89% of the respondents were both owner and operator (7% just owner, 5% just captain). The party boat responses were 94% owner and captain, 2% just owner, and 4% just captain. Only 14% of the charter boats were used year round (86% seasonally), while 18% of the party boats were used year round (82% seasonally). The average charter boat carried 6 passengers (SD = 0.4), while the average party boat carried 53 (SD = 32).

Thirty six percent of the charter boat respondents indicated that they fished commercially in 1989, with 91% of those fishing commercially from the charter boat and 9% from another boat. For party boats, 26% of the respondents indicated they had fished commercially in 1989, with 69% of those fishing commercially from the party boat and 31% from another boat.

On a scale of 1 (almost none) to 5 (almost all), respondents were asked what part of their personal earnings in 1989 came from party and charter boat fishing, commercial fishing, or other sources. For charter boat respondents the mean answers were: charter or party boat fishing, 2.2; commercial fishing 1.5; and other sources, 4.0. For party boat respondents the mean answers were: charter or party boat fishing, 3.2; commercial fishing 1.3; and other sources, 2.4.

Respondents were also asked what their perception of fishing success was for 1989 and what they thought their customers' perceptions of 1989 fishing success was. Ranking was on a scale of 1 (good) through 3 (bad). For charter boats, the operators reported a mean of 2.1 (SD = 0.7) for their own view and 1.9 (SD = 0.7) for their customers. For party boat operators, their own perception was 2.2 (SD = 0.6), while they thought their customers would rate the season at 2.0 (SD = 0.6).

The survey included a series of questions to determine how the respondents felt business was in 1989 compared to 1985. Both charter and party boats made slightly fewer trips in 1989 compared to 1985 (Table 68). The days per trip and/or trips per day were essentially unchanged. They operated fewer days per week, on average, and carried slightly fewer customers. The average price per trip increased from $121.80 to $149.50 for charter boats and $26.20 to $29.20 for party boats. The average number of fish taken per customer for charter boats fell from 10.9 to 8.3 for charter boats and from 15.2 to 9.9 for party boats between 1985 and 1989. The number of crew members stayed relatively constant. The average cost per trip rose from $96.10 to $131.10 for charter boats and from $113.30 to $146.60 for party boats during the period.

8.3. INTERNATIONAL TRADE

No summer flounder are imported into the US since the species occurs primarily along the US Atlantic coast. However, imports of several other species of flatfish are substitutes for summer flounder in the market place. These imports compete with and affect the price of summer flounder, winter flounder, yellowtail flounder, and other domestic flatfish species (Wang 1984).

Flat fish imports (excluding halibut) for all product forms totalled 88.4 million lbs in 1990, at a total value of $161.9 million (Table 69). Quantity is down 9% from 1989, and value down by 5% (Table 69). (These figures actually understate the decline since fresh Greenland Turbot could not be included in the 1989 table due to its aggregation with halibut until 1990.)

Import and export data are compiled by the US Bureau of the Census, with each year bringing more refinement in the level of detail collected. To date, however, Greenland Turbot is the only flatfish other than halibut identified to the species level, with the rest grouped loosely under "plaice," "sole," or "other flounder"

categories. Given the continuing evolution of the data categories, compiling consistent import and export statistics across time becomes problematic. One available data series which attempts to do this (USDC 1990a), quantifies imports of "flounder fillets" over time. While the species and product forms which are included under this designation are not specifically identified, it is of value in evaluating import trends over time.

According to this source, imports of flounder fillets have fluctuated on an increasing trend over the 10 year period from 1980 to 1989, with a low of 35.7 million lbs in 1983 to a high of 73.0 million lbs in 1987. In 1989, flounder fillet imports equaled 58.5 million lbs.

Canada dominates the countries shipping flatfish products to the US. In 1990, 52% of the weight of products originated in Canada, followed by the Republic of Korea (14%), Argentina (10%), the Netherlands (8%), Thailand (4%), Mexico (2%), and New Zealand (2%; Table 70).

Canada's dominance has actually decreased in recent years due to import duties imposed on Canadian fish (duties will eventually be phased out under the Free Trade Agreement) and size limits on imports pursuant to the NEFMC Multispecies Fishery Management Plan. At the same time, imports of flounder fillets from Argentina have increased. It is not known to what degree they are replacing Canadian imports directly or supplementing poor landings which have occurred off the southeastern US.

The value of imported flatfish products can vary widely depending on the species, whether fresh or frozen, overall quality, and the level of value added through filleting, etc. The Netherlands in particular specializes in high value species and products. The average value of Netherlands' flatfish exports to the US was $2.73 per lb. in 1990, versus Canada's $1.69 per lb., and $1.83 per lb. for all countries combined (Table 70).

Since virtually all summer flounder are sold fresh, it's primary competition comes from other high value species which are also sold fresh into US markets. Of the 88 million pounds imported in 1990, approximately 28% were comprised of fresh fish: 18 million lbs of whole fish selling for $0.85 per pound, and almost 6 million lbs of fresh fillets selling for $2.62 per pound (Table 69). Almost all of the remaining 72% of imports were comprised of frozen fillets: over 61 million lbs valued at $2.03 per pound.

Total US commercial production of flatfish (excluding halibut) equaled 525 million lbs in 1990, with an average exvessel value of $0.31 per pound (Schween pers. comm.). Slightly less than 2.3% (12.0 million lbs) of this domestic harvest was made up of summer flounder, with an average price of $1.76 per pound: more than five times the nation's average. When compared with just the more valuable Atlantic coast flounders, summer flounder comprised 17% of the 1990 landings and 26% of the value (Schween pers. comm.).

Only limited quantities of summer flounder have been exported from the US since 1981, most likely due to high demand for fresh flounder in the domestic markets. Annual quantities varied from 1,764 pounds to 197,312 pounds and export prices varied from $1.32 to $3.50 per pound (Table 71). The only consistent importer over this time frame has been Japan (R. Ross pers. comm.). In recent years, Rhode Island vessels landing larger, high quality summer flounder have been exporting to Japan (McCauley pers. comm.). Exports are targeted for the fresh (sashimi) market and command premium prices. Competition for frozen flatfish in the Japanese market is stiff, however, so there is essentially no profit in exporting summer flounder in frozen form (Fisheries Attache, Tokyo 1990). For example, Tokyo import value (including insurance and freight) of fresh flatfish (all spp.) from the US in January, 1990, averaged $5.66 a pound, while frozen imports averaged only $0.75 per pound. However, there are recent reports of exports of very large summer flounder to Japan at $5 per pound exvessel (McCauley pers. comm.).

No international trade in summer flounder results from bycatch or directed catch in foreign or joint venture fisheries in the US EEZ since summer flounder is a prohibited species.

9. FISHERY MANAGEMENT PROGRAM

9.1. MEASURES TO ATTAIN MANAGEMENT OBJECTIVES

9.1.0. Introduction

The purpose of this section 9.1.0 is to identify the changes made between the hearing draft of Amendment 2 and this adopted final version. The preferred alternative from the hearing draft is reprinted verbatim at the end of Appendix 1.

The hearing draft included a moratorium on entry of additional commercial vessels and party and charter boats. The final adopted version included a moratorium only on additional commercial vessels.

The hearing draft included permits and weekly reports for summer flounder commercial fishermen and dealers, with a provision that only a permitted dealer could purchase for resale. However, commercial fishermen were allowed to sell to anyone. Alternative 10 (Appendix 1) added the provision that permitted commercial fishermen would be allowed to sell only to permitted dealers. Following the public review process, the Council kept weekly reports by dealers in order to track the catch against the quota, but revised the fishermen's reports to monthly. It was, therefore, necessary to incorporate alternative 10 in the adopted Amendment so that all of the commercial catch would be accounted for in the dealer reports. This provision would mirror the provision in the preferred alternative that only operators of vessels with commercial permits may sell summer flounder. If only persons with dealer permits are allowed to purchase summer flounder from those vessels, and both vessel operators and dealers are required to submit reports (as in the preferred alternative), then the dealer reports will provide a valuable check on landings of summer flounder for purposes of quota monitoring.

The hearing draft included a provision that the minimum net mesh would apply in the cod end for at least 75 continuous meshes forward of the terminus of the net, or, if the net is not long enough for such a measurement, the net mesh applies to the terminal 1/3 of the net, measured from the terminus of the cod end to the headrope, only during the first year following implementation of the Amendment. In following years the entire net would be required to be the minimum size. The adopted version provides that this provision remains in effect rather than applying to the entire net in year two and thereafter.

The hearing draft included a provision that the minimum net mesh applied throughout the management unit for trawlers taking more than 100 lbs of summer flounder and that other nets could not be on board once the 100 lb threshold was met. Alternative 13 provided that in certain cases, specifically the fly net and squid fisheries, other nets could be on board after the 100 lb threshold was attained. The final adopted version includes three exemptions to the 100 lb rule: the fly net fishery; the pelagic net fishery (the same as the squid net identified in Alternative 13, but with a name change to recognize that squid are taken in nets other than those exempted); and a seasonal exempted fishery which generally occurs off New York and New England.

In addition to the changes made as a result of the basic hearings on this Amendment, soon after the close of the comment period, the Council was notified by NMFS that the Amendment needed to address the capture of endangered sea turtles in the fall and winter in the summer flounder fishery off southern Virginia and North Carolina. Management proposals were drafted, taken to hearings in the affected area, and the Amendment was modified accordingly (section 9.1.2.5).

In order that the reader can more easily follow the comments in the hearing summaries, Appendix 1 (Alternatives) is included in this document as it appeared in the hearing draft. Appendix 5, Responses to Comments, and Appendix 7, Responses to Supplementary Comments, should help the reader understand the evolution of the Amendment from the hearing draft to this final version.

9.1.1. Specification of OY, DAH, DAP, JVP, TALFF, Overfishing Definition, and Fishing Mortality Rate Reduction Strategy

Section 303(a)(3) of the MFCMA requires that FMPs assess and specify the OY from the fishery and include

a summary of the information utilized in making such specification. OY is to be based on MSY, or on MSY as it may be adjusted for social, economic, or ecological reasons. The most important limitation on the specification of OY is that the choice of OY and the conservation and management measures proposed to achieve it must prevent overfishing. MSY (section 5.4) has not been specified for summer flounder.

OY is all summer flounder harvested pursuant to this FMP. OY cannot be specified as a quantity because it will change as the fishing mortality rate target varies and is dependent on the level of recruitment .

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

Overfishing for the summer flounder is defined (MAFMC 1990) as fishing in excess of the F_{max} level. F_{max} is a biological reference point that corresponds to the level of fishing mortality (F) that produces the maximum yield per recruit. Based on current analysis, F_{max} is 0.23.

Recent stock assessment information indicates that summer flounder stocks are severely overfished. Current fishing mortality rates (F) are at least 1.4 and could be as high as 2.1. Thus, there is at least a six fold difference between the F_{max} and the current F. In order to achieve F_{max}, current exploitation rates would have to be reduced by 73%.

The Council and ASMFC Management Board considered a large number of strategies to reduce the fishing mortality rate to F_{max}, ranging from achieving F_{max} in the first year of FMP implementation to equal fishing mortality rate reductions over ten years. The Council and ASMFC Board adopted the following strategy: fishing mortality on summer flounder should be reduced to 0.53 in the first year of the management program and be maintained at that level through year 3. This requires a reduction in exploitation of approximately 47% in the first year. In year 4 and subsequent years, the target F would be F_{max} (0.23). The adopted strategy gives primary consideration to a high probability of reaching F_{max}, balanced against reasonable impacts on the fishermen.

9.1.2 Specification of Adopted Management Measures

9.1.2.1. Permits and fees

9.1.2.1.1. Vessel permits and fees

9.1.2.1.1.1. General

Any owner of a vessel desiring to fish for summer flounder within the US EEZ for sale, or transport or deliver for sale, any summer flounder taken within the EEZ, must obtain a moratorium permit from NMFS for that purpose. The vessel must meet the criteria set forth in 9.1.2.1.1.2 in order to qualify for the moratorium permit.

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

A recreational vessel, other than a party or charter boat (vessel for hire), is exempt from the permitting requirement if it catches no more than the recreational possession limit, multiplied by the number of persons on board, of summer flounder per trip.

A party or charter boat may have both a party or charter boat permit and a commercial moratorium permit to catch and sell if the vessel meets the commercial vessel qualification requirements set forth in 9.1.2.1.1.2. However, such a vessel may not fish under the commercial rules if it is carrying passengers for a fee. When a party or charter boat is operating as a commercial vessel, the crew size must not be more than 5 when it is operating as a party boat or and not more than 3 when it is operating as a charter boat.

9.1.2.1.1.2. Moratorium on entry to the commercial fishery

There will be a moratorium on entry of additional commercial vessels into the summer flounder fishery in the EEZ. Each State is encouraged to adopt complementary moratorium measures for those participating in the commercial fishery. Vessels with documented landings of summer flounder for sale between 26 January 1985 and 26 January 1990 qualify for a moratorium permit to land and sell summer flounder under this moratorium program. Under the moratorium, vessels and moratorium permits together may be bought and sold. Vessels that involuntarily leave the fishery (for example, vessels that were sunk or burnt) may be replaced with vessels of the same Gross Registered Tonnage (GRT) and overall registered length as the vessel being replaced. Commercial vessels that are judged unseaworthy by the Coast Guard for reasons other than lack of maintenance may be replaced by a vessel with the same GRT and vessel registered length. Permits may not be combined to create larger replacement vessels. The moratorium terminates at the end of the fifth year following implementation unless extended by FMP amendment. The moratorium may be terminated or replaced at any time by FMP amendment establishing an alternative limited entry system.

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

1. The owner or operator of the vessel landed and sold summer flounder in the management unit for summer flounder between 26 January 1985 and 26 January 1990; or

2. The vessel was under construction for, or was being rerigged for, use in the directed fishery for summer flounder on 26 January 1990 and provided the vessel has landed summer flounder for sale prior to implementation of this Amendment. For the purpose of this paragraph, "under construction" means that the keel has been laid, and "being rerigged" means physical alteration of the vessel or its gear had begun to transform the vessel into one capable of fishing commercially for summer flounder; or

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

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

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

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

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

9.1.2.1.1.3. Permit application

The owner or operator of a US vessel may obtain the appropriate Federal permit by furnishing on the form provided by NMFS information specifying, at least, the names and addresses of the vessel owner, the name of the vessel, official Coast Guard number, directed fishery or fisheries, gear type or types utilized to take summer flounder, gross tonnage of vessel, the permit number of any current or previous fishery permit issued to the vessel, radio call sign, registered length of the vessel, engine horsepower, year the vessel was built, type of construction, type of propulsion, navigational aids (e.g., Loran C), type of echo sounder, type of computer, crew size including captain, fish hold capacity (to the nearest 100 lbs), quantity of summer flounder landed during the year prior to the one for which the permit is being applied (documented by sales records),

principal State of landing, the home port of the vessel, and number of passengers the vessel may carry (for party and charter boats). Operators of commercial vessels must also supply information required to establish that the vessels qualify for a permit pursuant to the moratorium. The Regional Director will notify the applicant of any deficiency in the application. If the applicant fails to correct the deficiency within 15 days following the date of notification, the application will be considered abandoned.

Applicants for a permit under this FMP must agree, as a condition of issuance of the permit, to fish in accordance with Federal rules whether they are fishing in the EEZ or State waters. For vessels with moratorium permits, this includes agreeing to not land summer flounder in any State where the Regional Director has determined that the State's commercial quota has been landed.

Permits expire: (1) when the owner or operator retires the vessel from the fishery, or (2) when the vessel fails to land any summer flounder for 52 consecutive weeks , or (3) on 31 December of each year, or (4) when the ownership of the vessel changes; however, the Regional Director may authorize continuation of a vessel permit for the summer flounder fishery if the new owner so requests. Applications for continuation of a permit must be addressed to the Regional Director.

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

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

9.1.2.1.2. Dealer permits and fees

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

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

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

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

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

The Regional Director may suspend, revoke, or modify, any permit issued or sought under this section. Procedures governing permit sanctions or denials are found at Subpart D of 15 CFR Part 904. The Regional

Director may, after publication of a notice in the *Federal Register*, charge a permit fee. Within 15 days after the change in the information contained in an application submitted under this section, the dealer issued the permit must report the change in writing to the Regional Director.

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

9.1.2.2. Summer Flounder FMP Monitoring Committee

The Summer Flounder Monitoring Committee will be made up of staff representatives of the Mid-Atlantic, New England, and South Atlantic Fishery Management Councils, the Northeast Regional Office, the Northeast Fisheries Center, and the Southeast Fisheries Center, and ASMFC representatives. The MAFMC Executive Director or his designee will chair the Committee.

The Summer Flounder Monitoring Committee will annually review the best available data including, but not limited to, commercial and recreational catch/landing statistics, current estimates of fishing mortality, stock status, the most recent estimates of recruitment, VPA results, target mortality levels, beneficial impacts of size/mesh regulations, as well as the level of noncompliance by fishermen or States and recommend to the Council Committee and ASMFC Interstate Fishery Management Program (ISFMP) Policy Board commercial (annual quota, minimum fish size, and minimum mesh size) and recreational (possession and size limits and seasonal closures) measures designed to assure that the target mortality level on summer flounder to is not exceeded [0.53 in the first year of FMP implementation and maintaining it at that level through year three; in year four and subsequent years, the target fishing mortality rate will be Fmax (0.23)]. The Committee will also review State regulatory programs for consistency with the FMP. The Committee will also review the gear used to catch summer flounder to determine whether gear other than otter trawls needs to be regulated to help assure attainment of the fishing mortality rate target and propose such regulations as appropriate. The Council and ASMFC will receive the report of the Committee and make its recommendations to the Regional Director. The Regional Director will receive the report of the Council and ASMFC and publish his report in the *Federal Register* for public comment by the date specified in the regulations which provide States sufficient time to implement quotas and other management measures. Following the review period, the Regional Director will set the final quota and other management measure adjustments for the year.

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

1. The Monitoring Committee reviews the data and makes its recommendations to the Demersal Species Committee and ASMFC ISFMP Policy Board.

2. The Demersal Species Committee and ASMFC ISFMP Policy Board consider the recommendations of the Monitoring Committee and makes their recommendations to the Council and ASMFC.

3. The Council and ASMFC consider the recommendations of the Demersal Species Committee and ASMFC ISFMP Policy Board and make their recommendations to the Regional Director.

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

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

9.1.2.3. Commercial management measures

9.1.2.3.1. Commercial quota

The quota setting process is specified in 9.1.2.2. Quotas would be distributed to the States based on their percentage share of commercial landings for the period 1980-1989 (Table72) minus any landings in that State

in excess of the previous year's quota.

The annual commercial quota will be set at a range of between 0 and the maximum allowed by the adopted fishing mortality rate reduction strategy. The commercial quota includes all landings for sale by *any* gear.

All landings by any vessel that has a commercial moratorium permit (permit to sell) counts against the quota, whether the summer flounder are caught with an otter trawl, a scallop dredge, hook and line, or any other gear. If the vessel does not have a commercial moratorium permit, the fish may not be sold and the recreational rules on size, possession, and season apply.

The annual commercial quota would be based on the recommendations of the Summer Flounder FMP Monitoring Committee to the Council and ASMFC Board. The Council and ASMFC would consider those recommendations and submit their recommendations to the Regional Director. The Regional Director will set the commercial quota annually.

The commercial quota in 1992 would be a maximum of 11 million pounds assuming a minimum mesh size of 5.5" diamond mesh or 6" square mesh, a minimum commercial fish size of 13" TL, and a minimum recreational fish size of 14" TL. This quota is based on current information and assumes an average level of recruitment in 1989, 1990 and 1991. The quota will be calculated each year to reflect the most current information on recruitment, stock status, and level of compliance.

The 1992 quota may be revised prior to plan implementation to reflect additional information on stock status. If 1990 and 1991 recruitment is lower than expected than the quota will be lower than the maximum 11 million pounds. Several factors will be considered when determining the 1992 quota including: the highly overfished nature of the stock ($F>1.4$), the low spawning stock size (currently 2-3% of maximum), the fact that an average or above average year class has not been produced recently (1989 and 1990 year classes were no better than average, while the 1988 year class was poor), recruitment estimates for 1989 and beyond are based on a barely significant correlation between the NEFC VPA estimates and the VIMS survey (which has a short time series), and finally, 1992 projections are based on 1989 numbers- at-age from the VPA.

The quota must apply throughout the management unit, that is, in both State and Federal waters. All commercial landings in a State would count toward that State's quota. When a State's quota has been caught, fishing for and/or landing summer flounder would be prohibited in that State.

Using data collected through this FMP (section 9.1.3), NMFS will monitor the fishery and inform each of the States of the State's landings relative to that State's quota. It is expected that the States will assist NMFS with data collection.

It is the responsibility of each State to assure that its quota is not exceeded. Each State shall close their State's waters to commercial fishing for summer flounder when their quota is reached and prohibit landing by commercial vessels. Each State must submit to the Council and Regional Director a plan setting forth the means by which the State will manage the quota, size limit, and mesh regulation. Each State's plan will be reviewed by the Monitoring Committee. Until the Monitoring Committee determines that a State's plan is adequate to implement the FMP, the State will be considered not in compliance with the FMP. This provision is considered extremely important, particularly in the first year or two that the FMP is implemented, since few, if any, States will have measures in effect to rapidly implement the FMP (particularly the quota provision). This provision will allow the Regional Director to close the EEZ summer flounder fishery to vessels of a particular State early enough in the year to assure that there is quota remaining for the fishery in the State's territorial sea and internal waters and for vessels taking advantage of the 100 pound bycatch rule for small mesh. Without this provision, States would exceed their quotas the first year, have the overage deducted from the second year's quota, and likely never be able to receive a full quota in subsequent years.

A State is allowed to submit a plan for each year or to submit a framework plan setting forth criteria and schedules for actions to assure compliance with the FMP.

The Regional Director shall close the EEZ to fishing for summer flounder by commercial vessels if he determines

that the inaction of one or more States will cause the target fishing mortality levels to be exceeded.

The Regional Director shall close the EEZ to fishing for summer flounder by commercial vessels if the commercial fisheries in all States have been closed.

9.1.2.3.2. Commercial fish size limitations

It is illegal for owners or operators of vessels issued moratorium permits, except party and charter boats carrying passengers for hire, to possess summer flounder less than 13" total length (TL). It is also illegal to possess parts of summer flounder less than 13" to the point of landing.

Vessels with commercial moratorium permits issued pursuant to this FMP are required to fish and land pursuant to the provisions of this FMP unless the vessels land in States with larger minimum fish sizes than those provided in the FMP, in which case the minimum fish size would be required to meet the State limits. States with minimum size larger than those in the FMP are encouraged to maintain them.

The minimum fish size may be changed annually, if appropriate, following the Summer Flounder FMP Monitoring Committee process set forth in 9.1.2.2.

9.1.2.3.3. Minimum mesh requirement.

Vessels using otter trawls and possessing more than 100 lbs of summer flounder may only fish with 5.5" minimum diamond mesh or 6" minimum square mesh, inside measure, applied throughout the cod end for at least 75 continuous meshes forward of the terminus of the net, or, if the net is not long enough for such a measurement, the terminal 1/3 of the net, measured from the terminus of the cod end to the head rope. Mesh would be allowed to be larger than the minimum size, but it could be no smaller than the minimum size. If the fish are landed in a State that has a larger minimum net mesh size, the State limit would prevail. States with minimum mesh regulations larger than those established in this FMP are encouraged to maintain them.

Only nets of at least the legal size would be allowed on otter trawl vessels fishing for summer flounder. Any combination of mesh or liners that effectively decreases the mesh below the minimum size is prohibited. Otter trawl vessels retaining more than 100 lbs of summer flounder may not have any net, or any piece of net not meeting the mesh size requirements, on board. It must be recognized that at least a portion of the body of the net (ahead of the 75 meshes) may be smaller than the minimum legal mesh size, and that net may be legally on board, as may pieces of net to repair it.

The owner or operator of a fishing vessel shall not use any device, gear, or material, including, but not limited to, nets, net strengtheners, ropes, lines, or chaffing gear, on the top of the regulated portion of a trawl net; except that, one splitting strap and one bull rope (if present), consisting of line or rope no more than 2" in diameter, may be used if such splitting strap and/or bull rope does not constrict in any manner the top of the regulated portion of the net; and one rope no greater than 0.75 inches in diameter extending the length of the net from the belly to the terminus of the cod end along each of the following: the top, bottom, and each side of the net. "Top of the regulated portion of the net" means the 50% of the entire regulated portion of the net which (in a hypothetical situation) would not be in contact with the ocean bottom during a tow if the regulated portion of the net were laid flat on the ocean floor. For the purpose of this paragraph, head ropes shall not be considered part of the top of the regulated portion of a trawl net.

Since it will be difficult to detect a violation of the minimum mesh net regulation, the penalty for individuals detected of such a violation must be sufficient to provide an adequate deterrent. Nets can be double bagged or used as liners. Therefore, it is recommended that the penalty for the first offense be a six month loss of moratorium permit and the penalty for a second offense be a one year loss of permit. After imposition and expiration of such a penalty, if the individual fishes without penalty for three consecutive years, the earlier offenses would be expunged from the record.

The minimum net mesh size could be changed annually, if appropriate, following the Summer Flounder FMP Monitoring Committee process set forth in 9.1.2.2. Based on the recommendations of the Summer Flounder

Monitoring Committee and Council, the Regional Director, by regulatory amendment, shall implement regulations on gear other than otter trawls to achieve discards of summer flounder equivalent to the discards with otter trawls given the minimum net mesh requirements. This provision is intended to address the problem that could develop if gear currently not in significant use in the summer flounder fishery are developed as a way of avoiding the minimum otter trawl mesh rule.

There are two exceptions to the minimum mesh rule:

1. Vessels fishing in the fly net fishery are exempt from the minimum mesh size requirement. A fly net is a two seam otter trawl with the following configuration:

a. The net has large mesh webbing in the wings with a stretch mesh measure of 8" to 64".

b. The first body (belly) section of the net consists of 35 meshes or more of 8" (stretch mesh) webbing or larger.

c. In the body section of the net the stretch mesh decreases in size relative to the wings and continues to decrease throughout the extensions to the cod end, which generally has a webbing of 2" (stretch mesh).

If the Regional Director determines after a review of Sea Sampling, landing, or other data that the summer flounder catch in the fly net fishery exceeds 1% of the total catch in the fly net fishery, he may rescind the exemption.

2. Vessels fishing for summer flounder in the EEZ (taking and retaining more than 100 lbs of summer flounder) seaward of the line described below from 1 November through 30 April and not using a 5.5" minimum mesh (diamond) net, are required to obtain a special permit from NMFS. Application for this permit must be made 7 days prior to entering this exempted fishery and NMFS must be notified 7 days before the vessel exits the exempted fishery. The commercial minimum size limit (13") applies in the exempted area. Vessels with this special permit are exempted from the minimum net mesh regulations, but are prohibited from fishing west (landward) of the line. NMFS is authorized to establish procedural rules necessary to process applications for and cancellation of these special permits in order to facilitate enforcement.

The line follows 71°30′ west longitude south to 40°53.1′ N, 71°30′ W; thence northeasterly 41° 00.0′ N, 70°49.5′ W, thence easterly to 41°00.0′ N, 70°30.0′ W, thence southerly to 40°50.0′ N., 70°30.0′ W., thence easterly to 40°50.0′ N., 69°40.0′ W., thence southerly to 40°33.5′ N., 69°40.0′ W., thence southwesterly to 40°26.5′ N., 70°40.0′ W., thence northerly to 40°40.5′ N., 70°40.0′ W., then southwesterly to 40°30.0′ N., 72°00.0′ W., thence southerly to 40°17.8′ N., 72°00.0′ W., thence southwesterly to 40°15.5′ N., 72° 20.0′ W., thence southerly along 72°20.0′ W. until it intersects the outer boundary of the EEZ.

Vessels fishing with an exempted fishery permit may transit the area south and west of the exempted fishery area to leave and return to port so long as all fishing gear is stowed in a manner that it cannot be used outside the exempted fishery area.

If the Regional Director determines after a review of Sea Sampling data that vessels fishing seaward of the line described above are discarding more than 10% of their summer flounder catch, the Regional Director may rescind the exemption.

9.1.2.4. Recreational Fishery Measures

The recreational fishery throughout the management unit would be managed through an annual evaluation of a framework system (section 9.1.2.2) of possession limits, size limits, and seasonal closures. Recreational landings would be compared to annual target harvest levels established through the FMP Monitoring Committee process to determine if modifications to the recreational possession limit and size limit are required for the following year or if the fishery needed to be closed for certain periods.

The annual recreational possession limit, size limit, and season will be set at a range of between 0 and the

maximum allowed by the adopted fishing mortality rate reduction strategy. It will be illegal to possess parts of summer flounder less than the minimum size to the point of landing.

Clearly, within limits, there are various combinations of possession limits and seasons for a given size limit that will attain the fishing mortality rate target for a particular year. The length and timing of a seasonal closure are primary determinants in this consideration. Obviously, a closure during months when the fishery is not prosecuted at a significant level will not be particularly useful. Also, a very short closure may not be useful since it will allow fishermen the opportunity to expend greater effort in the months immediately before and after the closure.

During the first year of FMP operation there will be a 14" TL minimum fish size, 6 fish possession limit, and a fishing season from 15 May through 30 September.

On vessels with several passengers, where catches are pooled in one or more containers, the number of summer flounder contained on the vessel may not exceed the possession limit multiplied by the number of people aboard the vessel.

It is the responsibility of each State to assure that it implements measures equivalent with the Federal FMP. The Regional Director may prohibit landing summer flounder from the EEZ by recreational vessels (party, charter, and private boats) of any State not in compliance with this FMP (possession limit, size limit, and season). If the inaction of one or more States leads the Regional Director to conclude that the FMP will be adversely affected, he may close the entire EEZ to summer flounder fishing. To be equivalent with the FMP, the States' measures must have the same length and possession limits as the FMP, but may incorporate a different equivalent open season provided such open season remains within the same MRFSS waves (bimonthly sampling periods) used in the coastwide season.

9.1.2.5. Other measures.

Only persons with a dealer permit may buy summer flounder at the point of first sale landed by a vessel that has a commercial moratorium permit issued pursuant to this FMP.

Owners or operators of vessels with moratorium permits may sell summer flounder at the point of first sale only to a dealer that has a dealer permit issued pursuant to this FMP.

The amount of summer flounder on board a vessel using small mesh trawl gear other than exempted gear may not exceed 100 pounds.

Owners or operators of vessels with moratorium permits may not land summer flounder in a State when the Regional Director has determined that the State's commercial quota has been landed.

All summer flounder on vessels fishing with a mesh smaller than the legal minimum size must have any summer flounder on board boxed in a manner that will facilitate enforcement personnel knowing whether the vessel has more than 100 pounds of summer flounder on board to meet the minimum mesh size criterion. Any unboxed summer flounder on board a vessel fishing with a net smaller that the legal minimum is considered a violation of this FMP. A box holds 100 pounds of summer flounder and is approximately 36" long, 15" wide, and 12" high (approximately 3.75 cubic feet).

The Regional Director may place sea samplers aboard vessels if he determines a voluntary sea sampling system is not giving a representative sample from the summer flounder fishery.

The Regional Director, Northeast Region, NMFS is authorized to monitor sea turtles in the Exclusive Economic Zone from the mouth of the Chesapeake Bay to the southern border of North Carolina, through aerial surveys and sea sampling, in concert with similar efforts by the State of North Carolina, and to institute measures in this area within 10 miles (16.1 kilometers) of the shore to minimize the take of sea turtles in the summer flounder fishery between 15 October and 15 January, compatible with such measures instituted by North Carolina. If measures are considered necessary and North Carolina has not acted appropriately, the Regional

Director may limit tow times to 60 minutes or close the area to trawlers that do not use nets equipped with turtle excluder devices with bars spaced no greater than 6" (15.2 centimeters) apart, or other devices that may be authorized by the Regional Director.

No foreign fishing vessel shall conduct a fishery for or retain any summer flounder. Foreign nations catching summer flounder shall be subject to the incidental catch regulations set forth in 50 CFR 611.13, 611.14, and 611.50.

9.1.3. Specification and Sources of Pertinent Fishery Data.

9.1.3.1. Domestic and foreign fishermen.

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

Commercial logbooks must be submitted on a monthly basis by Federal moratorium permit holders in order to monitor the fishery.

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

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

Implementation of the vessel reporting shall begin no later than January 1, 1994.

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

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

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

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

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

9.2.1. The FMP 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 pursuant to this title shall be consistent with the following national standards for fishery conservation and management." The following is a discussion of the standards and how this FMP meets them:

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

MSY (section 5.4) has not been specified for summer flounder. OY is all summer flounder harvested pursuant to this FMP.

Overfishing in the Summer Flounder FMP is defined as fishing in excess of the F_{max} level. F_{max} is a biological reference point that corresponds to the level of fishing mortality (F) that produces the maximum yield per recruit. Based on current resource condition, F_{max} is 0.23. That overfishing definition was approved by NMFS in Amendment 1 to the FMP. The Council's schedule to reduce overfishing is presented in section 9.2.2.1. Recent stock assessment information indicates that summer flounder stocks are severely overfished. Current fishing mortality rates (F) are at least 1.4 and could be as high as 2.1. Thus, there is at least a six fold difference between the F_{max} and the current F. In order to achieve F_{max}, current exploitation rates would have to be reduced by 73%.

Long term trends in abundance and recruitment of summer flounder, derived from several local and coastwide surveys, indicate that the summer flounder stock has been so reduced that current levels of abundance are less than 20% of the stock size measured in the late 1970's. Based on current levels of exploitation, spawning stock biomass (SSB) levels are 2-3% of the virgin or unfished biomass level. SSB levels should be at least 20% of the unfished level, based on analysis conducted on other species, to allow the stock to sustain itself over an extended period of time. Survey indices also indicate that the 1988 year class was almost a complete failure and the 1989 and 1990 year classes "no better than average." In addition, age composition of the summer flounder stock is severely compressed. In fact, the coastwide NEFC survey did not collect any summer flounder older than age 3 in the 1990 survey although a decade ago summer flounder as old as age 10 were collected.

State and Federal cooperation increases the chances of reducing overfishing.

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

This FMP is based on the best and most recent scientific information available. Future summer flounder research should be devoted toward both data collection and analysis in order to evaluate the effectiveness of this FMP. This species should be periodically reviewed by the NEFC Stock Assessment Workshop process.

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

The FMP's management unit is summer flounder throughout their range on the Atlantic coast from Maine through North Carolina, including the EEZ, territorial sea, and internal waters. This specification is considered to be consistent with National Standard 3.

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

The FMP does not discriminate among residents of different States. It does not differentiate among US citizens,

nationals, resident aliens, or corporations on the basis of their State of residence. It does not incorporate or rely on a State statute or regulation that discriminates against residents of another State.

Summer flounder migrate inshore in the spring and offshore in the fall (section 5.1). These seasonal migrations lead to seasonal fisheries. Once the decision was made to use an annual quota as one of the tools to manage the commercial fishery, it became important to adopt measures to insure that fishermen from one State could not take the entire quota (which, at least in the short run, must be much smaller that historical catches in order to stop overfishing) before fishermen from other States had an opportunity to participate in the fishery. Early in the planning process it became apparent that it would be extremely difficult, if not impossible, to prevent overfishing without the use of an overall quota. The States quickly realized that overall or regional quotas could work to the detriment of a particular State and/or region, and, therefore, requested the Council to consider State by State quotas. In developing State quotas, the Council reviewed the history of the fishery and recommended a ten year timeframe as the appropriate historical data upon which quotas would be based. This was discussed thoroughly by the States and while efforts were made to shorten the period to as little as three years, it was quickly realized that short term variations in landings did occur and quotas based on a short term series would penalize one segment of the fishery while granting others what was considered an excessive share. The States, through ASMFC, approved the ten year time period and the method of allocating the quota.

However, the solution to allocate the quota by State created the problem of how to assure against overfishing in the FMP if a State did not take appropriate action to insure that its quota was not exceeded. The only action readily available was to close the EEZ to taking summer flounder, which was provided for in the Amendment. While the inaction of one State could result in such gross overfishing that a closure of the entire EEZ would be warranted, it was felt that prohibiting retention of summer flounder in the entire EEZ if only one State presented a problem generally would impose a hardship on fishermen from other States. Hence, the provision to prohibit fishermen resident (the State that is shown as the principal landing State in the annual permit application) in the problem State from taking summer flounder anywhere in the EEZ (section 9.1.2.3.1).

Preemption was not considered a serious alternative to this procedure. There is not a great deal of precedent to determine if preemption could work rapidly enough to prevent overfishing. The existing procedures are complicated. Additionally, there is the question of whether summer flounder landings are primarily from the EEZ or primarily from State waters. If the commercial fishery is the basis, landings from the EEZ have averaged 77% during the period 1980-89 (Table 50). It was 92% in 1989 (Table 2). In the recreational fishery, EEZ catch in pounds was 7% of the total recreational landings for the 1980-89 period and 4% of the total in 1989. For the total fishery in 1980-89, the EEZ share of the total was 49% . The total fishery EEZ share in 1989 was 74%.

In choosing historical catch as a basis of allocation, and by virtue of acceptance by the States of the timeframe and the resulting percent of allocations, National Standard 4A, the "fair and equitable to all such fishermen" test, has been met. Since the quota is based on stock size and will be determined annually to assure that the target mortality rate is not exceeded, National Standard 4B "reasonably calculated to promote conservation" is met.

Section 4C requires that the allocation be carried out in such a manner that "no particular individual, corporation, or other entity, acquires an excessive share of such privilege." It was therefore necessary for the Council and ASMFC to develop a method to assure that Section C was carried out.

In order to assure that 4C is fully met, any State or States not in compliance with the quota, that is, those States which have exceeded the allocated amount, must be prevented from taking additional summer flounder or an excessive share will be realized by the residents of that State, unfairly penalizing the other participants in the fishery. The Council and ASMFC have proposed that this obligation be met by requiring the Regional Director, upon advice from the Monitoring Committee through the Council and ASMFC, and upon his concurrence that the allocation has been exceeded by a particular State, to close the EEZ to fishermen from that State.

Another remedy which was considered to be available to the Regional Director was to close the entire EEZ when quotas are exceeded. While this still may be necessary if enough States exceed the quotas, it is certainly

not a remedy to prevent one State from acquiring an excessive share. The provision proposed by the Council, as stated above, will prevent excessive share gains and comply with the charge of National Standard 4C. It should be noted that this clause would not prohibit continued fishing in State waters as would "preemption", which is included in the Magnuson Act, and may or may not be applicable to the summer flounder fishery.

The Council and ASMFC considered the argument that this measure discriminates among fishermen of different States, and may therefore run afoul of National Standard #4. The Council and the ASMFC have considered this argument and believe that it results in too narrow a construction of the National Standard, particularly in the context of this fishery. The National Standard must be read as a whole, and any interpretation that focuses too narrowly on distinctions based on residence may face problems in providing fair allocations. In this FMP, all fishermen are given an equal opportunity to harvest a fair share of the overall quota. The distinction drawn in the management measures is not for the purpose of harming the fishermen of any State, but rather to ensure that all of the requirements of National Standard #4 are met. This kind of differentiation, which is implemented not to adversely affect anyone, but to ensure attainment of equitable allocations, cannot be considered discriminatory within the meaning of National Standard #4. The allocation system will be administered by the States under this cooperative interjurisdictional management program. The effect of this measure is simply to provide the Secretary with the opportunity to support the collective States' efforts in administering quotas.

The recreational measures are applied coastwide, although the States are allowed to make minor changes to the open season to allow for regional differences caused by the summer flounder migration. In the commercial fishery, the minimum fish size and minimum net mesh size are applied coastwide. The commercial quota is allocated on a State by State basis using the distribution of the commercial catch of summer flounder for the period 1980-1989. These provisions are, therefore, "fair and equitable to all fishermen."

The recreational size limit, possession limit, and season are all specified so they may be adjusted annually following procedures set forth in the FMP to assure that the fishing mortality reduction strategy is followed. The commercial quota, minimum fish size, and minimum net mesh are all specified so they may be adjusted annually following procedures set forth in the FMP to assure that the fishing mortality reduction strategy is followed. These provisions are, therefore, "reasonably calculated to promote conservation."

It is clear that while the best solution to this problem may be a change either in the Magnuson Act, or through an interjurisdictional fisheries act, or similar legislation, the Council and ASMFC have acted responsibly in the required measures and fully expect these measures to be successful in carrying out a fair and equitable summer flounder plan.

The Council believes that there is an intrinsic tension within the National Standards with respect to management of interjurisdictional fisheries such as the fishery for summer flounder, which is severely overfished. Strong and effective measures are needed to reverse the overfished nature of this valuable fishery resource. Each State must play a meaningful part in this cooperative effort to reverse the trend in this fishery. Allowing vessels from any recalcitrant State full reign to fish in the EEZ uncontrolled will have serious negative repercussions for the stock. It is a paramount that overfishing be prevented rather than access be preserved for vessels from a State that is not playing its part to rebuild the resource. The Council believes that the mandate of National Standard 1 far overshadows the introductory statement to National Standard 4. All of the State members of the ASMFC have voted in favor of an identical ASMFC version of Amendment 2. The States do not believe the measure preventing access to the EEZ to vessels from States not in compliance with the management measures in the Amendment is discriminatory with respect to their residents. The Secretary should adopt a similar interpretation.

The moratorium is fair and equitible. The Council voted to establish 26 January 1990 as a cut off date for limiting entry into the fishery at its February 1990 meeting. The *Federal Register* notice of this date was published 7 June 1990. The moratorium was part of the preferred alternative in the public hearing draft of Amendment 2. Additionally, the long time period for establishing egibility (26 January 1985 through 26 January 1990) assures that the largest possible number of fishermen can qualify under the moratorium.

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

The management regime is intended to allow the fishery to operate at the lowest possible cost (e.g., fishing effort, administration, and enforcement) given the FMP's objectives. The objectives focus on the issue of administrative and enforcement costs by encouraging compatibility between Federal and State regulations since a substantial portion of the fishery occurs in State waters. The FMP places no restrictions on processing, or marketing and no unnecessary restrictions on the use of efficient techniques of harvesting.

The minimum net mesh provision improves efficiency by reducing waste through discards.

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

The management regime was developed to be compatible with and reinforce the management efforts of the States and ASMFC. The FMP allows the States to manage their commercial quotas, the only constraint being a review to assure that the State's management system will not allow the quota to be exceeded. While the recreational size and possession limits apply coastwide, the open season may be adjusted slightly by the States to account for seasonal differences.

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

The management regime was developed to be compatible with and reinforce the management efforts of the States and ASMFC. The minimum size limits, quotas, possession limits, and, to some extent, closed seasons, can be enforced on shore, thus eliminating the need for high cost at sea enforcement. The provisions of this Amendment have already been adopted by the ASMFC.

9.2.2. Cost/Benefit Analysis.

9.2.2.1. Implications of overfishing definitions and need to reduce fishing mortality rate

The cost/benefit analysis must be considered in light of the guidelines in 50 *CFR* 611, which require that a Council define overfishing for the managed species, determine whether the species is in an overfished condition, and, if it is, develop a strategy for ending the overfished condition. The Council has adopted and NMFS has approved (MAFMC 1990) an overfishing definition (9.1.1). The Council has determined that summer flounder are currently greatly overfished and has adopted a strategy to reduce fishing mortality to prescribed levels in order to end the overfished condition (9.1.1) while considering the needs of the fishermen. Many fishing mortality rate reduction strategies were considered by the Council's Demersal Species Committee and the ASMFC Summer Flounder Board before the final strategy was adopted. All of these strategies involved balancing the impact on the fishing industry against the probability of successfully ending the overfished condition of the resource.

By the approved definition, the excessive take of summer flounder will cease when fishing mortality is at the F_{max} level, which current analysis indicate is F = 0.23. Current fishing mortality rates are at least 1.4 and could be as high as 2.1. Thus, there is at least a six fold difference between the F_{max} and the current F. In order to achieve F_{max}, current exploitation rates would have to be reduced by 73%.

An immediate reduction to an F_{max} level was seen as having an unnecessarily negative impact on the industry, so the Council and ASMFC Board adopted the following strategy:

Fishing mortality on summer flounder should be reduced to 0.53 in the first year of the management program and be maintained at that level through year 3. This requires a reduction in exploitation of approximately 47% in the first year. In year 4 and subsequent years, the target F would be F_{max} (0.23).

The remainder of this section will set forth the analyses that led to this conclusion. What must be remembered

when reading the remainder of 9.2.2 is that the baseline for the impacts is not "No Action" or the *status quo*, but rather, alternative ways of achieving the fishing mortality rate target (F_{max}).

In the development of Amendment 2, numerous strategies were proposed to reduce fishing mortality on summer flounder. The Council and Commission were presented with the following analysis so that they could choose an appropriate reduction strategy that would balance effective reductions with the short term economic burdens placed on the participants in the fishery.

GENMOD, an age-structured population model was used to simulate the summer flounder population under the various reduction strategies. The model has been used to determine optimal harvesting strategies for several fish stocks including anchovy, Atlantic menhaden, Pacific ocean perch, bluefish, and winter flounder. A description of the model and its use can be found in Hightower and Grossman (1985 and 1987).

The model uses standard fisheries equations to simulate the dynamics of an exploited fish stock. The model requires input data on weight-at-age, fecundity, mortality, and recruitment. These data were obtained for summer flounder from several sources including the summer flounder FMP, SAW documents, and NEFC personnel (Table 73).

The model is most affected by changes in the stock-recruitment (S-R) relationship, specifically the value of alpha, the slope at the origin of the S-R curve. Alpha can also be defined as the rate at which the population could grow if there was no inhibition due to parent stock size.

Because of the controversy associated with the use of the S-R relationship developed by Chang and Pacheco (1975) and used in a previous version of this risk assessment, alpha was estimated using alternative techniques based on life history parameters (Table 16). Specifically, these methods estimate alpha or r_m, the innate or intrinsic ability of a population to increase in size under favorable environmental conditions. Values of r_m are then converted to alpha. Based on the five separate methods a mean alpha of 2.53 was calculated and used in the simulation.

The beta term of the S-R relationship was estimated by incrementally adjusting the S-R relationship to derive an MSY value of approximately 45 million pounds. This value is close to the estimate derived by Chang and Pacheco (1975) and Fogarty (1981). Commercial and recreational landings since 1979 have averaged approximately 48.2 million pounds.

The model was first run to determine the spawning stock biomass (SSB) associated with specific fishing mortality rates. This allowed the determination of the SSB equal to 5%, 10%, 15%, 20%, 25%, and 30% of the unfished level (% of maximum spawning potential or MSP). A 20% MSP value has been used for some groundfish (e.g., cod, yellowtail, and winter flounder) and other fish species (red drum and scup) to define the minimum level at which the stock can sustain itself over an extended period of time. The 10% MSP level can be used to define the level below which the probability of recruitment failure is high. The other values were either suggested by MAFMC Demersal Committee members or are presented for illustrative purposes.

Using the 5% to 30% values as targets, the model was then run to determine the probability of reaching these values in 5 and 10 years under the various mortality-reduction alternatives. In order to simulate random variability in recruitment (that is, due to environmental effects), a multiplicative lognormal error term was used. Hightower and Grossman (1985) suggested that this term ranged from 0.25 to 0.75 for most fish stocks. A value of 0.75 for summer flounder was used in these simulations. An identical value was used by Gibson (pers. comm.) to simulate the winter flounder population.

The error term can also be estimated from a series of recruitment data by calculating the mean and standard deviation from a log transformed index and then dividing the standard deviation by the mean to calculate the mean square error (MSE). Because the MSE represents the variability in recruitment due to both environmental factors and spawning stock size, it is an overestimate of the lognormal error term. Using the YOY index obtained from the VIMS trawl survey the calculated MSE would be 0.96. Assuming 75% of the MSE is due to environmental effects (Crecco pers. comm.), an estimate of the lognormal error term would be .72.

The results of the VPA, specifically the 1989 numbers at age, the last year in the VPA time series, were used to estimate the current population size (number at age) prior to implementation of theoretical reduction strategies (Table 15). The probabilities associated with the alternatives were then derived using this starting age vector and the appropriate Fs. A frequency distribution of spawning biomass at the end of 5 or 10 years was then obtained by replicating the model 100 times for each 5 or 10 year period. This distribution served as the basis for the estimated probabilities.

Based on the strategy adopted by the Council and ASMFC Summer Flounder Management Board, the probability of reaching a 20% MSP in 5 years (Figure 16) and 10 years (Figure 17) would be approximately 30% and 100%, respectively. The probability that this reduction strategy would result in a 10% MSP in 5 years was close to 80%. The Council and the Commission rejected the other alternatives because they had an associated high risk of recruitment failure (that is, the proposed strategy did not have a high probability of achieving the 10% MSP level in 5 years or the 20% MSP in 10 years) or the economic burden on fishermen was too great.

For example, the alternative with the least amount of reduction in mortality had only about an 8% chance of allowing the stock biomass to rebuild to a 10% MSP level in 5 years. In contrast, a strategy that would have implemented a total closure of the fishery in year one with levels of mortality set at F_{max} in subsequent years, would have virtually guaranteed a 20% MSP level in 5 years, that is the associated probability was close to 90%.

It is important to note that the probabilities associated with each one of the reduction strategies reflect the assumptions associated with the input data. For example, if the mortality on age-1 fish is reduced due to the implementation of mesh regulations or minimum fish size, the associated probabilities would increase. Alternatively, if the variable associated with the effects of environmental factors on recruitment was less than 0.75, the value assumed for the model, the associated probabilities would decline. In addition, if the current (1991) population is more reduced than suggested by the 1989 numbers, than the associated probabilities are overestimates.

The following cost/benefit analysis of management measures recognizes that, due to the interannual variability in fishing effort, stock size and fishing mortality, and the variability associated with the point estimates for expanded recreational catch and commercial fishery landings, it is unwise to use only the past one or two years of data for assessment of fishery conditions and evaluation of management alternatives. Trends are more discernible at the five or ten year level, though they may be reinforced or contradicted by more recent data. A one year decline from a record high catch is more alarming if it substantiates a consistent downward trend from a ten year average.

Since most fish stocks are comprised of many cohorts, the effects of sustained overfishing are expressed through age class compression and lower CPUE over a period of time. Likewise, management measures aimed at reducing fishing mortality will require an adjustment period before the stocks show signs of increased abundance.

Given the above mentioned characteristics of fish stocks and fisheries, it is prudent to use five to ten year time horizons both for evaluating fishery conditions and for implementing reduction strategies. Such long term horizons are scientifically sound, and therefore approvable under the Magnuson Act, but they do affect economic assessments of the impacts of management measures.

In assessing impacts, analyses were performed relative to conditions which would prevail in the absence of the proposed regulations. For example, if a possession limit were imposed on the recreational fishery, the impacts should be gauged against what anglers would catch in the absence of the limit. Since predictions of angler effort and stock size are uncertain, the best way to estimate catch rates is to extrapolate from past experience. Extrapolations based on one year of data may not as accurately reflect true patterns when compared to extrapolations based on a longer time series.

Since stock recovery cannot be instantaneous, it is appropriate to assess impacts, both costs and benefits, over a time frame sufficient to reduce the uncertainty of estimates resulting from interannual variability.

However, short term evidence of stock condition and fishing success must not be ignored when monitoring the effectiveness of management measures. Rather, abrupt changes in fishery conditions should be weighed against long term trends and fishery independent evidence before adjusting and implementing regulations.

9.2.2.2. Recreational Fishery

9.2.2.2.1. Possession limits, minimum size limits, and seasonal closures

MRFSS intercept data from the years 1986 to 1990 were used to determine the impact of alternative possession/size limits on recreational landings. These data indicate that approximately 6% of the successful angler trips would have been affected by a 6 fish possession limit in these years (Table 74). Based on a comparison of the number of trips landing any size summer flounder and those trips where only 14" TL or larger fish were landed, approximately 25% of the trips would have been impacted in those same years by the 14" minimum size.

The percent reduction in exploitation associated with a 6 fish possession limit and a 14" minimum size would have been 33.9% for the years 1986 to 1990 combined (Table 75). This percent reduction reflects corrections for bias associated with the number of summer flounder measured in the MRFSS data set. MRFSS type A fish are fish that are seen and counted by the MRFSS interviewers but not necessarily measured. Frequently, only a portion of the total landings attributed to an individual angler are weighed and measured. The initial analysis of possession and size limits assumed that the measured fish were representative of the sample and that measured lengths could be extrapolated to those fish that are not measured. Based on this assumption, the impact of a 6 fish possession limit and a 14" TL minimum size was 25.8%. However, for summer flounder there is slightly more than a 8% difference between the impact of a 14" minimum size depending on whether the analysis is based on all type A fish or only those that are measured. Accounting for this bias results in a percent reduction of 33.9% for a 6 fish possession limit.

The proposed reduction strategy calls for a reduction in exploitation of 47%. As indicated above, a 6 fish possession limit combined with a 14" TL minimum size does not achieve the target reduction of 47%. However, coastwide seasons would allow for higher possession limits with a 14" TL minimum size.

Analysis of summer flounder recreational data indicated that over 20.1% of the annual landings occurred from October 1 through May 14 for the years 1985 to 1989 combined (Table 76). A closure during this period (i.e., an open season from May 15 through September 30) would have an associated reduction in exploitation of 13.5%, assuming a combined hooking mortality/effort transference rate of 33% (20.1 - (.33 x 20.1)) (Table 77). The combined effect of the season closure with the possession/size limit restrictions would have an associated reduction of 47.4% (i.e., 33.9 + 13.5).

The recreational fishery measures would allow for the States to incorporate a different open season provided the season remained within the same MRFSS waves (May through October) used in the coastwide season. MRFSS waves are bimonthly sampling periods, i.e., there are six waves in each year. Because of the method used to calculate the recreational estimates, catches are assumed to be constant for each week within the sampling period or wave. Thus, equivalent seasons within the same bimonthly sampling period would have the same effect on coastwide recreational landings.

As an example, this provision would allow for southern states to begin and end the season on earlier dates. For example, the States of Maryland, Virginia, and North Carolina could have an open season from May 1 through September 15 with northern states having a season from May 15 through September 30. The combined coastwide effect with the 6 fish possession limit and 14" TL minimum size would be approximately 47%.

The adopted combination of a closed season, minimum fish size, and possession limit (during the first year of FMP operation there will be a 14" TL minimum fish size, 6 fish possession limit, and a fishing season from 15 May through 30 September) is seen as providing the best compromise between a season and a possession limit. The public hearing document included alternative combinations ranging from 3 fish with a season open all year to 10 fish and an open season from 1 July through 31 December. All the options were associated with

a 14" minimum fish size.

These alternatives provided much debate in the meetings with the Council's industry advisors, in the hearings, and in the written comments received by the Council. The debate primarily focused on the issue of how small could a possession limit be and still attract fishermen (customers) to the party and charter boat industry. The conclusion was that with a limit less than 6 fish, the party and charter boat industry would be adversely impacted due to public perceptions that the cost of the fare exceeded ther anticipated benefits of the trip, that is, the number of fish that could be legally taken.

With the 15 May through 30 September season that accompanies the 6 fish possession limit, party and charter boat operators in Virginia were concerned that they would lose the beginning of their season. This concern was accommodated by allowing the States to adjust their seasons so long as they stay within the same waves as the Federal open season. The waves are those used by the Marine Recreational Fishery Statistics Survey (wave 1 = January - February, 2 = March - April, etc.). Since the MRFSS data are only reported by these waves, there is no way to know if the fishing mortality reduction effects of one open season differ from another open season so long as both seasons begin and end in identical waves. This provision would allow for southern States to begin and end the season on earlier dates. For example, the States of Maryland, Virgina, and North Carolina could have an open season from May 1 to September 15. Because this season would fall within the same bimonthly sampling period (May through October), the combined effect on coastwide recreational landings would be approximately the same.

9.2.2.2.2. Evaluation of framework provisions

Based on a recommendation by the Council and the ASMFC Policy Board, the Regional Director and the States in their respective jurisdictions could modify the possession limit to between 0 and 15 summer flounder per angler, the size limit from 13" TL to 16" TL, and open or close the fishing season for the entire year. Recreational limits would be revised according to specific criteria to account for changes in stock abundance and meet the time frame of the fishing mortality reduction strategy, that is, an F of .53 for years 1 through 3 followed by an F of .23 in subsequent years.

Short term impacts due to restrictive limits would be outweighed by the long term benefit of conserving the summer flounder stock for future generations of recreational anglers.

The possession limit could be raised to a maximum of 15 summer flounder, the size limit decreased to 13" TL, and the season open throughout the year. However, decreases in restrictions would only occur under circumstances of increased summer flounder abundance. Since the prevailing rate of fishing success would reflect increased stock abundance, the number of anglers catching their limit would be high for overly restrictive limits. Decreasing recreational restrictions by raising the possession limit, decreasing the size limit, or increasing the length of the fishing season would therefore decrease the number of affected anglers and have less adverse impact than the limit in force at the time.

If stock levels are allowed to continue to decline or the amount of effort by recreational anglers increases (more trips or more people) disproportionately to increases in stock size, landing rates for anglers would decline regardless of specific limits. Adverse impacts would therefore be measured against the prevailing rate of fishing success and would not be as great as when summer flounder are abundant or angler effort is less. In addition, if stock levels do not increase during the first three years of plan implementation recreational restrictions will have to increase to meet F_{max} levels in year four and subsequent years. Although it is not possible to estimate exact impacts for hypothetical levels of summer flounder abundance, it is clear that more restrictive limits than those proposed initially would have substantially less impact than a total fishery closure precipitated by stock collapse.

A zero possession limit or a season closed for the entire year would prohibit retention of summer flounder by recreational fishermen and would have significant impacts, depending on the level of fishing success currently operative and the value anglers place on retention of catch. A 16" TL minimum size, the most restrictive minimum size limit proposed for this framework measure, would have had an associated percent reduction in exploitation of nearly 54% for the years 1986-90. In addition, based on a comparison of the number of trips

landing any size summer flounder and those trips where only 16" TL or larger fish were landed, approximately 58% of the trips would have been impacted in those same years by the 16" minimum size. These severe restrictions would only be implemented in the event that the stock continues to decline and stock collapse becomes imminent.

Reductions associated with these limits assume 100% compliance by recreational fishermen. To determine the compliance by recreational anglers to the 13" minimum size regulation which was implemented in the fall of 1988, MRFSS data from 1985 to 1990 were examined (Figure 18). These data indicate that the percent of summer flounder less than 13" TL declined from 27.4% in 1985 to a low of 7.6% in 1989, the year after implementation. However, the low value in 1989 probably reflects poor recruitment in 1988 (that is, no age 1 fish in 1989) rather than an increase in compliance. In fact, the amount of fish less than 13" TL increased to 10.4% in 1990. Levels of noncompliance will be considered in annual reviews when assessing the impact of bag/size limits on the recreational fishery and determining if modification to the possession/size/season limits are necessary. A thorough and consistent enforcement program is required for this or any other FMP to succeed.

Recreational harvest limits would be calculated on an annual basis to reflect the current status of the stock and the most recent information on recruitment. Year end total recreational landings would be compared to the harvest limit to ensure that the landings target was not exceeded. Based on a 14" TL minimum fish size in the recreational fishery and a 13" TL minimum size and a 5.5" minimum diamond mesh or 6.0" minimum square mesh in the commercial fishery, the 1992 harvest limit would be 4.4 million fish (Table 80). This is in excess of the 1989 landings of 1.8 million fish but well below the 1980-89 average of 15 million (Table 81).

9.2.2.3. Commercial Fishery

9.2.2.3.1. Minimum net mesh size

The proposed management measure of 5.5" minimum cod end mesh (diamond) or 6" minimum square, will impact the costs and revenues of the summer flounder fishery. Landings of other species taken as bycatch in the summer flounder fishery will also be affected, as will landings of small mesh fisheries not targeting summer flounder but which will be subject to the mesh regulation due to summer flounder landings of 100 pounds or greater per trip. These impacts may reduce in time as some of these species should attain a larger size due to reduced fishing mortality.

Weighout data indicate that 5,215 trips landing 100 lbs or more of summer flounder were made in 1989 (Table 53), by approximately 510 vessels (Table 52). It is estimated that approximately 90 North Carolina vessels are in the summer flounder fishery (Hogarth pers. comm.). In order to account for the other vessels not covered by the weighout system (CT and DE), approximately 625 vessels shall be assumed to be affected by the mesh size restrictions. Compliance costs to these vessels fall into the following categories: reduced catch of summer flounder; reduced bycatch of marketable species; and gear conversion and other costs related to altered fishing practices.

Reduced catch of legal sized summer flounder will likely be minimal. A 5.5" diamond mesh has a length of 50% selection (L_{50}) of 13.5" (Tables 82 and 83) and a 6 " square mesh is considered equivalent (section 9.2.2.3.2). All States currently have a minimum legal size limit for summer flounder at 13" or greater (Table 84) so small amounts of flounder which could be legally retained would in fact be lost due to the mesh restriction.

Bycatch of marketable species may be affected, however, since a monthly average of 26% or more of revenues from weighout trips landing 100 pounds or more of summer flounder were derived from other species during 1985-89 (Table 58). The extent to which marketable bycatch is reduced will depend on fishing practices (season, area, etc.) and the selection characteristics of a 5.5" diamond mesh (6" square mesh) for the particular species. Without specific selectivity information, the magnitude of bycatch losses cannot be determined. The problem may be most acute in the southern New England area where other groundfish are relatively abundant and contribute a greater share of the catch (Miscellaneous species in Table 58). However, the 5.5" diamond minimum mesh (6" square mesh) requirement implemented through Amendment 4 to the

Multispecies FMP (NEFMC 1990) requires that a vessel use a 5.5" mesh net if a regulated groundfish species is on board, so, while Amendment 4 may have affected the summer flounder fishery in the southern New England area, this FMP will not impact that fishery since the 5.5" minimum mesh rule is already in place. Sea sampling data (Table 34) suggest that the *Loligo* and scup fisheries can be prosecuted with minimal summer flounder bycatch, so it is possible that they will not be significantly impacted given the 100 pound/trip threshold.

Cost increases associated with gear conversion are estimated to be about $1,000 per codend. Full costs cannot be attributable to the mesh size restriction, however, since many fishermen would be replacing codends due to State regulations and the Multispecies FMP or to normal wear and tear from fishing activities (generally every two years).

Benefits of mesh size restriction in the directed summer flounder fishery would result from reduced fuel consumption and increased catches of larger summer flounder in future years. Studies on fishing net drag and fuel consumption indicate only marginal gains in fuel efficiency with small increases in mesh size, but in times of rising fuel prices savings can be more significant.

Greater gains will accrue to fishermen through protecting small summer flounder until they reach legal size. Discard mortality is extremely high (estimated to be at least 80%) for trawl caught flatfish and the problem is particularly acute when new year classes are abundant. The benefits of the proposed mesh size regulation will be manifested through a more balanced age structure of the summer flounder stock. Further, waste will be reduced due to (1) lower total discards and (2) lower mortality of net encounter.

A threshold of 100 lbs per trip would have affected approximately 85% of the vessels and 59% of the trips landing summer flounder from 1983-89 based on NMFS weighout data (Tables 52 and 53). However, these trips accounted for over 99% of the total summer flounder landed during these years. In fact, for each year from 1983 to 1989 this percentage was 99%. This period encompassed years in which recruitment was both good (1985) and very poor (1988).

The 100 lb threshold was used to define a regulated trip after NMFS disapproved the 500 lb threshold in Amendment 1. The 100 lb threshold would impact between 48 and 66% of the trips, based on annual NMFS weighout data from 1983 through 1989 (Table 30).

9.2.2.3.2. Square and diamond mesh equivalency

Data are limited on the selectivity of a square mesh for summer flounder on which to base an equivalent to the 5.5" diamond mesh. Unquestionably, mesh selectivity for cod, haddock, and pollock demonstrate that for round fish, diamond mesh of 5.5" has roughly the same selectivity characteristics as a square mesh of 5.0". However, selectivity behavior for flatfishes, like summer flounder, have been evaluated significantly less. The equivalency of a 5.5" diamond mesh selectivity to a 6.0" square mesh for summer flounder is based on three sources. First, Amendment 4 to the Northeast Multispecies FMP (NEFMC 1990) states: "The use of square mesh codends is known to significantly increase the retention of small flounders. Preliminary information indicates that a 5.5" square mesh codend may have roughly the same flatfish selectivity characteristics as a 5" diamond mesh codend." Second, in a selectivity study for nets for winter flounder in Connecticut, Simpson (1989) states: "Diamond mesh was found to have a length at 50% retention about 1 cm longer (L_{50} = 22.6 cm), and a selection range (3.4 cm) about 1 cm narrower, than square mesh in 102 mm codends." (conversion from metric is 1 cm = 0.39") The third source is from Canadian researchers in Nova Scotia (Cooper and Hickey 1989) who, while exploring selectivity behavior mainly for cod and haddock, observed: "For flounder, the diamond mesh codends always have higher 50% retention lengths and selection factors."

9.2.2.4. Exemptions to mesh regulation

There are three exemptions to the minimum mesh regulation (section 9.1.2.3.3). One exemption is the area of the EEZ east of 71°30'W, the yellowtail closed area, and 72°20'W (a complete description is in 9.1.2.3.3). The other two exemptions are the fly net and pelagic net fisheries.

The exempted area was suggested by the New England Fishery Management Council.

Among the adverse impacts of a 5.5" diamond minimum mesh size (6" square) restriction for otter trawl trips would be the loss of marketable bycatch to fishermen who currently use smaller mesh in directed fisheries for other species, yet land 100 pounds or more of summer flounder. Many of these trips occur during the winter months off southern New England when vessels target on squid, butterfish, and other species with small mesh.

An analysis of 39 trips landing at the Pt. Judith Fishermen's Coop between December 1989 and April 1990 indicated that the summer flounder landings totalled between 565 and 3,834 lbs, while accounting for between 1.5 and 21.5% of the fish on board. A mesh of 5.5" would reduce total catch to the point where profits would be reduced. On the other hand, discarding summer flounder to reduce landings below the 100 pound threshold would be wasteful since the fish are generally large. "Large" and "Jumbo" categories comprised 75% of the landings of summer flounder in Rhode Island during the first quarter of 1990.

NEFC commercial weighout data were used to determine the length frequencies of summer flounder caught in northeast statistical areas that were entirely offshore 71°30'W, the yellowtail closed area, and 72°20'W. Based on combined 1985 to 1989 data, 99.8% of the summer flounder caught in these areas and landed by commercial fishermen were 13" or greater in length. A total of 84.7% were 15" or larger. These values were higher than the percentages for all other water areas combined, that is, 88.6% of the summer flounder landed from the other water areas were 13" or larger and only 50% were 15" or larger.

Under this alternative, vessels fishing east of the line are exempt from the mesh size requirement if the vessel has a permit from NMFS to fish east of the line (9.1.2.3.3). Vessels with this special permit are prohibited from fishing west of the line and inshore in the yellowtail area. This provision also reduces waste by eliminating the need to discard summer flounder in order to avoid the mesh size requirement.

The mesh size requirement is designed to protect smaller summer flounder, which do not occur in these offshore areas in the winter months. The exemption is thus viewed consistent with the conservation goals of the FMP, while reducing discard waste in the summer flounder fishery.

The 1990 NMFS Sea Sampling program collected data on a number of otter trawl vessels fishing in areas distinctly east of the line. A combined total of 4,059 pounds of summer flounder were caught by these vessels with approximately 8.8% discarded. Discard rates for otter trawl vessels fishing in other areas exceeded 25%.

The special permit mechanism for implementing this exemption is readily enforceable without boarding the fishing vessel. The effort needed to obtain and cancel these permits should be more than offset by the flexibility the exemption offers the fishermen.

The fly net exemption was suggested by the South Atlantic Council and by the State of North Carolina.

The use of fly nets occurs generally between Cape Henlopen, Delaware, and North Carolina in the fall - winter season. Atlantic croaker, weakfish, and Atlantic mackerel were the dominant species in the fly net catches made during successive fishing seasons from 1985 to 1988 (in 1987-88 several catches of large bluefish increased this species' relative importance). Limited amounts of summer flounder are traditionally harvested by this gear, with estimates of only 266 pounds (0.8% of the catch), 91 pounds (0.3%), and 58 pounds (0.2%) for the 1985-86, 1986-87, and 1987-88 fishing seasons harvested per trip. If one extrapolates the North Carolina sampled fly net catch to the total landings in North Carolina, it appears there are between 300 and 500 fly net trips per year. The exemption should increase flexibility to the fishermen while not negatively impacting the conservation objective of the FMP.

The provision that the Regional Director may withdraw the exemption if the annual average summer flounder catch in the fly net fishery exceeds 1% of the total is another safeguard. The 1% is reasonable in light of the statistics in the preceding paragraph.

The pelagic net exemption was suggested primarily by New Jersey fishermen. These nets are similar to the fly nets, are used in the offshore squid fishery, and are sometimes called millionaire nets. The characteristics

of these nets are such that virtually all of the summer flounder captured escape soon after entering the net.

9.2.2.3.3. Commercial quota

The 1992 maximum quota is only slightly less than the amount of summer flounder landed in 1990, but much less than the ten year average of 29.2 million pounds. However, landings of summer flounder represent only a fraction of the fishing mortality experienced by the stock. Undersized summer flounder, those less than 13" TL, experience both discard mortality and deaths due to encounters with commercial gear. The amount of fish dying due to these causes can be high with the current mesh sizes now used in the fishery, that is, an effective mesh size of 4.0" or less. Sea sampling data for 1990 indicated that the ratio of discarded to landed summer flounder can be as high as 1:1 (or 50%) during some months (Figure 19). Discard rates would be even greater in years of good recruitment, that is, years when more small fish were available. Discard rates on other trips may be significantly higher. In the yellowtail flounder fishery, discard rates as high as 9:1 have been observed.

Based on simulations conduced by the NEFC (Gabriel pers. comm.), approximately 22% of the summer flounder caught by commercial fishermen using 5.5" mesh would be discarded under the preferred alternative (Table 80). A larger minimum size of 14" TL, comparable to the minimum size in the recreational fishery, would have a larger discard rate of 35%. To prevent waste, a smaller minimum size of 13" TL will be implemented for the commercial fishery.

A minimum mesh regulation will reduce discard and escape mortality of undersized flounder. Using historical length frequency information, a 5.5" mesh would have reduced the number of summer flounder killed by commercial fishermen in the years 1985-89 by 14% and 30% in the Northeast and North Carolina, respectively (Tables 85 and 86). However, decreases in mortality would occur only with the smaller fish; reductions in mortality would not occur for summer flounder once they reached the legal size of 13" TL. Essentially the fish that contribute the most to the spawning population, fish 13" TL and larger, would continue to experience high mortality rates; overfishing would not be reduced.

The commercial quota will control mortality on fully recruited, older fish. The ability to close the fishery (except for the 100 lbs/trip bycatch) is a very powerful tool in controlling mortality. This bycatch can be accounted for by closing the directed fishery soon enough to allow for the bycatch and, to the extent the quota is exceeded, by appropriately reducing the next year's quota. This combination seems to be the most reasonable compromise between stopping all fishing that may result in additional summer flounder mortality and allowing fishing to continue and making all adjustments in the subsequent year's quota. Since summer flounder may only be sold by and purchased from a vessel with a moratorium permit, the summer flounder bycatch will be accounted for by the vessel and dealer reporting system.

This management measure will result in a short term reduction in the marketable catch and long term benefits as more fish mature and increase the size of the spawning stock. In addition, a reduction in the mortality of small summer flounder will allow for increase in yield or harvest as small fish that were previously killed grow larger and add weight to the stock.

Combined, these two measures, the minimum mesh regulation and the commercial quota, will prevent overfishing and reduce waste. As the stock rebuilds, commercial quotas would increase. Assuming current levels of recruitment, and 100% compliance by fishermen and affected States, the quota could more than double in ten years.

9.2.2.3.4. Moratorium on commercial vessels

The MFCMA allows the Council to limit entry into a fishery if the Council considers the factors set forth in section 303(b)(6) of the Act: "establish a system for limiting access to the fishery in order to achieve optimum yield if, in developing such system, the Council and the Secretary take into account (A) present participation in the fishery, (B) historical fishing practices in, and dependence on, the fishery, (C) the economics of the fishery, (D) the capability of fishing vessels used in the fishery to engage in other fisheries, (E) the cultural and social framework relevant to the fishery, and (F) any other relevant considerations;"

Present participation in the summer flounder commercial fishery is estimated to range between 800 and 2,300 vessels.

In addition to summer flounder, these vessels land scup, black sea bass, *Loligo* squid, yellowtail flounder, and other species. Most of the marketable species caught in the mixed trawl fishery are depleted, if not technically overfished. The Mid-Atlantic Council has already determined that scup and black sea bass are overfished, has adopted a control date for limited entry (the same as that used in this Amendment for summer flounder), and intends to develop an amendment to this FMP to initiate Federal management of these species in the near future. The New England Council has adopted a limited entry control date for the Northeast Multispecies FMP (which includes yellowtail flounder in its management unit) and is debating including an entry limitation measure in an amendment to that FMP currently being developed.

The measures proposed in this Amendment will significantly impact fishermen. They are considered to be the most reasonable and fair given the need to dramatically reduce fishing mortality. The real issue is that, if the measures proposed in this Amendment are not implemented, the negative impact on the fishermen will be even greater.

Given the likely number of vessels operating in this fishery and the level of probable quotas in the near term, not controlling the number of vessels could lead to a significant waste of capital resources as the ever decreasing probability of profits are dissipated over more operating units.

In term of other fisheries, only the Atlantic mackerel and *Loligo* and *Illex* squid resources in the northwest Atlantic are somewhat marketable and not overexploited. However, they cannot be viewed as replacements for summer flounder. To successfully harvest *Illex* vessels must be equipped with freezers or recirculating sea water tanks. Mackerel fishing requires different gear and fishing techniques.

In summary, there are no true alternatives to summer flounder. If there were, fishermen would be harvesting them already.

The Amendment proposes a moratorium on new entrants to the commercial summer flounder fishery. The main purpose of this provision is simply to cap entry so that any future gains in productivity and profitability which may occur in the fishery will not be dissipated by future entrants. In this way, the individuals who make sacrifices today will be able to share in the benefits of future stock recovery, rather than others who experienced none of the hardship.

The initial impacts of this provision are purely administrative. Vessel owners or operators will be asked to provide evidence that they harvested summer flounder between 26 January 1985 and 26 January 1990.

No license is intended or necessary for those individuals who do not sell the fish that they catch.

There are a number of impacts which will occur in the short term. The very fact that entry into the industry has been curtailed will give vessels with moratorium permits a scarcity value that they would not otherwise possess. Experience in the surf clam fishery has shown that, over time, the value these moratorium permits can accrue is substantial, though the magnitude in the summer flounder fishery will be reduced because thousands will be issued instead of hundreds.

Fishermen will also be impacted by the provision controlling vessel replacement. This is intended as a means to reduce the number of vessels in the fishery slightly by attrition, and will expire in five years unless extended by plan amendment or replaced by an alternative limited entry system.

A final impact is the reduction in flexibility which fishermen with genuinely lost vessels will have in replacing them. The current specification of the preferred alternative requires that replacement vessels not have a larger tonnage or registered length than the original. On balance, this limitation is considered necessary to inhibit a large scale increase in the fishing power of the fleet through such replacements.

The MFCMA (Section 303(b)(6)) provides that a fishery management plan may establish a system for limiting

access to a managed fishery in order to achieve Optimum Yield if, in developing such a system, the Council and the Secretary take into account six factors. A discussion of those factors and their application to the proposed limited entry program for the summer flounder fishery follows:

A. Present participation in the fishery.

Present participation in the summer flounder commercial fishery is estimated to range between 800 and 2,300 vessels. The proposed program of limited entry seeks to reduce the size of the fleet gradually through natural attrition. No vessel which is now actively fishing would be denied access to the fishery.

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

Virtually the entire summer flounder commercial catch is made by otter trawls (Table 19). Many species are caught in conjunction with summer flounder (annual average data are shown in Tables 29 and 31, while tow by tow data are shown in Table 33). Data for North Carolina (Table 37) shows as significant a bycatch mix as does the Mid-Atlantic and New England data (Tables 29 and 31). Economically, summer flounder is the most important species in the mixed trawl fishery (Tables 54 - 58).

C. The economics of the fishery.

As discussed above, summer flounder is economically the most important species in the mixed trawl fishery. The provisions of this Amendment, in order to solve the overfishing problem, will impose restrictions on the industry. Limiting entry is the only tool available under the MFCMA to allow vessel owners and operators to recover, at least in part, losses incurred during the rebuilding program. If entry remains open, profits will likely be dissapated among new entrants following recovery.

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

Summer flounder vessels traditionally harvest other species (sections 7.1.5 - 7.1.7 and 8.1.1.2). However, a number of species in the mixed trawl fishery have also been determined to be overfished. The Mid-Atlantic Council has determined that scup and black sea bass are overfished and is preparing another Amendment to this FMP to add scup and black sea bass to the management unit (the Council has already adopted and published in the *Federal Register* a control date for limiting entry into the scup and black sea bass fisheries). The ASMFC has adopted an Amendment to their Weakfish FMP to eliminate an overfished situation and the Mid-Atlantic Council is beginning development of an FMP to extend the ASMFC regime into the EEZ. The Mid-Atlantic Council is also considering an Amendment to the Atlantic Mackerel, Squid, and Butterfish FMP to limit entry into the squid fishery, if not into all of the fisheries covered by that FMP. While summer flounder are caught with these and other species (see sections cited above and Tables 29, 31, 33, and 34), because of its high value, summer flounder is the most economically important species in the fishery (Tables 54-58).

The proposed limited entry program will not force operators out of the fishery unless they clearly do not meet a minimum standard of involvement and activity in the fishery. The program is designed to continue over a period long enough to allow the number of operators to seek its own equilibrium level through natural attrition and to acquire data for an alternative limited entry program.

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

Many of the vessels in the fishery are smaller, older, and are owned and operated by independent, individual fishermen who have obtained their position of ownership through individual enterprise. There is a strong tradition of summer flounder fishing within families. Many of the family operated businesses are the most vulnerable to an influx of additional vessels because they are not in a position to survive long periods without revenue, or to operate at significantly lower levels of gross revenue.

F. Any other relevant consideration.

The management program is designed to rebuild the stocks. However, the vessels currently in the fishery will

have to sacrifice income opportunity as a part of the rebuilding program. While the net benefits to society from the management program are not in question, the benefits to individual operators who make the sacrifice could quickly be lost or eroded among new entrants. The length of the period of sacrifice is unknown. It would be unfair to dissipate the investment of these operators among a flood of opportunistic new entrants when it begins to appear that the stock is rebuilding. The proposed program of limited entry allows traditional operators to recoup at least a portion of their sacrifice. Such a program will promote resource stability and industry efficiency which is in the best interests of the fishing community and the nation.

9.2.2.3.4. Measures to minimize sea turtle conflicts

In 1988, a Section 7 consultation regarding the implementation of the Summer Flounder FMP was conducted. The resultant Biological Opinion, issued on 2 August 1988, concluded that threatened and endangered sea turtles were taken in the summer flounder trawl fishery off North Carolina and southern Virginia in some years, but that the continued existence of turtle populations was not jeopardized by fishing activities (section 9.3.3.1).

Between 26 November and 7 December 1990, 54 sea turtles, including at least 8 endangered Kemp's ridleys, stranded on North Carolina beaches (North Carolina officials estimate that 53 loggerhead, 1 Kemps ridley, and 1 hawksbille were killed in the fall/winter 1991 fishery through 18 December). The North Carolina Division of Marine Fisheries closed State waters to summer flounder bottom trawling from Cape Hatteras Light to Ocracoke Inlet on 7 December 1990. Twenty one additional sea turtles stranded before the end of December. The total mortality included 56 loggerheads, 9 Kemp's ridleys, 6 green turtles, and 4 unidentified sea turtles. During the closure period, in conjunction with the NMFS Pascagoula Laboratory, a Turtle Excluder Device (TED) was developed for use on summer flounder bottom trawlers. Experimental tows conducted during this time indicated that about 0.12 sea turtles were taken per hour for each net towed off Ocracoke in December, 1990 (Table 87). On 26 December 1990, waters were opened to trawlers pulling TEDs until early January, at which time turtles were no longer encountered in North Carolina waters and fishing without TEDs was allowed.

Because of the above new information, consultation under Section 7 of the Endangered Species Act was reinitiated. Evaluation of the sea turtle and fishery distribution data (Figures 20 and 21), trawl data collected off North Carolina in December, 1990, and January, 1991, (Table 87) and stranding data (Figure 22), indicated that the conflict between sea turtles and the fishery occurs annually in the late fall/winter summer flounder fishery in North Carolina. The Draft Biological Opinion resulting from the reinitiated consultation concluded that continued unrestricted operation of this fishery would be likely jeopardize the the continued existence of the endangered Kemp's ridley sea turtle population. Implementation of the reasonable and prudent alternatives discussed above is necessary to allow activities conducted under the Summer Flounder FMP to continue in compliance with the Endangered Species Act.

The Council was advised by NMFS of this situation on 22 August 1991, after the first set of hearings on Amendment 2 had been completed. The Council authorized additional hearings in Virginia and North Carolina so fishermen that could be impacted by the additional measures would have an opportunity to comment. The specific measure included in the notice for these hearings was developed by the Council staff following a conference call involving National Marine Fisheries Service Headquarters, Northeast Region, and Southeast Region staffs, the North Carolina Division of Marine Fisheries, and the Council staff, and was considered a workable solution to the problem by the NMFS, North Carolina, and Council personnel. That measure read as follows:

The Regional Director, Northeast Region, NMFS (Regional Director) is authorized to monitor sea turtles in the Exclusive Economic Zone from the mouth of the Chesapeake Bay to the southern border of North Carolina, through aerial surveys and sea sampling, in concert with similar efforts by the State of North Carolina, and to institute measures in this area within 10 miles (16.1 kilometers) of the shore to minimize the take of sea turtles in the summer flounder fishery between 15 October and 15 January, compatible with such measures instituted by North Carolina. If measures are considered necessary and North Carolina has not acted appropriately, the Regional Director may limit tow times to 60 minutes or close the area to trawlers that do not use nets equipped with turtle excluder devices with bars spaced no greater than 6" (15.2 centimeters) apart, or other devices that may be authorized by the Regional Director.

That provision is now included in section 9.1.2.5. The provision allows the most flexibility between State and Federal regulations to assure that sea turtle mortality is minimized while also minimizing, to the extent possible, negative impacts on fishermen. The idea is to allow the fishery to continue until sea turtles are in the area, at which time the special regulations may be imposed until the turtles leave the area.

9.2.2.4. Administrative, enforcement, and information costs

The minimum mesh regulation requires at sea enforcement in addition to the existing dockside enforcement of minimum size. The at sea enforcement efforts will be estimated by determining the number of vessels taking summer flounder in the EEZ (mesh regulation) and the number of vessels landing summer flounder (minimum size regulation). A change in mesh size will not affect enforcement requirements.

The number of vessels that landed at least 100 lbs of summer flounder caught in the EEZ in 1989 is estimated to be 625 (510 from the weighout files, 90 in North Carolina, and the balance for Connecticut and Delaware; section 9.2.2.3.1). However, the following analysis is based on 700 vessels requiring at sea inspection to reflect the redirection of groundfish otter trawlers to summer flounder and some vessels which will not be taking summer flounder but will be trawling in the same area and therefore need to be checked.

At sea enforcement is estimated to require 2 contacts per vessel per year (1,400 contacts) with an average of 4 contacts per enforcement vessel per day (263 days). It is estimated that patrol vessels ($6,828 per day) would be used for most of the contacts although medium endurance cutters ($26,664 per day) would be required during rough weather (assumed to be 15% of the time).

Whenever new fishery regulations are proposed, it is a common misconception that figures such as the above should be totalled and considered as an additional cost to the existing enforcement budget. Such an approach is inaccurate, however. The true costs of enforcing summer flounder mesh regulations equal the value of the *additional* capital and labor resources required to expand current enforcement efforts to encompass the new regulations. They are *not* equal to the costs which would be borne if entirely new vessels and crew were employed to enforce *only* summer flounder mesh regulations.

A simple analogy would be the case where a police cruiser is assigned to patrol a 15 mile stretch of highway. An officer is required to stop vehicles for traffic violations and enforce a suite of local, State, and Federal laws. What is the cost of enforcing one *additional* statute which was just passed into law? There will be a training cost for the officer to be instructed on the specifics of the law and any technical aspects involved in detecting a violation. However, if the new law does not require a substantial modification of the officer's behavior or increase the territory which must be monitored, the additional costs of enforcement are negligible.

The question then, is, beyond the costs of training Coast Guard personnel in the specifics of the new mesh regulation, what are the additional costs of adding the summer flounder mesh regulation to the suite of groundfish regulations, vessel safety regulations, immigration laws, and drug prohibitions which the Coast guard is already on the water enforcing every day?

The Council is not in a position to determine the answer to this question. Detailed study would be required by Coast Guard personnel on the disposition of its fleet and the additional vessel contacts which would be required to meet the "2 contacts per vessel" target stated above. However, if the total annual cost of enforcing EEZ mesh regulations *only* are estimated at $2.6 million, values for the additional costs they would actually entail (beyond enforcement of existing law) might reasonably be considered to be in the 5% to 15% range. Using the $2.6 million figure as a base, then, additional costs would fall within the range of $130,000 to $390,000.

The provisions of this Amendment are intended to minimize any additional burden on enforcement personnel. The minimum size regulations enacted in the original FMP already requires that enforcement be cognizant of fish size and be prepared to measure individual fish. The minimum mesh size provision is intended to make the summer flounder fishery cleaner with regard to small fish, and replace the need for entering fish holds and examining a great many fish by simply measuring the size of a net's mesh.

For those vessels choosing to fish with small mesh, fishermen will be asked to keep their bycatch of summer flounder apart from other species and store them in a standard (36" long x 15" wide x 12" deep) (3.75 cubic feet) box which holds 100 pounds. Enforcement should be straightforward in that vessels will not be allowed to have more than one 100 lb box of summer flounder on board and fish with small mesh.

The enforcement impacts of the recreational minimum fish size were considered in the current, approved FMP. The enforcement costs of recreational fishing should not increase, and may well decrease, as a result of adding the possession limit to the minimum fish size limit through this Amendment 2. The need to count the number of fish possessed by an angler cannot add significantly to the existing burden of measuring the fish. Given the possession limit, it may be that enforcement personnel will have fewer fish to measure, so there could be a time saving. It is anticipated that most of this enforcement effort will be expended by NMFS and State personnel operating onshore, rather than expensive at sea Coast Guard enforcement activities.

Minimum size regulations currently enforced dockside because State landing restrictions complement the FMP. No additional enforcement costs for size limit regulations result from this Amendment.

The Amendment envisions augmenting the current data collection system in the Northeast with monthly reports gathered from all commercial vessels which harvest summer flounder, as well as weekly from those dealers which buy directly from them. The first objective of this provision is to have the information processed in a timely fashion so that monitoring efforts will be able to accurately set a closure date for the fishery when the quota is reached.

A second objective is to improve the comprehensiveness and accuracy of harvest data to provide a foundation for both current and future management efforts. The most demanding of which would be a system of transferable individual quotas based on vessel catch histories. It was quite clear from experience in the surf clam and ocean quahog fisheries that accurate records of each vessel's harvests were crucial to the process of dividing the resource amongst the fishery's participants. The fact that the information was provided directly from the fishermen themselves improved fishermen's confidence that their efforts were fairly represented.

The major problem in implementing such a system is in avoiding duplication of effort with the current "weighout" based system. As things now stand, much of this information is obtained by NMFS specialists collecting dealer's weighout slips, which are then supplemented by interviews with vessel captains. The system has evolved over the years to accommodate differences in the way that coastal State agencies collect information as well as the way that fishermen and dealers themselves keep their records.

In many States the most prominent channel for selling fish is through dealers. Fishermen will sell their fish to dealers and have their catches recorded on trip "weighout" forms which the dealers use. Some dealers have agreed to use government supplied forms for this purpose, and simply send a carbon copy to the government in postpaid mailers.

The marketing system in New York is perhaps the most different from the traditional dealer system, in that fish are boxed at sea and sent directly to market via trucks which pull up to the docks. Less grading by size and species is possible with this system, and records kept by the trucking companies may not specify important information. NMFS information specialists must then interview captains and attempt to estimate the correct quantities as best they can.

The timing of information flow can also vary up and down the coast. Reports from some dealers in New England ports are collected on a daily basis, while others report weekly or monthly.

Cost estimates for a new reporting system which collects weekly information from fishermen were generated based on similar programs operated by NMFS.

As of 18 June 1991, 2,346 vessels held valid commercial permits for summer flounder and 8 for catcher/processor vessels. Additionally, there were 302 permits for charter or party vessels. A figure of 2,346 commercial vessels may be considered a high estimate for the number of commercial vessels that would report landings of summer flounder, as many owners obtain permits in order to retain the option to harvest, even

though they may not have actually caught much summer flounder for some time. NMFS weighout data (which excludes Connecticut, Delaware, and North Carolina) indicate that, in 1989, 599 vessels landed some summer flounder (Table 52). During the 1983-1989 period, the largest number of commercial vessels landed summer flounder in 1984 (704; Table 52). North Carolina officials estimate there are about 90 vessels in the summer flounder fishery off that State (Hogarth pers. comm.). For purposes of this analysis, the high number of commercial vessels required to report is estimated at 2,300 and the low number is 800 (704 + 90, rounded).

The figure of 302 permits for party and charter vessels is probably quite low, however, since a great many boats simply have not applied for a Federal license. The Sports Fishing Institute estimated that, in 1985, there were 1,626 charter boats and 454 party boats operating from Maine through North Carolina (Table 63). The Council's party and charter boat survey was mailed to 592 vessels (Table 66). For the purposes of this analysis, a range of 500 - 1,000 party and charter boats will be assumed to be required to submit monthly reports for participating in the summer flounder fishery. Given the 15 May through 30 September season of this fishery, it is assumed that, on average, each vessel will submit 5 monthly reports per year.

The number of dealers which buy and sell summer flounder is perhaps the most difficult to estimate. The National Marine Fisheries Service specified 155 as the number of dealers in the Atlantic bluefin tuna fishery (USDC, 1990c). For the purposes of this analysis, a range of 150 - 400 weekly dealer reports will be utilized.

A summary of reporting requirements follows:

	Commercial	Party/Charter	Dealer
Number of units reporting	800 - 2,300	500 - 1,000	150 - 400
Reports per unit per year	12	5	52
Total Annual Reports	9,600-27,600	2,500-5,000	7,800-20,800

Summing together the end points of each range, the overall spread in the potential number of reports submitted to the government each year ranges from 19,900 - 53,400 reports from between 1,450 and 3,700 entities. Governmental costs of administering such a reporting program would have four major components: printing costs for the report forms, mailing costs for their postpaid return, labor costs in processing them, and capital costs for the computers which processors would use. In each of the sections that follow, calculations will first be made using the low end value of the annual reporting range, then followed with the result at the at the high end value.

All of these costs may be recovered as they are part of the cost of issuing permits.

Printing costs were estimated using the most recent such report which the Northeast regional office of NMFS purchased: surf clam and ocean quahog record books. Each record book contained 50 weekly report forms (and postpaid mailers) and was printed at a cost of $8.00 each ($8,000 for an order of 1,000 books). Assuming costs would be similar for summer flounder reporting books, first year printing costs for commercial vessel logs would equal (800 books) x ($8.00 per book) or $6,400 at the low end of the reporting range. At the high end of the reporting range the cost would be $18,400. Recall that while commercial vessels must mail their reports in monthly, the data are tow by tow, so the size of the logbooks, and, hence, the printing cost, would be similar to the surf clam and ocean quahog logbooks. For party and charter boats, since there are only 5 reports per boat per year, assume $4.00 per logbook, the printing cost would be $2,000 to $4,000. Dealer reports would be $1,200 to $3,200. Total printing costs, therefore, would be $9,600 to $25,600.

Annual mailing costs would include the cost of mailing out all the record books at the start of the year plus the regular postage for each report as it was returned to the government. The initial mailing would cost ($2.90 per book) x (1,450 books) or $4,205. Monthly mailings for commercial vessels would cost ($0.29 per report) x (12 reports per year) x (800 entities) or $2,784. Monthly reports for party and charter vessels would cost ($0.29 per report) x (5 reports per year) x (500 vessels) or $725. Weekly mailings from dealers would cost ($0.29 per report) x (52 reports per year) x (150 dealers) or $2,262. Total mailing costs would then equal $9,976 at the low end of the reporting range. At the high end of the reporting range the cost would be $26,216.

Labor costs would equal the salary of a GS-5 government employee (Step 1 = $16,973) plus overhead of 29.5% overhead (benefits and taxes) or $21,980 per person per year. At an average of 5 minutes to process one commercial vessel report (Geyer, pers. comm.), the annual amount of time required to process commercial information would equal (5 minutes per report) x (12 reports per year) x (800 vessels reporting) or 107 days of processing time. Monthly reports from party and charter vessels would be expected to take longer to process than weekly reports, as would dealer reports which describe landings from multiple vessels. Using a figure of 15 minutes for each of these, party and charter boats would require (15 minutes per report) x (5 reports per year) x (500 vessels reporting) or 83 processing days. Dealers would require (15 minutes per report) x (52 reports per year) x (150 dealers) or 260 processing days. Totalled together from each sector, low end processing days would equal 450, or 1,167 days at the high end.

An average federal employee would work approximately 230 days per year assuming 24 paid vacation days, 6 days off for illness, and weekends. Dividing 450 processing days by 230 yields an average of 1.96 person years of processing time required, or a full time processing staff of approximately 2 people. With labor costs of $21,980 per person, the total labor costs for processing would equal ($21,980 per person) x (2 people) or $43,960. At the high end estimate of 1,667 processing days, a total staff of 8 people would be required at a cost of $175,840.

Finally, providing computer equipment for a processing staff would cost on the order of $3,000 per person for a 386 DOS based computer and the necessary accessories. For the entire staff this would cost ($3,000 per machine) x (2 people) or $6,000. Using the high end estimate of 8 staff, the cost would be $24,000. These costs would be reduced to maintenance costs in subsequent years since the computers are durable goods that can be expected to last approximately 5 years.

Totaling the costs across each of the four categories yields the following:

	Low End Range	High end Range
Printing costs	$9,600	$25,600
Mailing costs	9,976	26,216
Labor processing costs	43,960	175,840
Computer capital costs	6,000	24,000
TOTAL	$69,536	$251,656

9.2.2.5. Prices to consumers.

Recent upward trends in the real price per pound of commercially caught summer flounder indicate that the demand and/or supply factors may be shifting. The 1989 price for all size categories of summer flounder was the highest ever, at $1.56/lb (Table 46). Preliminary NMFS data for 1990 indicate an average price of $1.76/lb, ranging from $1.25/lb for small to $2.25/lb for large summer flounder (Schween pers. comm.). It is possible that increased demand for fish in general (e.g., due to health concerns) and summer flounder in particular (e.g. increases in income, section 8.1.3) could be the cause for increased exvessel revenue. To the extent that these factors continue to influence the exvessel price, the FMP effects will be obscured.

It is expected that the reduction in landings and value attributable to this Plan in its early years will not significantly increase overall exvessel summer flounder prices. To the extent that the supply of summer flounder is increased in future years by the reduction in mortality, higher average harvest weight, and stock stability, the price of summer flounder should stay steady or decrease, *ceteris paribus*.

The quantity and value of imports must be considered when the impact of an FMP is considered. Flatfish imports into the US in 1990 totalled 88,444,000 pounds, valued at $161,900, for an average of $1.83/lb (Table 70). Preliminary NMFS data for 1990 indicate 11,971,000 lbs of summer flounder landed at an exvessel value of $21,078,000(Schween pers. comm.). It seems clear that shortfalls in the marketplace, within limits, will likely be met through imports.

9.2.2.6. Redistribution of costs.

The FMP is designed to give fishermen the greatest possible freedom of action in conducting business and pursuing recreational opportunities consistent with the objectives. It is not anticipated that the proposed management measures will redistribute costs between users or from one level of government to another.

9.2.2.7. Fishery impact statement.

Clearly, there will be impacts from the adopted plan. However, if overfishing is to be eliminated, fishing mortality must be reduced (section 9.2.2.1). The real test of impacts is whether the fishing mortality reduction period adopted by the Council represents the best compromise between the probability that the stock will recover relative to minimizing costs to the fishing industry. Achieving the fishing mortality reduction target in the first year would probably require closure of the fishery, thus maximizing costs to the fishermen. Based on the strategy adopted by the Council and ASMFC Summer Flounder Management Board, the probability of reaching a 20% MSP in 5 years (Figure 16) and 10 years (Figure 17) would be approximately 30% and 100%, respectively.

The greatest impact to fishermen would come with no action. With the only management measure being the minimum fish size limit (as it is with the basic Summer Flounder FMP), it is quite likely that the resource would continue to decline and any attempt at recovery in the future would have a greater impact on the fishermen than would the strategy proposed at this time.

The adopted management measures are considered the most reasonable program to achieve the fishing mortality rate reduction target available at this time. The moratorium is included to increase probability of compliance with the management program in the near term, as well as providing a mechanism for participants to share in the recovery of the resource rather than having the dividend of recovery dissipated over additional vessels that could enter the fishery as soon as the resource has recovered. This technique was used to great success with the surf clam fishery.

The importance of summer flounder to the recreational fishery, most particularly the party and charter boat industry, is presented in section 8.2.4. The survey reported in that section was carried out by the Council to characterize this important part of the fishery.

In terms of the consultative requirement of this provision of the Magnuson Act, since the management unit of the FMP is summer flounder in US waters in the western Atlantic Ocean from the southern border of North Carolina northward to the US - Canadian border, the South Atlantic and New England Councils were invited and did designate members of their Councils to the Mid-Atlantic Council's Demersal Species Committee, the oversight committee for this FMP. Additionally, both Councils were invited to appoint industry advisors to the Mid-Atlantic Council Summer Flounder Advisory Panel. The South Atlantic Council named an advisor. The New England Council chose not to name a particualr advisor, but gave the Mid-Atlantic Council a list of fourteen names that were included in all mailings to advisors and those who attended meetings were allowed to participate with the same status as the regularly appointed advisors.

9.3. RELATION OF RECOMMENDED MEASURES TO EXISTING APPLICABLE LAWS AND POLICIES

9.3.1. FMPs

This FMP 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 fishermen 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 on other fisheries by causing transfers of fishing effort.

Many fisheries of the northwest Atlantic result in significant nontargeted species fishing mortality. Therefore, each FMP must consider the impact of nontargeted species fishing mortality on other stocks and as a result of other fisheries.

9.3.2. Treaties or international agreements.

No treaties or international agreements, other than GIFAs entered into pursuant to the MFCMA, relate to this fishery.

9.3.3. Federal law and policies.

9.3.3.1. Marine Mammals and Endangered Species.

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

Four hundred and seventy one large whale sightings, 1547 small whale sightings and 1172 sea turtles were encountered in the surveys (Table 88). The "estimated minimum population number" for each mammal and turtle in the area, as well as those species currently included under the Endangered Species Act, were also tabulated.

CETAP concluded that both large and small cetaceans were widely distributed throughout the study area in all four seasons, and grouped the 13 most commonly seen species into three categories, based on geographical distribution. The first group contained only the harbor porpoise, which is distributed only over the shelf and throughout the Gulf of Maine, Cape Cod, and Georges Bank, but probably not southwest of Nantucket. The second group contained the most frequently encountered baleen whales (fin, humpback, minke, and right whales) and the white-sided dolphin. These were found in the same areas as the harbor porpoise, and also occasionally over the shelf at least to Cape Hatteras or out to the shelf edge. The third group indicated a "strong tendency for association with the shelf edge" and included the grampus, striped, spotted, saddleback, and bottlenose dolphins, and the sperm and pilot whales. While it is unlikely that incidental take of marine mammals would occur in the summer flounder fishery, the Marine Mammal Exemption Program requires that any lethal takes of marine mammals in this fishery be reported to the National Marine Fisheries Service (508-281-9254) within 10 days of the vessel's return to dock. Unreported takes are subject to the prohibitions of the Marine Mammal Protection Act.

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

Pound nets in Maryland, Virginia, and North Carolina take between 2 and 13% of the commercial summer flounder landings of these States (Table 20). An investigation of the causes of sea turtle (loggerhead and some ridley) mortality in Chesapeake Bay indicated pound nets accounted for about 19% of the deaths (Musick *et* al. 1985). Other identifiable causes accounted for 11% of the mortalities with the cause of death undetermined for the remaining 70%.

The winter trawl fishery for summer flounder, which takes place principally off the coast of North Carolina may contribute to the mortality of loggerhead sea turtles (classified as "threatened") and Kemp's ridley sea turtles (classified as "endangered"). Studies at the Virginia Institute of Marine Science (VIMS) (Musick *et al.* 1985, Bellmund *et* al. 1987, Lutcavage and Musick 1985) have shown that large juveniles of these two sea turtles use Chesapeake Bay as a foraging area during the summer. Both species emigrate from the Bay with the onset of northeast storms and falling water temperatures, usually in October. These turtles then migrate south along the coast to the vicinity of Capt Hatteras, North Carolina. Migration south of the Cape usually occurs in early December. The winter trawl fishery usually operates from early October to April in North Carolina waters. Thus,

there is a potential for incidental capture of sea turtles in the fishery during some years when the flounder and turtle migrations overlap. This is confirmed by sea turtle stranding data, which shows distinct peaks in strandings of turtles in northern North Carolina in the fall and early winter of some years.

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

Information regarding the level of turtle mortalities in Virginia and North Carolina comes from stranding data. This circumstantial evidence suggested that flounder trawls were the cause of the mortalities, thus requiring a formal consultation under Section 7 of the Endangered Species Act of 1973 (ESA), as amended. This consultation was conducted by the National Marine Fisheries Service in 1988. The resultant 1988 Biological Opinion indicated that the observed levels and infrequent nature of these events would not jeopardize any sea turtle populations. An Incidental Take Statement was given that allowed the capture of up to 1 dead and 10 live Kemp's ridleys with certain handling and reporting requirements.

Between 26 November and 7 December 1990, 54 sea turtles, including at least 8 endangered Kemp's ridleys, stranded on North Carolina beaches (North Carolina officials estimate that 53 loggerhead, 1 Kemps ridley, and 1 hawksbille were killed in the fall/winter 1991 fishery through 18 December). The North Carolina Division of Marine Fisheries closed State waters to summer flounder bottom trawling from Cape Hatteras Light to Ocracoke Inlet on 7 December 1990. Twenty one additional sea turtles stranded before the end of December. The total mortality included 56 loggerheads, 9 Kemp's ridleys, 6 green turtles, and 4 unidentified sea turtles. During the closure period, in conjunction with the NMFS Pascagoula Laboratory, a Turtle Excluder Device (TED) was developed for use on summer flounder bottom trawlers. Experimental tows conducted during this time indicated that about 0.12 sea turtles were taken per hour for each net towed off Ocracoke in December, 1990 (Table 87). On 26 December 1990, waters were opened to trawlers pulling TEDs until early January, at which time turtles were no longer encountered in North Carolina waters and fishing without TEDs was allowed.

Because of the above new information, consultation under Section 7 of the Endangered Species Act was reinitiated. Evaluation of the sea turtle and fishery distribution data (Figures 20 and 21), trawl data collected off North Carolina in December, 1990, and January, 1991, (Table 87) and stranding data (Figure 322), indicated that the conflict between sea turtles and the fishery occurs annually in the late fall/winter summer flounder fishery in North Carolina. The Draft Biological Opinion resulting from the reinitiated consultation concluded that continued unrestricted operation of this fishery would be likely jeopardize the the continued existence of the endangered Kemp's ridley sea turtle population. Implementation of the reasonable and prudent alternatives discussed above is necessary to allow activities conducted under the Summer Flounder FMP to continue in compliance with the Endangered Species Act.

To be consistent with the Biological Opinion issued for this FMP, fishermen conducting activities regulated under this management plan must comply with any regulations published by NMFS implementing sea turtle conservation measures including mandatory limited tow times, observer coverage, and the use of Turtle Excluder Devices in bottom trawls participating in the winter fishery for summer flounder in waters from Cape Charles, Virginia, to the southern border of North Carolina. This issue is also addressed directly in section 9.1.2.5 of this FMP.

Shortnose sturgeon (*Acipenser brevirostrum*) is an additional endangered species that may be caught incidentally in the summer flounder fishery. Sturgeon will be included in the Incidental Take Statement of the pending Biological Opinion.

The range of summer flounder and the above mentioned marine mammals and endangered species overlap and

there always exists a potential for an incidental kill. Except in unique situations, such accidental catches should have a negligible impact on marine mammal or abundances of endangered species, and the Councils do not believe that implementation of this FMP will have any adverse impact upon these populations.

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

9.3.3.2. Marine Sanctuaries.

There is one national marine sanctuary in the area covered by the FMP: the USS *Monitor* National Marine Sanctuary off North Carolina. The Sanctuary was officially established on 30 January 1975 under the Marine Protection, Research, and Sanctuaries Act of 1972. Rules and regulations have been issued (15 CFR 924) that prohibit deploying any equipment in the Sanctuary, fishing activities which involve "anchoring in any manner, stopping, remaining, or drifting without power at any time" (924.3 (a)), and "trawling" (924.3(h)). The Sanctuary is clearly designated on all National Ocean Survey charts by the caption "protected area". This minimizes the potential for damage to the Sanctuary by fishing operations. Details on sanctuary regulations may be obtained from the Director, Sanctuary Programs Office, Office of Coastal Zone Management, NOAA, 3300 Whitehaven Street NW, Washington, DC 20235.

9.3.3.3. Indian treaty fishing rights

No Indian treaty fishing rights are known to exist in the fishery.

9.3.3.4. 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 Councils, through involvement in the Intergovernmental Planning Program of the MMS, monitor OCS activities and have opportunity to comment and to advise MMS of the Councils' 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. The Councils are unaware of pending deep water port plans which would directly impact offshore fishery management goals in the areas under consideration, and are unaware of potential effects of offshore FMPs upon future development of deep water port facilities.

Approximately 70% of the commercial fishery occurs in the EEZ (Table 2). While the fishery varies among the States and targets on the concentrations of fish as they move inshore in the spring and offshore in the fall, the offshore winter fishery targets on large concentrations of fish that are overwintering along the shelf edge. Offshore (depths up to 500 ft.) areas (section 5.1), where overwintering occurs, and where spawning occurs in the spring, are areas where significant potential conflicts between this resource and offshore energy resources may occur.

9.3.3.5. Vessel Safety

Section 303(a)(6) of the MFCMA requires that FMPs consider access to the fishery for vessels otherwise prevented from harvesting because of weather or other ocean conditions affecting the safety of vessels. The proposed management measures of this FMP do not limit the times or places when or where vessels may fish. Therefore, the Council has concluded that the proposed FMP will not impact or effect the safety of vessels fishing in this fishery.

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

9.3.4.1. State management activities.

Maine, New Hampshire, New Jersey, Delaware, Maryland, Virginia, and North Carolina have 13" minimum possession size limits for summer flounder. Massachusetts, Rhode Island, Connecticut, and New York have 14" minimum possession size limits. Maryland has a tolerance of 5% by number and Virginia has a tolerance of 10% or 2 fish, whichever is greater, for trawl landings (Table 84).

Most of the States regulate fishing gear (Table 84). Maine has a 5.5" minimum mesh size for trawls, scottish seines, bottom tending gillnets and bottom tending seines. Mobile fishing gear may not be used in New Hampshire state waters between April 16 and Dec 14. In Massachusetts, minimum mesh sizes for mobile trawl gear are: - north of Cape Cod: - 5.5" required year round [permitted small mesh exemptions are allowed for underutilized species (e.g., dogfish and ocean pout) with no bycatch of regulated species]; south of Cape Cod: - 5.5" required Nov. 1 - April 14; 3.5" required June 16 - Oct. 31, and no minimum required April 15 - June 15 (squid season); and east of Cape Cod: - 5.5" required Nov. 1 - April 30. In Rhode Island, trawling is prohibited in the upper portion of Narragansett Bay from Nov 1 - July 1; 5" codend minimum mesh size in a portion of central Narragansett Bay from Nov 1 - Feb 28. Connecticut has a codend minimum mesh size of 4.5" in trawls from Nov 15 - May 14, and 3" from Aug 1 - Nov 14. New York has no minimum mesh size for trawls at the present time. In New Jersey, trawls taking summer flounder must have a 4.5" minimum mesh size in the codend. (A summer flounder trip is defined as one in which 20% of the weight of the catch is comprised of summer flounder). In Delaware, trawls, purse seines, power operated seines, and runaround gillnets are prohibited and there is a moratorium on issuance of new commercial (> 200 ft) gillnet permits until the number of fishermen falls below 30. In Maryland, trawls are prohibited within one mile of the coastline, and in Chesapeake Bay. Use of monofilament gillnets prohibited, except in coastal bays and the Atlantic Ocean; several specific gillnet restrictions exist for Chesapeake Bay; minimum mesh sizes for pound nets, haul seines, and fyke nets are 1.5"; purse seines prohibited. Trawls and encircling gillnets are prohibited in Virginia waters. In North Carolina, trawl nets my not be used in internal, coastal fishing waters for finfish, however an unlimited quantity of legal size flounder may be retained as a bycatch in the trawl fisheries for crab and shrimp (non-flounder bycatch is limited to 1,000 pounds per trip).

Many of the states have areas closed at certain times or for certain gear (Table 84), but only Maine has a spawning area closure for groundfish, which includes summer flounder (in Booth Bay and Sheepscot Bay from May 1 to June 30)

Except for the spawning closure in Maine noted above, none of the States have seasonal restrictions on the fisheries for summer flounder (Table 84).

All of the States have some type of license requirement (Table 84). Maine requires a commercial license for the harvest, transport, and sale of fish that are not for personal use; no license is required for fish taken with hook and line for personal use. In New Hampshire there is a resident commercial saltwater fishing license; no sport fishing license; residents are not required to have a license to sell fish caught by hook and line, but a $200 minimum license fee is required for nonresidents. Massachusetts requires commercial fishing licenses; there is no sport license for fish caught for personal use; there is a license to sell fish caught with hook and line is, except for those who sell less than 100 lbs "plus one fish" per day. Rhode Island requires multipurpose commercial licenses allow for harvest and sale of fish; there is no sport license to fish for personal use. In Connecticut, there are a variety of commercial resident and nonresident licenses available allowing for the harvest and sale of fish; marine angling with hook and line does not require a license if fish are for personal use only; personal use fishing with trawls and other specific gear will require a commercial license. A commercial license is required in New York for the harvest and sale of fish; a nonresident license allows landing only; there is no sport license for fish caught for personal use. In New Jersey, commercial gears are licensed; there is no sport fishing license for hook and line gear, and no license is required to sell hook and line caught fish. Commercial food fishing license is required in Delaware for the harvest and sale of fish; there is no sport license for fish caught for personal use.A Maryland tidal fish license is required to catch, buy, or sell fish from tidal waters for commercial purposes; there is a Chesapeake sport fishing license. Commercial licenses are required in Virginia for specific fishing gears; there is no sport fishing license, and no license is required to sell

hook and line caught fish. A commercial license is required in North Carolina for vessels; an inland sport fishing license is necessary for some portions of tidal waters; a license is required to sell fish caught by hook and line, but there is a 500 lb exemption per 12 month period.

Virginia has a 10 fish per day summer flounder possession limit (a voluntary 6 fish per day limit is encouraged, as well as not making use of the 2 undersized fish tolerance). No other States in the management unit have summer flounder possession limits.

Nonresidents in Maine are required by law to report all groundfish (summer flounder) catches.

9.3.4.2. Impact of Federal regulations on State management activities.

All States have 13" or 14" minimum size possession laws and are, therefore, compatible with the FMP.

As noted above, Maine, Massachusetts, and North Carolina are compatible with the 5.5" minimum mesh regulation by virtue of their existing regulations. New Hampshire, Delaware, and Virginia are in compliance by virtue of their bans of trawling. Rhode Island, Connecticut, New York, New Jersey, and Maryland would need to take some action to comply with the proposed regulations.

9.3.4.3. Coastal Zone Management Program Consistency.

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

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

The FMP was reviewed relative to CZM programs of Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and North Carolina. Letters were sent to all of the States listed. The letters to all of the States except New Hampshire and Pennsylvania stated that the Council concluded that the FMP would affect the State's coastal zone and was consistent to the maximum extent practicable with the State's CZM program as understood by the Council. For New Hampshire, the evaluation was that the FMP might affect the coastal zone and was consistent. For Pennsylvania, the evaluation was that the FMP would not affect the coastal zone. The letters were mailed to the States along with a copy of the hearing draft of the FMP. New Hampshire, Massachusetts, New York, New Jersey, Pennsylvania, and North Carolina have concurred with the Council's opinion.

9.4. COUNCIL REVIEW AND MONITORING OF THE FMP

9.4.1. Monitoring

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

The primary organization in the review and monitoring process will be the Summer Flounder FMP Monitoring Committee (section 9.1.2.2).

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

It is also necessary that NMFS conduct more studies to evaluate the equivalency between diamond and square mesh nets. The regulations proposed in this Amendment are based on the best information available. To not provide for diamond versus square mesh would allow a fishermen to use 5.5" square mesh, which, based on all research available to the Council and ASMFC, would select for a higher proportion summer flounder smaller than the 13" minimum size limit than does a 5.5" diamond mesh. Conservation of the resource requires the differentiation in minimum mesh size be made. However, much more research in this area is needed, not only for summer flounder, but for all commercially important species caught with trawls.

Estimates of discarded summer flounder will be very important for adjusting the overall quota in order to meet the target mortality levels. It is, therefore, important that levels of sea sampling effort be sufficient and representative of the fisheries that contribute to summer flounder fishing mortality to accurately describe the level of discard. It must be recognized that this sea sampling will likely involve some vessels not in the summer flounder fishery *per se*, but vessels in the scallop, squid, scup, and groundfish fisheries, for example, where large quantities of summer flounder are caught and possibly discarded.

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Table 1. Summer Flounder Commercial Landings (thousands of lbs) by State, 1940-1989.

Year	ME	NH	MA	RI	CT	NY	NJ	DE	MD+	VA+	NC	Total
1940	0	0	2847	258	149	1814	3554	3	444	1247	498	10814
1941	na	na	na	na	na	na	na	na	183	764	na	947
1942	0	0	193	235	126	1286	987	2	143	475	498	3945
1943	0	0	122	202	220	1607	2224	11	143	475	498	5502
1944	0	0	719	414	437	2151	3159	8	197	2629	498	10212
1945	0	0	1730	467	270	3182	3102	2	460	1652	1204	12297
1946	0	0	1579	625	478	3494	3310	22	704	2889	1204	14305
1947	0	0	1467	333	813	2695	2302	46	532	1754	1204	11146
1948	0	0	2370	406	518	2308	3044	15	472	1882	1204	12219
1949	0	0	1787	470	372	3560	3025	8	783	2361	1204	13570
1950	0	0	3614	1036	270	3838	2515	25	543	1761	1840	15442
1951	0	0	4506	1189	441	2636	2865	20	327	2006	1479	15469
1952	0	0	4898	1336	627	3680	4721	69	467	1671	2156	19625
1953	0	0	3836	1043	396	2910	7117	53	1176	1838	1844	20213
1954	0	0	3363	2374	213	3683	6577	21	1090	2257	1645	21223
1955	0	0	5407	2152	385	2608	5208	26	1108	1706	1126	19726
1956	0	0	5469	1604	322	4260	6357	60	1049	2168	1002	22291
1957	0	0	5991	1486	677	3488	5059	48	1171	1692	1236	20848
1958	0	0	4172	950	360	2341	8109	209	1452	2039	892	20524
1959	0	0	4524	1070	320	2809	6294	95	1334	3255	1529	21230
1960	0	0	5583	1278	321	2512	6355	44	1028	2730	1236	21087
1961	0	0	5240	948	155	2324	6031	76	539	2193	1897	19403
1962	0	0	3795	676	124	1590	4749	24	715	1914	1876	15463
1963	0	0	2296	512	98	1306	4444	17	550	1720	2674	13617
1964	0	0	1384	678	136	1854	3670	16	557	1492	2450	12237
1965	0	0	431	499	106	2451	3620	25	734	1977	272	10115
1966	0	0	264	456	90	2466	3830	13	630	2343	4017	14109
1967	0	0	447	706	48	1964	3035	0	439	1900	4391	12930
1968	0	0	163	384	35	1216	2139	0	350	2164	2602	9053
1969	0	0	78	267	23	574	1276	0	203	1508	2766	6695
1970	0	0	41	259	23	900	1958	0	371	2146	3163	8861
1971	0	0	89	275	34	1090	1850	0	296	1707	4011	9352
1972	0	0	93	275	7	1101	1852	0	277	1857	3761	9223
1973	0	0	506	640	52	1826	3091	*	495	3232	6314	16156
1974	*	0	169	2552	26	2487	3499	0	709	3111	10028	22581
1975	0	0	1768	3093	39	3233	4314	5	893	3428	9539	26311
1976	*	0	4020	6790	79	3203	5647	3	697	3303	9627	33368
1977	0	0	1478	4058	64	2147	6566	5	739	4540	10332	29927
1978	0	0	1439	2238	111	1948	5414	1	676	5940	10820	28586
1979	5	0	1175	2825	30	1427	6279	6	1712	10019	16084	39561
1980	4	0	367	1277	48	1246	4805	1	1324	8504	13643	31216
1981	3	0	598	2861	81	1985	4008	7	403	3652	7459	21056
1982	18	*	1665	3983	64	1865	4318	8	360	4332	6315	22928
1983	84	0	2341	4599	129	1435	4826	5	937	8134	7057	29548
1984	2	*	1488	4479	131	2295	6364	9	813	9673	12510	37765
1985	3	*	2249	7533	183	2517	5634	4	577	5037	8614	32352
1986	0	*	2954	7042	160	2738	4017	4	316	3712	5924	26866
1987	8	*	3327	4774	609	2641	4451	4	319	5791	5128	27052
1988	5	0	2421	4719	741	3439	6006	7	514	7756	6770	32377
1989	9	0	1878	3083	513	1464	2865	3	204	3689	4206	17913

* = less than 500 lbs.; na = not available; + = NMFS did not identify flounders to species prior to 1957 for both MD and VA and thus the numbers represent all unclassified flounders.
NOTE: numbers may not total due to rounding.
Source: 1940-1977 USDC 1984; 1978- 1989 unpublished NMFS General Canvass data.

Table 2. Summer Flounder Commercial Landings (thousands of lbs) by State by Distance from Shore (miles) and Percent of Total Summer Flounder Landings Taken from the EEZ, 1980-1989

Year	Distance	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	NC+	All
1980	0-3	-	-	218	185	3	1,090	493	1	65	1,238	3,399	6,696
	3-200	4	-	147	1,091	44	155	4,311	-	1,258	7,265	10,242	24,520
	Total	4	-	365	1,276	48	1,245	4,805	1	1,323	8,503	13,642	31,216
	% EEZ	100	-	40	85	91	12	89	-	95	85	75	78
1981	0-3	-	-	406	352	21	1,727	853	6	8	441	837	4,655
	3-200	2	-	191	2,507	59	257	3,155	-	394	3,210	6,621	16,400
	Total	2	-	597	2,860	81	1,984	4,008	6	403	3,651	7,459	21,056
	% EEZ	100	-	32	87	73	12	78	-	97	87	88	77
1982	0-3	-	-	855	475	8	1,282	402	7	59	463	2,103	5,657
	3-200	17	1	810	3,507	56	582	3,916	-	300	3,868	4,211	17,270
	Total	17	1	1,665	3,982	64	1,865	4,318	7	360	4,331	6,315	22,927
	% EEZ	100	100	48	88	87	31	90	-	83	89	66	75
1983	0-3	1	-	693	507	32	977	485	5	125	2,757	3,644	9,228
	3-200	82	-	1,648	4,091	96	458	4,340	-	811	5,376	3,413	20,319
	Total	83	-	2,341	4,599	129	1,435	4,826	5	936	8,134	7,057	29,547
	% EEZ	98	-	70	88	74	31	89	-	86	66	48	68
1984	0-3	-	-	721	617	59	1,571	1,342	8	125	3,618	3,174	11,239
	3-200	2	1	766	3,862	71	722	5,021	-	687	6,055	9,334	26,525
	Total	2	1	1,488	4,479	130	2,294	6,364	8	812	9,673	12,509	37,764
	% EEZ	100	100	51	86	54	31	78	-	84	62	74	70
1985	0-3	1	-	530	822	133	1,419	1,187	4	79	928	1,454	6,561
	3-200	1	0	1,718	6,710	50	1,098	4,446	-	498	4,107	7,160	25,791
	Total	2	1	2,249	7,532	183	2,517	5,634	4	577	5,036	8,614	32,352
	% EEZ	28	100	76	89	27	43	78	-	86	81	83	79
1986	0-3	-	-	465	914	145	1,808	1,049	3	27	510	2,176	7,101
	3-200	-	1	2,488	6,127	15	929	2,967	-	288	3,202	3,747	19,764
	Total	-	1	2,953	7,042	160	2,737	4,016	3	315	3,712	5,923	26,865
	% EEZ	-	100	84	87	9	33	73	-	91	86	63	73
1987	0-3	-	-	727	349	82	1,062	480	4	122	1,500	1,204	5,534
	3-200	7	1	2,600	4,424	526	1,578	3,970	-	196	4,290	3,922	21,517
	Total	7	1	3,327	4,774	609	2,641	4,450	4	318	5,790	5,127	27,051
	% EEZ	100	100	78	92	86	59	89	-	61	74	76	79
1988	0-3	-	-	801	338	277	1,685	834	6	192	1,078	1,869	7,084
	3-200	4	-	1,619	4,380	463	1,753	5,171	1	321	6,677	4,900	25,292
	Total	4	-	2,420	4,718	740	3,438	6,006	6	513	7,756	6,770	32,377
	% EEZ	100	-	66	92	62	50	86	3	62	86	72	78
1989	0-3	-	-	283	140	27	133	126	2	104	319	201	1,338
	3-200	9	-	1,594	2,942	485	1,330	2,738	-	99	3,369	4,004	16,574
	Total	9	-	1,877	3,082	513	1,463	2,864	2	204	3,688	4,205	17,913
	% EEZ	100	-	84	95	94	90	95	-	48	91	95	92

- = zero
Note: numbers may not total due to rounding.
Source: unpublished NMFS General Canvass data.

Table 3. Estimated Total Weight (millions of lbs)+ of Several Substitutable Species Caught by Marine Recreational Anglers, US East Coast, 1960 - 1989

	Summer Flounder		Bluefish		Weakfish and Sea trout		Striped Bass		Scup		Sea Bass		Total Weight of Recreational	
	lbs	%	lbs	%	lbs	%	lbs	%	lbs	%	lbs	%	lbs	%
1960	53.0	7	50.6	7	26.9	4	37.5	5	16.6	2	12.6	2	731.9	100
1965	34.8	4	90.5	11	20.5	2	56.9	7	14.4	2	10.9	1	836.5	100
1970	28.3	3	119.2	13	40.7	4	73.3	8	4.4	*	21.5	2	917.6	100
1979	25.1	5	136.9	26	19.6	4	8.9	2	9.5	2	NA	NA	534.4	100
1980	33.1	7	148.6	29	48.0	9	2.2	*	9.6	2	8.5	2	476.1	100
1981	16.7	4	123.2	29	17.8	4	1.5	*	5.7	2	6.5	2	426.4	100
1982	27.9	7	104.2	26	14.3	4	12.9	3	7.4	2	25.2	7	396.1	100
1983	54.5	11	144.2	29	15.4	3	5.2	1	8.6	2	10.1	3	494.5	100
1984	47.9	13	88.4	24	8.8	2	4.8	1	4.0	1	11.4	4	365.8	100
1985	20.6	5	100.3	25	9.4	2	5.0	1	9.1	2	9.7	3	397.4	100
1986	35.5	6	130.9	22	17.1	3	15.1	2	16.2	3	19.0	3	608.6	100
1987	32.2	9	109.5	29	13.1	3	16.1	4	8.1	2	3.8	1	374.3	100
1988	30.8	6	73.5	14	16.5	3	16.5	3	6.4	1	9.5	2	535.5	100
1989	5.0	1	51.5	12	28.2	7	NA	NA	9.8	2	11.5	3	417.9	100
1960-70 Mean	38.7	5	86.8	10	29.4	3	55.9	7	11.8	2	15.0	2	828.7	100
1980-89 Mean	30.4	7	107.4	24	18.9	4	8.8	2	8.5	2	11.5	3	449.3	100

+ = total number of fish (Types A, B1, and B2) multiplied by mean weight of Type A fish.
NA = data not available.
* = less than 0.5%.
In 1960, summer flounder was listed with other species under "flat fishes".
In 1979, black sea bass was listed with other species under "sea basses".
Sources: 1960: Clark, 1962. 1965: Deuel and Clark, 1968. 1970: Deuel, 1973. 1974: Deuel, pers. comm. 1979 - 1986: USDC 1987b. 1987-1989: Essig pers.comm.

Table 4. Summer Flounder Spring Offshore Mean Number per Tow (fitted Δ values), NEFC Survey, Offshore Strata 1-12, 61-76

	Age											
Year	0	1	2	3	4	5	6	7	8	9	10	Total
1976	0.00	0.03	1.50	0.60	0.25	0.06	0.01	0.01				2.46
1977	0.00	0.54	1.17	0.62	0.09	0.08	0.01		0.01			2.51
1978	0.00	0.52	0.71	0.49	0.14	0.03	0.02	0.02			0.01	1.92
1979	0.00	0.11	0.32	0.15	0.07	0.06			0.02			0.73
1980	0.00	0.01	0.64	0.28	0.13	0.02	0.05	0.03	0.01		0.01	1.18
1981	0.00	0.58	0.52	0.17	0.08	0.05	0.03	0.02	0.01			1.46
1982	0.00	0.53	1.09	0.09	0.02							1.72
1983	0.00	0.36	0.44	0.21	0.05	0.01				0.01		1.08
1984	0.00	0.24	0.46	0.13	0.07		0.01	0.01				0.93
1985	0.00	0.42	1.18	0.16	0.03	0.02						1.80
1986	0.00	1.23	0.36	0.17	0.02	0.01						1.78
1987	0.00	0.55	0.51	0.02	0.02							1.11
1988	0.00	0.41	0.57	0.05	0.02							1.05
1989	0.00	0.07	0.32	0.03	0.01							0.45
1990	0.00	0.56	0.03	0.05								0.64

Source: USDC 1990b.

Table 5. Summary of Summer Flounder Recruitment Indices from State, Federal, and University Research Surveys, North Carolina through Massachusetts

	Year Class										
Survey	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
NEFC1 (age 1)	0.58	0.53	0.36	0.24	0.42	1.23	0.55	0.41	0.07	0.56	
NEFC1 (age2)	1.09	0.44	0.46	1.18	0.36	0.51	0.58	0.32	0.03		
MASS2 (age 1)	0.40	0.38	0.24	0.04	0.14	0.97	0.62	0.15		0.25	
MASS2 (age 2)	1.42	1.30	0.07	1.19	0.53	0.58	0.97	0.34	0.02		
VIMS3 (age 0)	1.36	1.25	1.65	0.73	0.50	0.53	0.45	0.19	0.14	0.28	0.38
MASS4 (age 0)			3.00	3.00	1.00	19.00	5.00	5.00	2.00	3.00	11.00
VIMS5 (age 0)							3.23	0.75	0.06	0.77	1.98
NC6 (age 0)								19.86	2.61	6.86	4.20

1 Number-per-tow (fitted Δ values), NEFC Survey, Offshore Strata 1-12, 61-76.
2 Number-per-tow (stratified mean), Massachusetts Division of Marine Fisheries spring trawl survey.
3 Number-per-tow (stratified mean), Virginia Institute of Marine Science historical trawl survey.
4 Total number, Massachusetts Division of Marine Fisheries beach seine survey (fixed stations).
5 Number-per-tow, Virginia Institute of Marine Science young-of-the-year survey (fixed stations).
6 Number-per-tow (stratified mean), North Carolina Division of Marine Fisheries.

Source: USDC 1990b.

Table 6. Maturity Indices (% Ovary Weight of Total Fish Weight) for Summer Flounder, June 1974-October 1976.

Month	Year	n	Mean	SD	Range
June	1974	58	0.65	0.33	0.31-2.26
	1975	100	0.76	0.55	0.34-3.34
July	1974	64	0.56	0.19	0.27-1.27
August	1974	43	0.57	0.17	0.21-1.01
September	1974	95	1.34	1.30	0.23-5.59
	1975	81	1.38	1.40	0.34-7.77
October	1974	78	1.83	2.05	0.23-11.53
	1976	139	2.05	1.38	0.37-7.91
November	1974	39	1.87	1.39	0.41-6.35
December	1975	171	1.60	0.90	0.31-8.71
February	1975	14	1.26	2.29	0.43-9.23
March	1975	14	0.84	0.38	0.51-1.79
	1976	72	0.94	0.95	0.36-6.20
April	1975	12	0.81	0.38	0.46-1.91
May	1975	42	0.71	0.23	0.32-1.17

Source: Morse, 1981.

Table 7. Mean Length (inches) at Age of Male and Female Summer Flounder Collected from the Spring and Autumn NEFC 1975-1989 Bottom Trawl Surveys

	Age 0	1	2	3	4	5
			Spring			
Males	-	10.4	14.0	17.2	19.6	19.7
Females	-	10.4	15.4	18.3	22.2	23.9
			Autumn			
Males	10.5	13.7	16.2	18.6	20.0	21.1
Females	10.3	15.0	18.4	21.3	23.2	26.2

Source: Almeida pers. comm.

Table 8. Length-Weight Relationships for Summer Flounder, Expressed as Log_{10} Weight = Log_{10} a + b (Log_{10} Length), Correlation Coefficient (r), & Expected Mean Weight at 15.7" (400 mm) TL for Each Month by Sex.

Month	Year	Sex	n	Mean Wt.(g)*	a	Log10 b	r
June	1974	M	46	687	-5.565	3.229	0.97
		F	68	692	-5.810	3.324	0.99
July	1974	M	23	739	-5.827	3.342	0.99
		F	75	717	-5.495	3.207	0.98
August	1974	M	30	739	-5.826	3.341	0.97
		F	75	720	-5.398	3.170	0.98
September	1974	M	110	747	-4.675	2.901	0.96
		F	104	735	-5.477	3.206	0.98
October	1974	M	54	727	-4.719	2.914	0.99
		F	87	756	-5.111	3.070	0.99
November	1974	M	42	711	-5.98	3.055	0.99
		F	40	713	-5.421	3.180	0.99
February	1975	M	33	702	-5.178	3.084	0.99
		F	18	691	-4.848	2.953	0.98
March	1975	M	11	663	-4.617	2.859	0.98
		F	15	692	-5.287	3.123	0.98
April	1975	M	10	655	-5.230	3.092	0.99
		F	20	682	-5.408	3.167	0.99
May	1975	M	55	670	-5.886	3.339	0.98
		F	80	666	-5.498	3.198	0.99
June	1975	M	154	676	-5.700	3.278	0.99
		F	151	675	-5.584	3.233	0.99
Total		M	568	703	-5.289	3.126	0.98
		F	702	703	-5.548	3.226	0.99

* 1 gram = 0.035 ounces: 1 ounce = 28.35 g.
Source: Morse, 1981.

Table 9. Parameters of the von Bertalanffy Growth Equation Derived for Summer Flounder in the Middle Atlantic Bight.*

Parameter	Male	Female
L∞ (cm)#	67.49	82.67
	(9.26)	(8.68)
k	0.183	0.1731
	(0.068)	(0.056)
to (years)	-1.657	-1.039
	(0.649)	(0.691)

* Asymptotic standard errors for each parameter in parentheses.
# 1 cm = 0.3937"; 1" = 2.540 centimeters.
Source: USDC 1986.

Table 10. Total Catch-at-Age of Summer Flounder (thousands), ME-NC, 1982-1988

	Age										Total
Year	0	1	2	3	4	5	6	7	8	9	Catch
1982	5,224	19,070	12,329	814	280	116	68	26	4	-	37,931
1983	11,989	33,271	8,790	1,072	167	103	16	20	5	4	55,473
1984	12,056	31,614	14,242	3,401	1,075	247	110	5	1	4	62,755
1985	2,427	16,933	17,510	2,805	1,663	313	135	5	2	1	41,794
1986	4,411	16,170	10,665	4,166	295	496	150	20	86	-	36,549
1987	2,656	19,839	10,637	1,700	620	34	35	409	11	-	35,491
1988	3,541	21,995	14,069	2,143	643	131	63	20	5	-	42,610

Source: USDC 1990b.

Table 11. Mean Weight-at-Age (kg*) of All Landed Summer Flounder, ME-NC, 1982-1988

	Age										Mean wt.
Year	0	1	2	3	4	5	6	7	8	9	all ages
1982	0.254	0.435	0.654	1.687	2.135	2.795	2.621	3.762	4.284		0.534
1983	0.218	0.447	0.786	1.297	1.466	1.706	2.567	3.169	3.875	4.370	0.475
1984	0.228	0.399	0.640	1.055	1.592	2.245	3.476	3.620	4.640	4.030	0.491
1985	0.282	0426.	0.612	1.092	1.782	2.343	2.670	4.682	4.780	4.800	0.611
1986	0.256	0.454	0.659	1.173	1.790	2.503	3.267	2.994	4.415		0.624
1987	0.237	0.445	0.651	1.121	1.933	2.852	3.080	3.020	4.140		0.557
1988	0.290	0.474	0.648	1.158	1.985	2.699	3.968	3.913	4.500		0.584

* 1 kg = 2.2046 pounds; 1 pound = 0.4536 kilograms.
Source: USDC 1990b.

Table 12. Sex Ratios (male:female) of Summer Flounder, Collected in NMFS Bottom Trawls Between Cape Cod and Cape Hatteras, 1974-1979.

Total Length			1974-1979 (combined)		
interval (in)	Spring	Summer	Fall	Winter	Total
8.1-10.0	15:7	12:4	175:63	49:12	251:86
10.1-12.0	76:32	90:31	298:84	38:16	502:163
12.1-14.0	93:56	213:93	430:205	31:24	767:378
14.1-15.9	80:94	139:137	284:456	28:42	531:729
16.0-17.9	22:90	50:115	71:204	16:32	159:441
18.0-19.9	7:41	7:63	31:138	4:20	49:262
20.0-21.9	2:16	4:28	3:77	2:10	11:131
22.0-23.8	0:10	0:6	1:36	0:5	1:57
>23.9	0:3	0:5	0:20	0:5	0:33
Total	295:349	515:482	1293:1283	168:166	2271:2280
%	46:54	52:48	50:50	50:50	50:50

Source: Morse, 1981 modified.

Table 13. Length at Maturity of Summer Flounder, Collected in NMFS Bottom Trawls, Between Cape Cod and Cape Hatteras, 1974-1979

Total Length (in)	Males 1974-75 # of Obs.	Males 1974-75 % Mature	Males 1976-77 # of Obs.	Males 1976-77 % Mature	Males 1978-79 # of Obs.	Males 1978-79 % Mature	Males 1974-76 (fall only) # of Obs.	Males 1974-76 (fall only) % Mature	Females 1974-75 # of Obs.	Females 1974-75 % Mature	Females 1976-77 # of Obs.	Females 1976-77 % Mature	Females 1978-79 # of Obs.	Females 1978-79 % Mature	Females 1974-76 (fall only) # of Obs.	Females 1974-76 (fall only) % Mature	Males 1974-79 # of Obs.	Males 1974-79 % Mature	Females 1974-79 # of Obs.	Females 1974-79 % Mature
7.1	-	-	3	0	-	-	-	-	-	-	-	-	-	-	-	-	3	0	-	-
7.5	3	0	9	33	-	-	-	-	-	-	-	-	-	-	-	-	12	25	-	-
7.9	5	20	8	38	-	-	2	0	-	-	-	-	-	-	-	-	13	31	-	-
8.3	15	33	15	20	-	-	9	11	-	-	-	-	-	-	-	-	30	27	-	-
8.7	25	24	24	21	8	0	33	27	-	-	-	-	-	-	-	-	57	19	-	-
9.1	26	35	43	35	7	14	30	30	-	-	-	-	-	-	-	-	74	33	-	-
9.4	36	36	25	52	5	20	43	42	-	-	5	0	-	-	-	-	66	41	5	0
9.8	57	37	38	58	7	29	54	27	-	-	5	20	5	0	-	-	102	44	10	10
10.2	78	45	29	69	12	75	69	44	17	0	15	7	8	13	17	0	119	54	40	5
10.6	64	70	40	90	16	44	53	70	14	7	11	27	10	10	8	13	120	73	35	14
11.0	80	76	35	89	26	58	63	76	33	3	16	25	7	14	19	5	141	76	56	11
11.4	83	77	45	87	19	63	51	88	18	6	15	40	10	40	15	13	147	78	43	26
11.8	92	89	28	89	19	74	59	92	37	22	11	27	20	60	25	28	139	87	68	34
12.2	95	96	39	97	19	74	55	98	30	30	25	60	9	89	26	31	153	94	64	50
12.6	122	94	34	94	19	68	71	100	45	42	11	82	10	60	33	55	175	91	66	52
13.0	122	91	40	98	15	73	84	99	60	47	11	73	13	77	33	67	177	91	84	55
13.4	141	97	44	100	15	87	108	99	73	59	22	82	7	86	44	71	200	97	102	66
13.8	112	96	-	-	15	87	104	98	94	64	10	90	10	60	66	71	127	95	114	66
14.2	103	94	-	-	14	79	78	100	117	80	16	88	10	70	75	84	117	92	143	80
14.6	97	95	-	-	25	100	-	-	117	79	28	96	11	82	103	87	122	96	156	82
15.0	85	97	-	-	-	-	-	-	131	82	39	95	12	50	109	96	85	97	182	82
15.4	76	99	-	-	-	-	-	-	124	84	34	97	12	58	97	95	76	99	170	85
15.7	48	98	-	-	-	-	-	-	93	90	28	100	11	82	70	96	48	98	132	90
16.1	45	100	-	-	-	-	-	-	87	91	-	-	10	90	61	95	45	100	97	91
16.5	-	-	-	-	-	-	-	-	68	93	-	-	10	100	41	98	-	-	78	94
16.9	-	-	-	-	-	-	-	-	74	87	-	-	-	-	45	100	-	-	74	87
17.3	-	-	-	-	-	-	-	-	70	99	-	-	-	-	-	-	-	-	70	99
17.7	-	-	-	-	-	-	-	-	32	100	-	-	-	-	-	-	-	-	32	100
Total	1610		499		241		966		1334		302		185		887		1821		2350	
Size at 50% Maturity		9.9		9		10.7		10		13		11.9		12		12.7		9.7		12.7
95% Confid. Interval		9.6-10		9-9.6		10-11		9.8-10		12.9-13		11.6-12		11-13		12.5-12.9		9.5-9.9		12.5-12.9

- = zero

Source: Morse, 1981.

Table 14. Fecundity Relationships of Summer Flounder, with Length Expressed as Log_{10} Fecundity = Log_{10} a + b, and Weight and Ovary Weight Expressed as Fecundity = a + bX. SE is Standard Error and r is Correlation Coefficient.

Years		n	a	b
1974-1977	Length (cm)*	134	-3.098	3.402
1974-1976	Weight (g)**	79	-101867.500	908.864
1974-1976	Ovary weight (g)	79	552515.161	10998.048

* 1 cm = 0.394 inches:1 inch = 2.540 cm.
** 1 gram = 0.035 ounces:1 ounce = 28.35 grams.

Source: Morse, 1981.

Table 15. Fishing Mortality and Stock Number for Summer Flounder by Age

Fishing Mortality (F) at Age

Age	1982	1983	1984	1985	1986	1987	1988	Ave F 82-85	Ave F 82-88
0	0.0755	0.1516	0.2574	0.0586	0.0834	0.0599	0.1234	0.1358	0.1157
1	0.6824	0.9200	0.7382	0.6932	0.6663	0.6413	0.9567	0.7585	0.7569
2	1.4778	0.7983	1.5229	1.3175	1.4297	1.3955	1.4643	1.2791	1.3437
3	1.0456	0.4543	0.8599	1.9470	1.5683	0.9755	1.3766	1.0767	1.1753
4	1.2617	0.6263	1.1914	1.6323	1.4990	1.1855	1.4196	1.1779	1.2594
+gp	1.2617	0.6263	1.1914	1.6323	1.4990	1.1855	1.4196		

Stock Number-At-Age (start of year)

Age	1982	1983	1984	1985	1986	1987	1988	1989	Ave stock 82-85
0	79,185	93,820	58,362	46,986	60,741	50,311	33,588		67,183
1	42,066	60,118	66,011	36,938	36,279	45,751	38,795	24,307	49,832
2	17,213	17,407	19,615	25,832	15,120	15,255	19,725	12,202	19,739
3	1,362	3,215	6,414	3,502	5,664	2,963	3,094	3,735	3,149
4	422	392	1,671	2,222	409	966	915	639	885
+gp	323	347	571	609	1,043	762	312	243	
Total	140,570	175,299	152,644	116,090	119,256	116,010	96,428	41,126	

Source: USDC 1990b.

Table 16. Indirect Methods for Estimating Alpha Based on Life History Parameters.

Source	Equation	Input	Alpha
Hoenig *et al.* (1987)	$r = 425.2 \times t_m$-0.949 (3 years)	t_m = 1095 days	2.84
Cushing (1973)	alpha = 1.98 + $0.0306XF^{0.33}$	F = 687,873	2.45
Longhurst (1983)	r = 3K[(L∞/L)-1]	L∞ = 82.7 L = 42.3 K = 0.1731 t_o = -1.039	2.47
Boudreau and Dickie (1989)	r = 2.88 * w-0.33	w = 190.6 Kcal	2.48
Krebs (1972)	Leslie model	age specific	2.41

Table 17. Preliminary Ranking of Major Threats to Living Marine Resources and Habitats in the Northeast.

1. Urban and Port Development *
2. Ocean Disposal #
3. Dams
4. Agricultural Practices ●
5. Industrial Waste Discharges @
6. Domestic Waste Discharges @
7. OCS Oil and Gas Development
8. Insect Control
9. Water Diversion
10. Sand and Gravel Mining
11. Power Generation

* Includes dredge and fill and construction activities covered by Section 10/104 permits, as well as point source pollution covered by NPDES permits and nonpoint source pollution.

Includes dredged material disposal in State waters, as well as actual ocean dumping of dredged material, sewage sludge, etc., covered by Section 103 permits.

● Includes nonpoint source pollution (fertilizers, animal wastes, biocides, sediments, heavy metals, etc.) that affects coastal aquatic areas.

@ Point source pollution covered by NPDES permits.

Source: USDC, 1985.

Table 18. Summer Flounder Landings by State and Fishing Area, 1983-89 Combined.

	ME		MD		MA		NH		NJ		NY		RI		VA		ALL	
Area	1000 Lbs	%	1000 Lbs	%	1000 Lbs	%	1000 Lbs	%	1000 Lbs	%	1000 Lbs	%	1000 Lbs	%	1000 Lbs	%	1000 Lbs	%
464	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*
465	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	*
511	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	*
512	19	15	-	-	*	*	-	-	-	-	-	-	-	-	-	-	19	*
513	62	49	-	-	3	*	1	100	-	-	-	-	-	-	-	-	66	*
514	*	*	-	-	526	3	-	-	-	-	-	-	5	*	-	-	532	*
515	23	18	-	-	4	*	-	-	-	-	-	-	10	*	-	-	37	*
521	-	-	-	-	187	1	-	-	*	*	-	-	25	*	*	*	213	*
522	*	*	-	-	124	1	-	-	-	-	-	-	56	*	-	-	181	*
523	*	*	-	-	16	*	-	-	-	-	-	-	10	*	-	-	27	*
524	*	*	-	-	238	1	-	-	-	-	-	-	127	*	-	-	366	*
525	*	*	-	-	600	3	-	-	-	-	-	-	4,501	12	1	*	5,103	3
526	*	*	-	-	4,015	24	-	-	-	-	160	1	7,010	19	80	*	11,267	7
533	-	-	-	-	-	-	-	-	-	-	-	-	1	*	-	-	1	*
534	-	-	-	-	-	-	-	-	-	-	28	*	-	-	-	-	28	*
537	2	2	*	*	2,738	16	-	-	36	*	1,020	10	16,362	45	55	*	20,216	14
538	-	-	-	-	6,318	39	-	-	-	-	*	*	1,753	4	12	*	8,085	5
539	-	-	-	-	143	1	-	-	-	-	4	*	3,180	8	-	-	3,328	2
561	*	*	-	-	4	*	-	-	-	-	-	-	*	*	-	-	4	*
562	*	*	-	-	33	*	-	-	-	-	-	-	4	*	-	-	38	*
611	-	-	-	-	-	-	-	-	*	*	2,013	19	216	1	-	-	2,230	1
612	-	-	3	*	270	1	-	-	2,522	7	1,570	15	34	*	249	1	4,650	3
613	*	*	1	*	634	3	-	-	1,639	4	2,893	28	1,096	3	443	1	6,709	4
614	*	*	12	*	-	-	-	-	3,247	9	-	-	-	-	173	*	3,433	2
615	*	*	73	2	26	*	-	-	1,636	4	3	*	4	*	281	1	2,026	1
616	6	5	123	3	218	1	-	-	2,880	8	2,444	24	1,619	4	721	1	8,014	5
621	-	-	1,995	59	18	*	-	-	9,063	26	-	-	9	*	4,058	9	15,145	10
622	3	2	526	15	20	*	-	-	12,992	38	16	*	8	*	4,178	9	17,745	12
623	5	4	-	-	-	-	-	-	-	-	-	-	-	-	35	*	41	*
624	-	-	*	*	-	-	-	-	-	-	-	-	1	*	-	-	1	*
625	-	-	29	1	-	-	-	-	*	*	-	-	-	-	4,581	10	4,610	3
626	*	*	537	16	8	*	-	-	*	*	-	-	3	*	10,788	25	11,337	7
627	-	-	26	1	-	-	-	-	*	*	-	-	-	-	-	-	26	*
631	-	-	-	-	-	-	-	-	-	-	-	-	8	*	11,816	27	11,824	8
632	-	-	-	-	1	*	-	-	-	-	-	-	-	-	4,485	10	4,486	3
635	-	-	-	-	-	-	-	-	-	-	-	-	-	-	319	1	319	*
636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	*	13	*
700	-	-	-	-	-	-	-	-	*	*	-	-	-	-	-	-	*	*
All	126	100	3,330	100	16,154	100	1	100	34,020	100	10,154	100	36,053	100	42,297	100	142,137	100

* = less than 500 Lbs or 0.5%
Source: Unpublished NMFS weighout data (CT, DE, NC not included).

Table 19. Summer Flounder Commercial Landings by Gear, ME-NC, 1980-89 Combined.

Gear	1000 Pounds	Percent
Haul Seines, Beach	94	*
Haul Seines, Long(Danish)	6	*
Stop Nets	2	*
Purse Seines, Menhaden	239	*
Beam Trawls, Other	8	*
Otter Trawl Bottom, Fish	269,179	96
Otter Trawl Bottom, Lobster	119	*
Otter Trawl Bottom, Scallop	52	*
Otter Trawl Bottom, Shrimp	5	*
Otter Trawl Bottom, Other	1,248	*
Otter Trawl Midwater	1	*
Trawl Midwater, Paired	110	*
Trawl Bottom, Paired	27	*
Scottish Seine	5	*
Weirs	1	*
Pound Nets, Fish	2,862	1
Pound Nets, Other	25	*
Floating Traps (Shallow)	619	*
Fyke And Hoop Nets, Fish	13	*
Pots And Traps, Crab, Blue	1	*
Pots And Traps, Eel	1	*
Pots And Traps, Fish	22	*
Pots And Traps, Lobster Inshore	2	*
Pots And Traps, Lobster Offshore	1	*
Gill Nets, Other	170	*
Gill Nets, Drift, Other	79	*
Gill Nets, Drift, Runaround	2	*
Gill Nets, Stake	17	*
Lines Hand, Other	688	*
Lines Troll, Other	61	*
Lines Long Set With Hooks	10	*
Spears	1	*
Dredges, Clam	1	*
Dredges, Conch	1	*
Dredges Scallop, Bay	1	*
Dredges Scallop, Sea	3,389	1
Unk. 989	1	*
ALL GEAR	279,072	100

* = less than 0.5 %
Source: Unpublished NMFS General Canvass data.

Table 20. Summer Flounder Commercial Landings by State and Gear, 1980-89 Combined.

Gear	ME % of Total	NH % of Total	MA % of Total	RI % of Total	CT % of Total	NY % of Total	NJ % of Total	DE % of Total	MD % of Total	VA % of Total	NC % of Total
Haul Seines, Beach	-	.	-	0.0	0.0	0.0	-	2.8	0.4	0.1	.
Haul Seines, Long(Danish)	-	.	0.0	-	.	-	0.0	-	.	-	.
Stop Nets	-	.	-	0.0	-	.	-	.	-	.	.
Purse Seines, Menhaden	-	.	1.2	-	.	-	0.0	-	.	0.0	.
Beam Trawls, Other	-	.	-	.	-	.	-	.	-	0.0	.
Otter Trawl Bottom, Fish	93.5	76.9	93.6	94.3	99.2	97.9	98.4	-	93.8	92.5	100.0
Otter Trawl Bottom, Lobster	-	.	-	0.0	-	0.5	0.0	-	.	0.0	.
Otter Trawl Bottom, Scallop	-	.	0.0	-	.	0.0	0.0	-	0.0	0.1	.
Otter Trawl Bottom, Shrimp	3.5	15.4	0.0	-	.	-	.	-	.	-	.
Otter Trawl Bottom, Other	-	.	-	2.8	-	.	-	.	-	.	.
Otter Trawl Midwater	-	.	-	.	-	.	-	.	-	0.0	.
Trawl Midwater, Paired	-	.	0.5	0.0	-	.	0.0	-	.	-	.
Trawl Bottom, Paired	-	.	-	0.1	-	0.0	-	.	-	.	.
Scottish Seine	0.5	-	0.0	0.0	-	.	0.0	-	.	-	.
Weirs	-	.	-	.	-	.	-	.	-	0.0	.
Pound Nets, Fish	-	.	0.6	-	0.0	0.8	0.2	-	2.1	3.9	.
Pound Nets, Other	-	.	0.1	-	.	-	.	-	.	-	.
Floating Traps (Shallow)	-	.	-	1.4	-	.	-	.	-	.	.
Fyke And Hoop Nets, Fish	-	.	-	0.0	-	.	-	1.0	0.2	0.0	.
Pots And Traps, Crab, Blue	-	.	-	.	-	.	-	.	-	0.0	.
Pots And Traps, Eel	-	.	0.0	-	.	-	.	-	.	0.0	.
Pots And Traps, Fish	-	.	0.0	-	.	-	.	-	0.2	0.0	.
Pots And Traps, Lobster Inshore	-	.	-	.	0.0	-	0.0	-	.	-	.
Pots And Traps, Lobster Offshore	-	.	-	.	-	.	0.0	-	.	-	.
Gill Nets, Other	1.7	7.7	0.0	0.1	0.0	0.0	0.0	83.1	1.1	0.0	.
Gill Nets, Drift, Other	-	.	-	.	0.0	-	0.0	8.7	0.0	0.1	.
Gill Nets, Drift, Runaround	-	.	-	.	-	.	0.0	-	.	-	.
Gill Nets, Stake	-	.	-	.	-	.	-	.	0.3	-	.
Lines Hand, Other	-	.	1.7	0.3	0.6	0.5	0.0	4.4	1.5	0.0	.
Lines Troll, Other	-	.	0.0	0.1	-	.	-	.	-	.	.
Lines Long Set With Hooks	-	.	0.0	0.0	-	.	-	.	-	.	.
Spears	-	.	-	.	0.0	-	.	-	.	-	.
Dredges, Clam	-	.	-	.	-	.	-	.	0.0	-	.
Dredges, Conch	-	.	-	.	-	.	-	.	0.0	0.0	.
Dredges Scallop, Bay	-	.	-	.	-	.	-	.	0.0	-	.
Dredges Scallop, Sea	0.8	-	2.1	0.8	-	0.2	1.3	-	0.4	3.2	.
Unk. 989	-	.	-	.	0.0	-	.	-	.	-	.
ALL GEAR	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* = less than 0.05 %
Source: Unpublished NMFS General Canvass data.

Table 21. Percent of Summer Flounder Landings Taken by Otter Trawl in Each Fishing Area (distance from shore), by State, 1980-89 Combined.

State	Percent of Fishing Area Total: State Waters (<3 Miles)	EEZ (>3 Miles)
ME	100.0	96.9
NH	-	92.3
MA	90.8	94.8
RI	83.7	98.7
CT	97.4	100.0
NY	97.7	99.5
NJ	98.5	98.4
DE	-	-
MD	63.3	99.2
VA	81.0	95.8
NC	100.0	100.0

Source: Unpublished NMFS General Canvass data.

Table 22. Summer Flounder Commercial Landings (thousands of lbs) by State by Month, All Gear, 1980-1989 Mean

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
ME	1	1	1	1	2	1	2	1	1	1	1	1	13
NH	1	-	1	1	1	1	1	-	1	1	1	1	1
MA	45	47	93	97	129	267	277	223	192	303	134	53	1,866
RI	550	708	725	435	296	127	108	144	300	546	247	225	4,417
NY	167	128	119	90	421	176	153	241	316	181	66	86	2,149
NJ	743	597	438	184	196	155	89	337	792	517	325	351	4,729
MD	87	63	48	34	19	11	24	29	48	46	65	97	576
NC	2,299	967	556	331	110	33	18	13	56	152	982	2,239	7,762
FL	937	898	659	412	117	53	87	113	210	477	1,167	890	6,027
Total	4,832	3,413	2,643	1,588	1,293	826	761	1,105	1,918	2,225	2,989	3,946	27,543
EEZ	4,300	3,339	2,622	1,557	727	403	269	453	1,096	1,709	1,801	2,900	21,181
State	531	73	20	29	565	423	490	651	819	512	1,187	1,045	6,351

- = zero. Source: Unpublished NMFS General Canvass data.

Table 23. Distribution (%) of Summer Flounder Commercial Landings by Month by State, All Gear, 1980-1989 Mean

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
ME	9.8	14.6	3.9	6.5	15.0	1.0	17.0	11.1	4.3	2.6	1.8	12.4	100.0
NH	9.1	-	26.6	21.4	1.6	4.1	12.7	-	1.3	9.5	7.0	6.7	100.0
MA	2.4	2.6	5.0	5.2	6.9	14.3	14.9	12.0	10.3	16.3	7.2	2.9	100.0
RI	12.5	16.0	16.4	9.9	6.7	2.9	2.5	3.3	6.8	12.4	5.6	5.1	100.0
NY	7.8	6.0	5.6	4.2	19.6	8.2	7.1	11.2	14.7	8.4	3.1	4.0	100.0
NJ	15.7	12.6	9.3	3.9	4.2	3.3	1.9	7.1	16.8	10.9	6.9	7.4	100.0
MD	15.1	11.0	8.5	5.9	3.3	2.0	4.2	5.2	8.4	8.0	11.4	16.9	100.0
VA	15.6	14.9	10.9	6.8	2.0	0.9	1.4	1.9	3.5	7.9	19.4	14.8	100.0
NC	29.6	12.5	7.2	4.3	1.4	0.4	0.2	0.2	0.7	2.0	12.7	28.8	100.0
Total	17.5	12.4	9.6	5.8	4.7	3.0	2.8	4.0	7.0	8.1	10.9	14.3	100.0
EEZ	20.3	15.8	12.4	7.4	3.4	1.9	1.3	2.1	5.2	8.1	8.5	13.7	100.0
State	8.4	1.2	0.3	0.5	8.9	6.7	7.7	10.3	12.	98.1	18.7	16.4	100.0

- = zero. Source: Unpublished NMFS General Canvass data.

Table 24 . Distribution (%) of Summer Flounder Commercial Landings by State by Month, All Gear, 1980-1989 Mean

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
ME	*	*	*	*	*	*	*	*	*	*	*	*	*
NH	*	-	*	*	*	*	*	-	*	*	*	*	*
MA	0.9	1.4	3.6	6.2	10.0	32.3	36.4	20.2	10.0	13.6	4.5	1.4	6.8
RI	11.4	20.8	27.4	27.4	22.9	15.5	14.3	13.1	15.7	24.6	8.3	5.7	16.0
NY	3.5	3.8	4.5	5.7	32.6	21.3	20.1	21.8	16.5	8.1	2.2	2.2	7.8
NJ	15.4	17.5	16.6	11.6	15.2	18.8	11.8	30.6	41.3	23.3	10.9	8.9	17.2
MD	1.8	1.9	1.8	2.2	1.5	1.4	3.2	2.7	2.5	2.1	2.2	2.5	2.1
VA	19.4	26.3	25.0	26.0	9.1	6.5	11.5	10.2	11.0	21.5	39.1	22.6	21.9
NC	47.6	28.3	21.1	20.9	8.5	4.1	2.4	1.2	2.9	6.9	32.9	56.8	28.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EEZ	89.0	97.8	99.2	98.1	56.2	48.7	35.4	41.0	57.2	76.8	60.3	73.5	76.9
State	11.0	2.2	0.8	1.9	43.8	51.3	64.6	59.0	42.8	23.2	39.7	26.5	23.1

- = zero; * = less than 0.5%. Source: Unpublished NMFS General Canvass data.

Table 25. Distribution (%) of Summer Flounder Landings by State, Jan-Jun vs. Jul-Dec, 1980-89

State	Jan-Jun	Jul-Dec	Total
ME	50.8	49.2	100.0
NH	62.7	37.3	100.0
MA	36.5	63.5	100.0
RI	64.4	35.6	100.0
NY	51.4	48.6	100.0
NJ	49.0	51.0	100.0
MD	45.9	54.1	100.0
VA	51.1	48.9	100.0
NC	55.4	44.6	100.0
All	53.0	47.0	100.0
EEZ	61.1	38.9	100.0
State	25.9	74.1	100.0

Source: Unpublished NMFS General Canvass data.

Table 26. Summer Flounder Commercial Landings by State and Size Class, 1980-89 Combined

	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	NC	All
Size Class	%	%	%	%	%	%	%	%	%	%	%	%
Jumbo	8	7	10	23	-	1	5	-	3	3	3	7
Large	26	30	35	33	-	1	26	-	17	20	18	21
Medium	44	38	37	28	-	1	35	72	22	28	21	25
Small	14	7	6	10	-	.	28	-	22	25	19	18
Unclassified	5	15	9	4	100	97	3	27	34	22	38	26

Source: Unpublished NMFS General Canvass data.

Table 27. Coverage of Weighout System Relative to General Canvass for Summer Flounder. (Last column is weighout percent of General Canvass. Data are all gear, Maine to North Carolina, but note that CT, DE and NC are not included in the weighout system.)

	Weighout			General Canvass			
	Landings (1000 lbs)	Value ($1000)	Avg. Price	Landings (1000 lbs)	Value ($1000)	Avg. Price	WO/GC %
80	-	-	-	31,216	16,035	0.51	-
81	-	-	-	21,056	14,629	0.69	-
82	-	-	-	22,928	16,628	0.73	-
83	20,416	14,150	0.69	29,548	19,926	0.67	0.69
84	22,173	15,777	0.71	37,765	25,935	0.69	0.59
85	20,753	20,048	0.97	32,352	31,027	0.96	0.64
86	20,509	25,737	1.25	26,866	32,667	1.22	0.76
87	20,980	30,447	1.45	27,052	37,953	1.40	0.78
88	24,394	31,757	1.30	32,377	40,602	1.25	0.75
89	12,912	20,618	1.60	17,913	27,992	1.56	0.72

Source: Unpublished NMFS General Canvass and weighout data.

Table 28. Total Summer Flounder Landings and Percent Taken by Otter Trawl for States Included in Weighout, 1983-89.

	Summer Flounder Landings (Pounds)		Otter Trawl
Year	All Gear	Otter Trawl	Percent
1983	20,415,693	20,047,416	98.2
1984	22,173,282	21,641,547	97.6
1985	20,752,977	20,001,042	96.4
1986	20,508,872	19,942,525	97.2
1987	20,980,158	20,311,298	96.8
1988	24,394,428	23,640,259	96.9
1989	12,912,205	12,478,982	96.6
Total	142,137,615	138,063,069	97.1

Source: Unpublished NMFS weighout data (CT, DE, NC not included).

Table 29. Mean Catch Composition of all Otter Trawl Trips Landing Summer Flounder, 1983-89.

	83		84		85		86		87		88		89		All Years	
Species	Lbs	%	Lbs	%	Lbs	%	Lbs	%	Lbs	%	Lbs	%	Lbs	%	Lbs	%
Black Sea Bass	195	1	233	1	152	1	204	2	223	2	166	1	151	1	190	1
Scup	766	5	711	5	580	6	669	7	555	6	503	5	460	4	613	6
Bluefish	80	1	103	1	126	1	135	1	118	1	88	1	100	1	108	1
Butterfish	341	2	1,002	8	391	4	383	4	348	4	199	2	275	2	432	4
Croaker	2	*	14	*	21	*	13	*	12	*	5	*	25	*	13	*
Winter Flounder	1,045	7	839	7	642	7	524	6	480	5	425	4	334	3	627	6
Summer Flounder	2,553	18	2,564	21	2,351	28	2,257	26	2,345	28	2,725	30	1,941	20	2,404	24
Mackerel	58	*	129	1	231	2	91	1	109	1	259	2	245	2	157	1
Weakfish	88	1	93	1	69	1	106	1	97	1	58	1	53	1	82	*
Tautog	3	*	21	*	19	*	15	*	12	*	11	*	8	*	13	*
Whiting	715	5	791	6	781	9	830	9	964	11	828	9	873	9	822	8
Lobster	11	*	20	*	11	*	8	*	19	*	17	*	10	*	14	*
Sea Scallop	46	*	28	*	40	*	23	*	108	1	152	1	96	1	68	*
Loligo Squid	856	6	846	7	810	9	1,111	13	1,005	12	1,446	16	2,339	24	1,158	11
Misc. Species	7,004	50	4,474	37	2,139	25	2,104	24	1,786	21	2,022	22	2,656	27	3,219	32
Total Trip	13,763	100	11,866	100	8,362	100	8,473	100	8,182	100	8,904	100	9,568	100	9,920	100

* = less than 0.5%
Source: Unpublished NMFS weighout data (CT, DE, NC not included).

Table 30. Weighout Otter Trawl Trips Landings Summer Flounder. Note that weighout data are a sample of fishing activity, not a census.

	83	84	85	86	87	88	89	Mean 83-89
				100 lbs or more				
Mean lbs/trip	3,899	3,863	3,428	3,382	3,463	3,961	3,219	3,618
# of trips	6,509	7,632	8,147	10,165	9,674	8,306	5,215	7,950
Landings ('000)	19,900	21,504	19,774	19,067	19,331	20,879	11,429	18,841
% of WO Total*	99	99	99	99	99	99	99	99
				Less than 100 lbs				
Mean lbs/trip	28	30	31	28	26	29	25	28
# of trips	5,134	4,690	6,527	6,553	5,079	5,266	5,613	5,552
Landings ('000)	147	136	226	194	136	160	146	164
% of WO Total*	1	1	1	1	1	1	1	1

* Percent of weighout total summer flounder where effort data available.
Source: Unpublished NMFS weighout data (CT, DE, NC not included).

Table 31. Mean catch Composition of Summer Flounder Otter Trawl Trips Landing 100 Lbs/trip or Greater, 1983-89.

	83		84		85		86		87		88		89		All Years	
Species	Lbs	%	Lbs	%	Lbs	%	Lbs	%	Lbs	%	Lbs	%	Lbs	%	Lbs	%
Black Sea Bass	263	1	312	2	197	2	288	2	262	2	210	2	214	1	251	2
Scup	713	4	706	5	599	6	771	7	556	6	571	5	515	4	638	5
Bluefish	79	*	120	*	121	1	166	1	140	1	102	*	106	*	120	1
Butterfish	338	2	1,212	8	476	5	513	5	453	4	251	2	360	3	528	4
Croaker	3	*	12	*	27	*	11	*	10	*	5	*	21	*	12	*
Winter Flounder	1,042	6	708	5	570	6	498	5	454	4	413	4	246	2	578	5
Summer Flounder	3,899	24	3,863	28	3,428	36	3,382	34	3,463	37	3,961	38	3,219	28	3,618	31
Mackerel	47	*	69	*	244	2	84	*	95	1	281	2	181	1	142	1
Weakfish	97	*	77	*	60	*	78	*	61	*	44	*	43	*	67	*
Tautog	3	*	22	*	21	*	19	*	14	*	13	*	9	*	15	*
Whiting	504	3	504	3	559	5	637	6	747	8	674	6	774	6	620	5
Lobster	15	*	20	*	9	*	9	*	21	*	16	*	8	*	14	*
Sea Scallop	65	*	26	*	55	*	30	*	131	1	179	1	148	1	86	*
Loligo Squid	790	4	913	6	717	7	1,125	11	1,023	11	1,634	15	2,880	25	1,219	10
Misc. Species	8,289	51	4,908	36	2,266	24	2,101	21	1,729	18	1,902	18	2.689	23	3,455	30
Total Trip	16,145	100	13,471	100	9,350	100	9,711	100	9,160	100	10,258	100	11,403	100	11,363	100

* = less than 0.5%
Source: Unpublished NMFS weighout data (CT, DE, NC not included).

Table 32. Summer Flounder Catch by 3-Digit Area, 1990 (3-digit areas on Figure 14)

3-digit area	% summer flounder
513	*
521	*
522	*
525	*
526	*
537	5
538	*
539	2
613	4
614	1
616	12
621	20
622	38
623	*
626	15
632	2
Total	100

* = less than 0.5%.
Source: Unpublished NEFC sea sampling survey data.

Table 33. Average Species Composition (%) of Tows Catching Summer Flounder, 1990

Species	Tows catching any summer flounder (505 tows)	Tows catching > 100 lbs summer flounder (153 tows)
Summer flounder	6	18
Skates	22	15
Dogfish	10	3
Loligo	10	12
Silver hake	9	8
Scup	8	4
Sea robins	7	22
Yellowtail flounder	6	*
Horshoe crab	5	2
Red hake	3	2
Fourspot flounder	2	3
Butterfish	1	1
Atlantic mackerel	1	1
Angler	1	2
Black sea bass	1	2
Sea scallops	1	2
Other species	9	5
Total	100	100

* = less than 0.5%; percentages may not sum to 100% because of rounding.
Source: Unpublished NEFC sea sampling survey data.

Table 34. Average Species Composition (%) of Selected Otter Trawl Tows , 1990

Species	Tows catching >100 lbs Loligo (214 tows)	Tows catching >500 lbs Loligo (87 tows)	Tows catching >100 lbs Scup (97 tows)	Tows catching >500 lbs Scup (39 tows)
Summer flounder	4	2	2	1
Skates	8	7	5	2
Dogfish	3	2	6	3
Loligo	31	49	13	7
Silver hake	12	11	10	5
Scup	14	6	37	59
Sea robins	7	6	5	3
Red hake	2	2	5	3
Butterfish	5	7	4	3
Atlantic mackerel	2	*	6	7
Other species	12	10	8	7
Total	100	100	100	100

* = less than 0.5%; percentages may not sum to 100% because of rounding.
Source: Unpublished NEFC sea sampling survey data.

Table 35. Average Annual Summer Flounder Landings by State, 1980-89, all Gear Combined.

State	Pounds	Percent
ME	13,450	*
NH	130	*
MA	1,928,700	6.9
RI	4,434,860	15.9
CT	266,010	1.0
NY	2,162,430	7.7
NJ	4,729,520	16.9
DE	5,030	*
MD	576,620	2.1
VA	6,027,990	21.6
NC	7,762,540	27.8
Total	27,907,280	100.0

* = less than 0.5%
Source: Unpublished NMFS General Canvass data.

Table 36. Summer Flounder Mean Catch per Trip and Percent of Total Trip Catch in Sampled North Carolina Winter Trawl Fisheries, 1982-89.

	Nearshore		Deepwater		Flynet	
Season	lbs/trip	%	lbs/trip	%	lbs/trip	%
1982-83	12,285	93.7	3,029	10.3	713	2.9
1983-84	21,707	93.3	6,296	29.2	884	2.9
1984-85	18,286	88.6	9,755	38.2	108	0.4
1985-86	7,390	74.2	5,559	35.0	266	0.8
1986-87	6,822	62.0	5,185	24.2	92	0.3
1987-88	9,101	81.5	8,096	56.2	53	0.2
1988-89	6,895	91.7	8,917	72.0	88	0.4
Mean	11,783	83.6	6,690	37.9	315	1.1

Source: North Carolina 1990.

Table 37. Seasonal Mean Catch/trip (lb/trip) for the Dominant Species in the 1982-89 North Carolina Nearshore Flounder Trawl Fishery, Including the Species Percent of the Total Weight of the Catches Sampled.

Species		Season 1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	7-season mean CPUE
Summer Flounder	lb/trip	12,311	21,753	18,325	7,405	6,837	9,121	6,909	11,808
	%	94	93	89	74	62	82	92	87
Weakfish	lb/trip	448	547	761	1111	2674	783	40	908
	%	3	2	4	11	24	7	1	7
Loligo pealei	lb/trip	187	289	461	234	282	172	163	256
	%	1	1	2	2	3	2	2	2
Bluefish	lb/trip	66	276	445	260	337	485	55	276
	%	1	1	2	3	3	4	1	2
Northern Kingfish	lb/trip	64	18	11	95	37	15	<2	35
	%	1	*	*	1	*	*	*	*
Southern Kingfish	lb/trip	<2	7	11	90	31	40	<2	24
	%	*	*	*	1	*	*	*	*
Butterfish	lb/trip	9	66	18	46	79	29	2	35
	%	*	*	*	1	1	*	*	*
Atlantic Sturgeon	lb/trip	15	15	37	15	15	13	2	18
	%	*	*	*	*	*	*	*	*
Goosefish	lb/trip	2	220	201	40	44	53	31	84
	%	*	1	1	*	*	1	*	1
Southern Flounder	lb/trip	26	0	26	4	15	108	2	26
	%	*	*	*	*	*	1	*	*
Atlantic Croaker	lb/trip	4	9	18	130	364	71	31	90
	%	*	*	*	1	3	1	*	1
Totals (11 species)	lb/trip	13,133	23,199	20,313	9,431	10,717	10,889	7,236	13,563
	%	100	100	99	95	97	97	97	100

* = less than 0.5%. Source: North Carolina 1990.

Table 38. Percent Reductions (PR) in Number of Summer Flounder Killed by Commercial Fishermen Assuming Various Mesh and Minimum Size Regulations. (Estimates are based on NEFC weighout data, 1985-1989, and were derived using selectivity curves with assumed 80% mortality of discards and 25% mortality of fish escaping from the net. Given the current size limit of 13", effective mesh size in the fishery is about 4.0".)

	Mesh Size (inches)				
Min Size	4.0	4.5	5.0	5.5	6.0
(TL inches)	PR	PR	PR	PR	PR
None	*	1	5	14	21
11	*	1	5	14	21
12	*	2	5	14	21
13	2	3	6	14	22
14	5	6	8	17	24
15	9	10	13	21	27
16	12	13	16	24	30

* = <1.0%
Note: Mesh sizes are inside stretch measurements.
Source: Unpublished NMFS weighout data.

Table 39. Summer Flounder - Commercial and Recreational Landings (thousands of pounds)

Year	Comm	Rec	Total	% Comm	% Rec
1980	31216	25842	57058	55	45
1981	21056	11297	32353	66	35
1982	22928	18901	41829	55	45
1983	29548	35651	65199	45	55
1984	37765	28878	66643	57	43
1985	32352	17085	49437	65	35
1986	26866	17573	44439	60	40
1987	27052	13131	40183	67	33
1988	32377	18422	50799	64	36
1989	17913	3192	21105	85	15
Ave	27907	18997	46905	62	38

Source: Commercial - NMFS General Canvass data; Recreational - unpublished NMFS MRFSS data.

Table 40. Number of Recreational Fishing Trips (000s) for All Species in Bimonthly State/fishing Mode/Fishing Area Cells with Summer Flounder Catch, Compared with Numbers of Nominal Summer Flounder Recreational Trips (000s) in these Cells, Aggregated at the Subregional Level, 1980-1988.

Year	Subregion	All species trips	Nominal summer flounder trips	Proportion nominal summer flounder to all species trips
1980	New England	2,626	277	0.106
	Mid-Atlantic	21,097	9,295	0.441
	South Atlantic	2,270	287	0.126
	Total	25,992	9,859	0.379
1981	New England	1,701	196	0.115
	Mid-Atlantic	10,919	4,532	0.415
	South Atlantic	1,740	623	0.358
	Total	14,361	5,351	0,373
1982	New England	3,607	551	0.153
	Mid-Atlantic	11,463	5,541	0.483
	South Atlantic	2,905	1,010	0.358
	Total	17,974	7,102	0.395
1983	New England	4,792	745	0.155
	Mid-Atlantic	19,407	01,100	0.520
	South Atlantic	3,396	855	0.252
	Total	27,595	11,700	0.424
1984	New England	2,996	667	0.223
	Mid-Atlantic	17,018	9,075	0.533
	South Atlantic	3,811	1,348	0.354
	Total	23,826	11,090	0.465
1985	New England	3,369	388	0.115
	Mid-Atlantic	12,152	5,311	0.437
	South Atlantic	3,584	1,501	0.419
	Total	19,105	7,200	0.377
1986	New England	4,653	670	0.144
	Mid-Atlantic	17,428	6,578	0.377
	South Atlantic	2,090	666	0.318
	Total	24,172	7,914	0.327
1987	New England	3,870	583	0.150
	Mid-Atlantic	16,069	6,649	0.401
	South Atlantic	3,098	307	0.099
	Total	23,037	7,340	0.319
1988	New England	4,929	650	0.132
	Mid-Atlantic	15,142	7,366	0.486
	South Atlantic	3,870	884	0.228
	Total	23,941	8,900	0.372

Source: Essig pers. comm.

Table 41. Estimated Total Summer Flounder Recreational Catch Number, Weight & Average Weight by Region & Fishing Area, 1989.

Region	Area	Number	Pounds	Avg. Weight
New England	State	178,902	350,524	2.0
	EEZ	8,297	-	-
	Total	187,199	-	-
Mid-Atlantic	State	2,132,621	3,744,893	1.8
	EEZ	111,688	189,996	1.7
	Total	2,244,309	3,934,889	1.8
North Carolina	State	371,367	488,870	1.3
	EEZ	1,286	1,120	0.9
	Total	372,653	489,990	1.3
Total	State	2,682,889	4,584,287	1.7
	EEZ	121,270	191,116	1.7
	Total	2,804,160	4,775,404	1.7

Source: Unpublished NMFS MRFSS data.

Table 42. Estimated Total Recreational Catch of All Species and Summer Flounder, Maine to North Carolina, 1989.

State	Total Catch	Summer Flounder Catch	% of Coast SF Catch	SF % of State Catch
ME	2,206,420	-	-	-
NH	1,765,093	6,360	0.2	0.4
MA	14,137,658	26,122	0.9	0.2
RI	4,984,989	120,842	4.3	2.4
CT	5,908,942	33,875	1.2	0.6
NY	20,114,161	449,865	16.0	2.2
NJ	17,176,916	651,288	23.2	3.8
DE	4,371,203	143,750	5.1	3.3
MD	12,791,667	471,839	16.8	3.7
VA	20,127,089	527,566	18.8	2.6
NC	16,852,753	372,652	13.3	2.2

Source: Unpublished NMFS MRFSS data.

Table 43. Estimated Total Summer Flounder Recreational Catch Number and Weight by Region & Mode of Fishing, 1989.

	Number			Pounds		
Region/Mode	State	EEZ	Total	State	EEZ	Total
New England						
Shore	8,059	-	8,059	6,530	-	6,530
Party/Charter	1,819	2,357	4,176	9,222	-	9,222
Private/Rental	169,024	5,940	174,964	334,772	-	334,772
Mid-Atlantic						
Shore	174,879	-	174,879	175,043	-	175,043
Party/Charter	230,193	50,212	280,405	363,926	8,495	372,421
Private/Rental	1,727,549	61,476	1,789,025	3,205,923	91,501	3,297,424
North Carolina						
Shore	154,548	-	154,548	206,390	-	206,390
Party/Charter	223	-	223	276	-	276
Private/Rental	216,595	1,286	217,881	282,205	1,120	283,325
Total						
Shore	337,486	-	337,486	387,963	-	387,963
Party/Charter	232,235	52,569	284,803	373,424	8,495	381,919
Private/Rental	2,113,168	68,702	2,181,870	3,822,900	92,621	3,915,521

Source: Unpublished NMFS MRFSS data.

Table 44. Size Frequency of Recreational Summer Flounder Catch (type A) for 1989.

Inches	Frequency	Percent	Cumulative Frequency	Cumulative Percent
4	4	0	4	0.2
8	4	0.1	8	0.4
9	12	0.3	20	1.0
10	13	0.5	33	1.6
11	32	1.2	65	3.2
12	84	3.9	149	7.4
13	289	14.2	438	21.6
14	238	11.8	676	33.3
15	319	15.6	995	49.1
16	306	14.9	1301	64.2
17	231	11.3	1532	75.6
18	242	11.8	1774	87.5
19	130	6.2	1904	93.9
20	70	3.2	1974	97.4
21	34	1.4	2008	99.1
22	9	0.3	2017	99.5
23	3	0.1	2020	99.7
24	4	0	2024	99.9
25	1	0	2025	99.9
26	1	0	2026	100.0
27	1	0	2027	100.0

Source: Unpublished NMFS MRFSS data.

Table 45. Observer Estimated Catch (lbs) of Summer Flounder by Foreign Directed Fishing & by Joint Venture Fishing, 1979-1988

	Directed Foreign Fishing	Joint Venture Fishing
1979	78,200	-
1980	164,300	-
1981	129,100	-
1982	76,300	1,400
1983	-	<100
1984	<100	100
1985	<100	4,900
1986	-	5,200
1987	100	2,400
1988	<100	100

Note: Observer coverage was less than 100% prior to 1987.
Source: Gerrior pers. comm.

Table 46. Exvessel Value, Nominal Price and 1989 Adjusted Price of Summer Flounder by Year, ME-NC, All Gear Combined.

Year	Nominal Value 1000 $	Nominal Price Mean	1989 Adj. Price Mean
80	16,035	0.51	0.64
81	14,629	0.69	0.80
82	16,628	0.73	0.81
83	19,926	0.67	0.75
84	25,935	0.69	0.74
85	31,027	0.96	1.04
86	32,667	1.22	1.36
87	37,953	1.40	1.53
88	40,602	1.25	1.32
89	27,992	1.56	1.56

Note: Prices adjusted with PPI (1982 = 100).
Source: Unpublished NMFS General Canvass data.

Table 47. Total Value of All Finfish and Shellfish Landings, Value of Summer Flounder Landings, and Summer Flounder Percent of Total Value by State, 1989.

State	Total Value ($1000)	Summer flounder ($1000)	Summer Flounder Percent
ME	132,522	5	0.0
NH	10,247	0	0.0
MA	272,847	3,668	1.3
RI	75,004	5,308	7.1
CT	18,309	1,282	7.0
NY	51,096	2,589	5.1
NJ	78,802	4,141	5.3
DE	3,453	4	0.1
MD	52,050	359	0.7
VA	100,014	5,116	5.1
NC	70,582	5,516	7.8

* = less than 0.1%
Sources: Unpub. NMFS General Canvass data.

Table 48. Total US Flounder Landings and Exvessel Value, Summer Flounder Landings and Exvessel Value, and Summer Flounder Percent of Total, 1980-89.

	Total Flounders		Summer Flounder		SF % of Total	
Year	1000 lbs	$ 1000	1000 lbs	$ 1000	Lbs	Value
80	216,920	82,488	31,216	16,035	14	19
81	201,053	85,892	21,056	14,629	10	17
82	228,341	102,029	22,928	16,628	10	16
83	253,528	116,440	29,548	19,926	12	17
84	219,995	124,259	37,765	25,935	17	21
85	195,718	129,121	32,352	31,027	17	24
86	169,050	124,586	26,866	32,667	16	26
87	199,711	145,080	27,052	37,953	14	26
88	228,620	140,142	32,377	40,602	14	29
89	202,489	119,831	17,913	27,992	9	23

Source: Unpublished NMFS General Canvass data.

Table 49. Landings, Value and Price of Summer Flounder by State for 1989, All Gear Combined.

State	Landings 1000 lbs	Value $ 1000	Price $/lb
ME	9	5	0.58
MA	1,877	3,668	1.95
RI	3,082	5,308	1.72
CT	513	1,282	2.50
NY	1,463	2,589	1.77
NJ	2,864	4,141	1.45
DE	2	4	1.68
MD	204	359	1.76
VA	3,688	5,116	1.39
NC	4,205	5,516	1.31

Source: Unpublished NMFS General Canvass data.

Table 50. Landings, Value and Price of Summer Flounder by Month, 1980-89 averaged, All Gear Combined.

	State (<3 mi)			EEZ (>3 Mi)			All		
Month	1000 Lbs	Value $1000	Adj. Price	1000 Lbs	Value $1000	Adj. Price	1000 Lbs	Value $1000	Adj. Price
JAN	531	495	0.93	4,300	3,789	0.88	4,832	4,285	0.89
FEB	73	58	0.79	3,339	3,563	1.07	3,413	3,621	1.06
MAR	20	20	0.99	2,622	3,366	1.28	2,643	3,386	1.28
APR	29	36	1.24	1,557	1,883	1.21	1,588	1,921	1.21
MAY	565	727	1.29	727	874	1.20	1,293	1,602	1.24
JUN	423	588	1.39	403	580	1.44	826	1,170	1.42
JUL	490	757	1.54	269	478	1.78	761	1,237	1.62
AUG	651	935	1.44	453	589	1.30	1,105	1,526	1.38
SEP	819	848	1.04	1,096	1,028	0.94	1,918	1,879	0.98
OCT	512	435	0.85	1,709	1,585	0.93	2,225	2,026	0.91
NOV	1,187	891	0.75	1,801	1,453	0.81	2,989	2,345	0.78
DEC	1,045	724	0.69	2,900	2,453	0.85	3,946	3,178	0.81
ALL	6,351	6,519	1.03	21,181	21,646	1.02	27,543	28,180	1.02

Note: Prices adjusted with PPI (1982 = 100).
Source: Unpublished NMFS General Canvass data.

Table 51. Landings, Exvessel Value & Price of Summer Flounder by Size Category for 1989, All States & All Gear Combined.

Size Category	Landings 1000 lbs	Value $1000	Price $/lb
Jumbo	1,223	2,359	1.93
Large	6,216	9,741	1.57
Medium	5,458	7,861	1.44
Small	904	988	1.09
Unclassified	4,113	7,044	1.71

Source: Unpublished NMFS General Canvass data.

Table 52. Annual Number of Otter Trawl Vessels Landing a Given Threshold of Summer Flounder, 1983-89. (Note that weighout data are a sample of fishing activity, not a census.)

Lbs/trip	83 Vessels	84 Vessels	85 Vessels	86 Vessels	87 Vessels	88 Vessels	89 Vessels
> = 1 lb	702	704	653	640	603	624	599
> = 100 lbs	612	604	596	553	522	563	510
> = 200 lbs	572	576	562	525	502	540	468
> = 300 lbs	543	555	535	511	478	521	443
> = 400 lbs	530	531	509	494	464	488	433
> = 500 lbs	519	517	495	477	448	470	422

Source: Unpublished NMFS weighout data (CT, DE, NC not included).

Table 53. Annual Number of Otter Trawl Trips Landing a Given Threshold of Summer Flounder, 1983-89. (Note that weighout data are a sample of fishing activity, not a census.)

Lbs/Trip	83 Trips	84 Trips	85 Trips	86 Trips	87 Trips	88 Trips	89 Trips
> = 1 lb	11,643	12,323	14,674	16,719	14,753	13,572	10,828
> = 100 lbs	6,509	7,632	8,147	10,166	9,674	8,306	5,215
> = 200 lbs	5,412	6,124	6,863	8,678	7,835	6,686	3,969
> = 300 lbs	4,816	5,181	6,005	7,347	6,584	5,840	3,386
> = 400 lbs	4,349	4,599	5,445	6,474	5,611	5,084	3,016
> = 500 lbs	4,045	4,212	5,013	5,881	5,084	4,632	2,856

Source: Unpublished NMFS weighout data (CT, DE, NC not included).

Table 54. Mean Exvessel Value of all Otter Trawl Trips Landing Summer Flounder, 1983-89.

	83		84		85		86		87		88		89		All Years	
Species	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%
Black Sea Bass	125	1	157	2	140	2	179	2	213	3	149	2	163	2	160	2
Scup	296	4	320	5	292	5	329	5	360	5	310	4	316	4	319	5
Bluefish	8	*	13	*	16	*	21	*	21	*	11	*	15	*	15	*
Butterfish	109	1	369	4	122	2	308	5	220	3	143	2	130	1	188	3
Croaker	-	-	3	*	5	*	4	*	4	*	2	*	8	*	4	*
Winter Flounder	454	7	499	8	453	9	414	6	452	6	413	6	350	5	437	7
Summer Flounder	1,767	27	1,797	30	2,256	44	2,758	45	3,249	48	3,345	53	3,017	45	2,563	41
Mackerel	8	*	16	*	36	*	9	*	12	*	36	*	33	*	21	*
Weakfish	23	*	32	*	32	*	31	*	26	*	18	*	25	*	27	*
Tautog	-	-	3	*	3	*	4	*	4	*	4	*	3	*	3	*
Whiting	133	2	130	2	148	2	181	2	335	5	207	3	174	2	185	3
Lobster	30	*	66	1	32	*	27	*	71		63	*	35	*	46	*
Sea Scallop	31	*	19	*	23	*	13	*	54	*	68		45	*	35	*
Loligo Squid	264	4	210	3	224	4	378	6	372	5	483	7	797	12	373	6
Misc. Species	3,068	48	2,440	40	1,242	24	1,463	23	1,256	18	1,045	16	1,464	22	1,734	28
Total Trip	6,318	100	5.972	100	5,028	100	6,119	100	6,649	100	6,296	100	6,576	100	6,109	100

* = less than 0.5%
Source: Unpublished NMFS weighout data (CT, DE, NC not included).

Table 55. 1985-1989 Mean Exvessel Value by Month per Trip by Species for Trips Landing Any Summer Flounder ($)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Black Sea Bass	386	445	447	305	116	73	65	10	13	26	73	130
Scup	678	643	692	711	322	188	126	65	96	202	373	456
Bluefish	25	4	12	9	7	17	23	25	29	22	28	21
Butterfish	927	415	432	98	53	60	40	35	60	87	97	540
Croaker	*	*	*	1	*	*	*	14	18	17	4	*
Winter Flounder	150	79	153	400	730	768	758	429	313	367	431	278
Summer Flounder	4,818	5,452	4,760	2,470	1,375	1,438	1,886	2,087	2,336	2,598	1,937	2,447
Mackerel	38	17	121	212	112	23	*	*	*	*	4	42
Weakfish	15	9	7	8	1	2	7	12	43	75	88	35
Tautog	*	*	*	2	9	10	11	4	3	2	2	*
Whiting	235	353	383	348	204	402	131	74	75	90	120	156
Lobster	4	4	4	8	13	26	72	182	139	103	22	12
Sea Scallop	38	44	78	117	34	17	10	15	1	38	14	23
Loligo Squid	1,081	730	686	728	675	418	317	278	196	234	402	803
Misc. Species	1,516	1,661	1,663	1,646	1,588	1,053	686	410	389	836	1,184	1,684
Total Trip	9,913	9,857	9,437	7,062	5,238	4,493	4,133	3,639	3,712	4,698	4,778	6,627

* = less than $1.
Source: Unpublished NEFC weighout data (excludes CT, DE, and NC).

Table 56. 1985-1989 Distribution of Mean Exvessel Value by Month per Trip by Species for Trips Landing Any Summer Flounder (%)

	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Black Sea Bass	3	4	4	4	2	1	1	*	*	*	1	1
Scup	6	6	7	10	6	4	3	1	2	4	7	6
Bluefish	*	*	*	*	*	*	*	*	*	*	*	*
Butterfish	9	4	4	1	1	1	*	*	1	1	2	8
Croaker	*	*	*	*	*	*	*	*	*	*	*	*
Winter Flounder	1	*	1	5	13	17	18	11	8	7	9	4
Summer Flounder	48	55	50	34	26	31	45	57	62	55	40	36
Mackerel	*	*	1	3	2	*	*	*	*	*	*	*
Weakfish	*	*	*	*	*	*	*	*	1	1	1	*
Tautog	*	*	*	*	*	*	*	*	*	*	*	*
Whiting	2	3	4	4	3	8	3	2	2	1	2	2
Lobster	*	*	*	*	*	*	1	4	3	2	*	*
Sea Scallop	*	*	*	1	*	*	*	*	*	*	*	*
Loligo Squid	10	7	7	10	12	9	7	7	5	4	8	12
Misc. Species	15	16	17	23	30	23	16	11	10	17	24	25
Total Trip	100	100	100	100	100	100	100	100	100	100	100	100

* = less than 1%.
Source: NEFC weighout data (excludes CT, DE, and NC).

Table 57. 1985-1989 Mean Exvessel Value by Month per Trip by Species for Trips Landing > 100 Lbs of Summer Flounder ($)

	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Black Sea Bass	497	516	497	352	77	113	108	14	15	31	93	192
Scup	588	567	509	683	239	251	151	77	105	207	389	573
Bluefish	29	5	9	12	7	19	20	16	29	24	29	26
Butterfish	1,008	455	505	64	37	27	15	12	39	52	66	553
Croaker	*	0	*	0	*	0	*	7	17	16	6	1
Winter Flounder	93	46	103	300	846	762	504	255	257	385	479	205
Summer Flounder	6,536	6,872	6,393	3,939	1,955	2,345	3,197	2,787	2,831	3,452	2,960	3,919
Mackerel	11	12	81	74	81	*	0	*	0	*	3	11
Weakfish	21	11	8	5	1	2	10	13	41	59	59	45
Tautog	*	0	*	2	10	14	16	5	4	3	2	
*												
Whiting	221	399	422	397	198	129	22	17	31	64	95	107
Lobster	2	5	5	10	10	23	55	118	148	114	11	10
Sea Scallop	52	55	105	136	46	16	10	19	2	49	20	36
Loligo Squid	1,078	843	495	540	630	434	96	110	118	159	296	860
Misc. Species	1,425	1,634	1,715	1,837	1,687	799	546	270	289	947	1,404	2,089
Total Trip	11,562	11,421	10,845	8,351	5,825	4,934	4,751	3,722	3,925	5,566	5,913	8,626

* = less than $1.
Source: NEFC weighout data (excludes CT, DE, and NC).

Table 58. 1985-1989 Distribution of Mean Exvessel Value by Month per Trip by Species for Trips Landing > 100 Lbs of Summer Flounder (%)

	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Black Sea Bass	4	4	4	4	1	2	2	*	*	*	1	2
Scup	5	4	4	8	4	5	3	2	2	3	6	6
Bluefish	*	*	*	*	*	*	*	*	*	*	*	*
Butterfish	8	3	4	*	0	*	*	*	*	0	1	6
Croaker	*	*	*	*	*	*	*	*	*	*	*	*
Winter Flounder	*	*	*	3	14	15	10	6	6	6	8	2
Summer Flounder	56	60	58	47	33	47	67	74	72	62	50	45
Mackerel	*	*	*	0	1	*	*	*	*	*	*	*
Weakfish	*	*	*	*	*	*	*	*	1	1	*	*
Tautog	*	*	*	*	*	*	*	*	*	*	*	*
Whiting	1	3	3	4	3	2	*	*	*	1	1	1
Lobster	*	*	*	*	*	*	1	3	3	2	*	*
Sea Scallop	*	*	*	1	*	*	*	*	*	*	*	*
Loligo Squid	9	7	4	6	10	8	2	2	3	2	5	9
Misc. Species	12	14	15	21	28	16	11	7	7	17	23	24
Total Trip	100	100	100	100	100	100	100	100	100	100	100	100

* = less than 1%.
Source: NEFC weighout data (excludes CT, DE, and NC).

Table 59. Annual number of plants processing Flounder (all species) by State, 1980-88.

Year	ME	NH	MA	RI	CT	NY	NJ	MD	VA	NC	All
80	15	1	52	2	-	14	1	2	7	31	125
81	18	1	49	2	-	17	1	2	7	26	123
82	18	2	48	9	-	18	2	2	6	28	133
83	19	2	47	13	1	18	2	3	4	27	136
84	23	2	49	12	1	17	2	3	4	25	138
85	21	2	51	8	2	19	2	3	4	20	132
86	26	2	49	7	1	19	2	3	5	18	132
87	27	3	49	8	-	22	2	3	4	20	138
88	21	1	50	6	1	19	2	3	4	20	127

Note: These plants also processed seafood other than flounders.
Source: Unpublished NMFS Processed Products Survey data.

Table 60. Value of Flounder (all species, thousands of $) processed product by State, 1980-88.

Year	ME	NH	MA	RI	CT	NY	NJ	MD	VA	NC	ALL
80	2,395	82	45,456	1,483	-	8,971	391	174	7,978	3,305	70,239
81	8,148	1,315	50,356	559	-	11,275	410	123	5,508	2,016	79,715
82	8,847	498	90,794	4,038	-	7,375	1,532	96	5,336	7,190	125,710
83	7,365	3,236	73,071	11,194	680	7,853	1,386	176	5,662	6,891	117,519
84	10,030	1,934	89,046	8,146	1,584	12,537	1,413	115	2,800	8,797	136,407
85	7,177	494	100,319	3,618	1,692	11,155	960	1,424	1,019	10,470	138,332
86	8,031	361	104,898	6,852	1,740	12,811	1,000	3,011	907	10,713	150,326
87	10,746	551	87,936	6,884	-	18,740	860	2,161	831	22,150	150,861
88	8,614	19	85,489	3,481	1,440	15,949	850	2,658	1,962	9,506	129,972

Note: Flounder product passed between firms has been double counted.
Source: Unpublished NMFS Processed Products Survey data.

Table 61. Fulton Market Share of Total Summer Flounder Landings (lbs x 000) 1984 and 1985

	1984			1985*		
	State Landings	Fulton Market	% Fulton	State Landings	Fulton Market	% Fulton
ME	2.4	.0	-	2.5	.0	-
NH	.2	.0	-	.3	.0	-
MA	1,488.1	47.9	3.22	2,249.4	147.2	6.54
RI	4,479.3	535.7	11.96	7,532.8	712.6	9.46
CT	130.8	112.1	85.70	183	124.6	68.09
NY	2,294.7	697.1	30.38	2,517.4	1,004.3	39.89
NJ	6,364.4	174.7	2.74	5,634.2	147.5	2.62
DE	8.7	.0	-	4.1	.0	-
MD	812.7	7.5	.92	577.4	.0	-
VA	9,673.4	126.9	1.31	5,036.7	29.8	.59
NC	12,509.8	692.6	5.54	8,614.4	771.0	8.95
Total	37,764.5	2,394.5	6.34	32,352.2	2,937.0	9.08
Total ME-DE	14,768.6	1,567.5	10.61	18,123.7	2,136.2	11.79

Source: Unpublished NMFS General Canvass data.

Table 62. National Economic Impacts of Total Flounder and Summer Flounder Commercial Fishing in the Mid-Atlantic Region. (Employment in person-years and income/output in $1000.)

	Total Flounders			Summer Flounder		
	Employment	Income	Output	Employment	Income	Output
Harvest	368	6,154	14,547	309	5,169	12,219
Processing	379	3,408	15,855	318	2,863	13,318
Distribution	93	1,815	3,378	78	1,525	2,838
Food Service	1,660	11,742	20,983	1,394	9,863	17,626
Retail	225	2,558	5,026	189	2,149	4,222
Cumulative	2,726	2,5677	59,789	2,290	21,569	50,223

Sources: Total flounders from National Fisheries Education and Research Foundation 1989. Summer flounder estimates were modified by unpublished NMFS General Canvass data.

Table 63. Estimated Number of Party and Charter Boats Operating Along the Atlantic Coast and Associated Revenues by State, 1985.

State	Charter	Party	Revenues ('000 1985 $)
Maine	35	10	2,696
New Hampshire	19	21	3,226
Massachusetts	136	41	10,717
Rhode Island	78	6	4,164
Connecticut	46	15	3,753
New York	300	100	24,723
New Jersey	375	100	28,074
Delaware	80	12	2,511
Maryland	221	109	11,307
Virginia	200	30	5,196
North Carolina	136	10	4,376
Total	1,626	454	100,723

Source: Sport Fishing Institute 1988a.

Table 64. National Direct Economic Impacts of All Species and Summer Flounder Recreational Fishing in the Mid-Atlantic Region.

	Employment (Person-years)	Wages (Million $)	Retail Sales (Million $)
All species	17,114	213.8	1,048.8
Summer Flounder	1,795-2,494	22.4-31.1	110.0-152.8

Sources: Sport Fishing Institute 1988 a and b.

Table 65. The percent of summer flounder (number) landed by anglers fishing on party and charter boats, Maine to North Carolina, 1985-89.

State	1985	1986	1987	1988	1989	1985-89
MA	0.0	0.0	0.6	0.2	1.0	0.1
NH	0.0	27.4	0.0	0.0	0.0	2.0
RI	0.1	5.4	1.0	0.0	0.1	3.4
CT	1.2	2.1	0.8	0.0	0.0	1.4
NY	15.9	19.3	11.2	15.3	32.5	16.0
NJ	10.4	25.9	23.6	14.1	7.7	16.5
DE	32.5	8.0	46.4	20.6	6.5	23.3
MD	7.3	1.4	0.2	0.6	1.3	0.8
VA	3.6	1.5	4.2	13.1	2.1	6.4
NC	28.1	0.5	0.0	0.0	0.1	13.1

Source: Unpublished NMFS MRFSS data.

Table 66. Charter and Party Boat Survey Distribution and Returns, 1990

State	Number sent	Usable returns	Non-usable returns
ME	24	5	1
NH	21	5	-
MA	80	17	9
RI	15	7	2
CT	17	4	2
NY	92	24	3
NJ	159	51	6
PA	16	7	1
DE	14	3	-
MD	4	2	-
VA	143	44	5
NC	1	1	-
FL	6	2	1
Total	592	172	30

Table 67. Relative Customer Interest and Success in Catching Selected Species in 1989. (1 = Low, 2 = Somewhat Low, 3 = Moderate, 4 = Somewhat High, and 5 = High)

	Charter boats		Party boats	
Species	Interest (mean)	Success (mean)	Interest (mean)	Success (mean)
Large pelagics (marlin, tunas)	3.9	2.4	3.1	2.8
Sharks (other than dogfish)	3.2	2.4	2.1	1.9
Bluefish	3.9	3.9	4.6	4.0
Atlantic mackerel	2.4	3.0	3.5	3.5
Summer flounder	3.2	1.9	3.6	1.5
Scup	1.4	1.7	2.2	2.0
Black sea bass	2.1	2.6	3.2	2.9
Hakes	1.4	1.6	2.3	2.5
Groundfish (cod, haddock, yellowtail)	3.0	2.6	3.0	2.4
Weakfish	3.1	1.7	3.3	1.7
Striped bass	3.7	2.5	3.5	1.7
Other: spot	4.6	3.9	4.7	3.4

Table 68. Party and Charter Boat Operating Experience in 1985 and 1989

	Charter 1985 (mean)	Party 1989 (mean)	1985 (mean)	1989 (mean)
Ave. number of trips per year	57.0	50.0	142.0	130.0
Ave. number of trips per day OR	1.0	1.0	1.3	1.4
Ave. number of days per trip	1.1	1.1	1.2	1.3
Ave. number days fishing per week	3.2	3.1	5.0	4.6
Ave. number of anglers per trip	5.2	5.1	20.9	19.5
Ave. trip price per customer ($)	121.8	149.5	26.2	29.2
Ave. number of fish Taken per customer	10.9	8.3	15.2	9.9
Ave. number of crew members	1.4	1.4	2.1	2.0
Ave. cost of fuel & supplies ($)	96.1	131.1	113.3	146.6

Table 69. US Flatfish Imports (excluding halibut), all Countries, 1989 and 1990 (pounds & dollars in thousands)

	1989			1990		
	Pounds	Dollars	$/lb.	Pounds	Dollars	$/lb.
FRESH OR CHILLED						
Whole / Excluding Fillets						
Greenland Turbot	N/A	N/A	N/A	656	1,025	1.56
Plaice	80	142	1.79	12	38	3.22
Sole (Solea spp.)	8,185	7,412	0.91	4,531	5,728	1.26
Other Flounder	N/A	N/A	N/A	7,339	4,681	0.64
Other Other Flatfish	12,644	9,990	0.79	5,761	3,999	0.69
Total Whole, Fresh	20,908	17,545	0.84	18,299	15,470	0.85
Fillets						
Sole	N/A	N/A	N/A	2,680	7,588	2.83
Plaice	N/A	N/A	N/A	26	65	2.48
Flounder	N/A	N/A	N/A	2,009	4,894	2.44
Greenland Turbot	N/A	N/A	N/A	381	967	2.54
Other Flatfish	5,010	11,043	2.20	779	1,853	2.38
Total Fillets, Fresh	5,010	11,043	2.20	5,875	15,367	2.62
FROZEN						
Whole / Excluding Fillets						
Greenland Turbot	N/A	N/A	N/A	103	197	1.92
Plaice	94	115	1.22	11	20	1.81
Sole (Solea spp.)	768	2,001	2.60	1,560	3,717	2.38
Other Flounder	N/A	N/A	N/A	476	562	1.18
Other Other Flatfish	1,634	3,362	2.06	711	1,902	2.67
Total Whole, Frozen	2,497	5,477	2.19	2,861	6,399	2.24
Fillets Frozen into Blocks > 4.5 kg.						
Greenland Turbot	677	796	1.18	45	58	1.30
Sole	N/A	N/A	N/A	4,997	6,898	1.38
Flounder	N/A	N/A	N/A	1,213	2,124	1.75
Other Turbot	N/A	N/A	N/A	470	508	1.08
Other Other Flatfish	6,499	9,219	1.42	685	1,378	2.01
Total Fillet Blocks	7,176	10,015	1.40	7,409	10,965	1.48
Other Frozen Fillets						
Greenland Turbot	7,668	12,481	1.63	3,493	6,173	1.77
Sole	N/A	N/A	N/A	19,495	38,509	1.98
Flounder	N/A	N/A	N/A	20,071	47,657	2.37
Other Turbot	N/A	N/A	N/A	3,515	6,965	1.98
Other Other Flatfish	53,445	114,613	2.14	7,298	14,221	1.95
Total Fillets, Oth. Froz.	61,113	127,094	2.08	53,872	113,526	2.11
OTHER FRESH OR FROZEN IN BULK						
Sole	N/A	N/A	N/A	111	147	1.33
Greenland Turbot	N/A	N/A	N/A	17	26	1.60
Total Other	0	0	0.00	128	174	1.36
Grand Total	96,703	171,175	1.77	88,444	161,900	1.83

Source: NMFS Import/Export files.

Table 70. US Flatfish Imports (excluding halibut), by Country, All Product Types, 1990

Country	Pounds (1000)	Value (1000 US$)	$/lb.	% of Weight	% of Value
Canada	45,994	77,882	1.69	52	48
Rep. of Korea	12,006	20,035	1.67	14	12
Argentina	8,489	18,021	2.12	10	11
Netherlands	7,401	20,191	2.73	8	12
Thailand	3,829	4,981	1.30	4	3
Mexico	2,102	2,729	1.30	2	2
New Zealand	1,890	4,381	2.32	2	3
Australia	1,432	3,503	2.45	2	2
Iceland	1,328	2,177	1.64	2	1
China	735	1,214	1.65	1	1
Chile	674	1,200	1.78	1	1
Uruguay	657	718	1.09	1	*
Belgium	434	1,764	4.07	*	1
Brazil	308	599	1.95	*	*
St.Pierre & Miquelon	205	426	2.08	*	*
Japan	184	470	2.55	*	*
Hong Kong	130	285	2.20	*	*
Peru	124	60	0.48	*	*
Taiwan	89	171	1.92	*	*
All Others	434	1,093	2.52	*	1
TOTAL	88,444	161,900	1.83	100	100

* = less than 0.5%. % may not add to 100 because of rounding.
Source: NMFS Import/Export Files.

Table 71. Quantity (pounds), Value ($), and Price ($/lb) of Yearly Exports of Summer Flounder from Atlantic and Gulf Coast Ports, 1981-1987.

Year	Quantity	Value	Price
1981	47,840	101,083	2.11
1982	11,243	20,998	1.87
1983	25,573	50,880	1.99
1984	1,764	4,129	2.34
1985	8,377	16,728	2.00
1986	197,312	261,157	1.32
1987*	27,558	96,344	3.50

* = January to June.
Source: R. Ross pers. comm.

Table 72. State Share (%) of Summer Flounder Commercial Landings, 1980-89 (pounds, excludes southern flounder landings) and Recreational Landings (MRFSS Types A & B1; numbers) by State, 1980-89, (%)

State	Commercial Share	Recreational Share
ME	0.0482	0.01
NH	0.0005	0.01
MA	6.9111	3.31
RI	15.8914	1.74
CT	0.9532	1.69
NY	7.7486	14.22
NJ	16.9473	43.06
DE	0.0180	2.77
MD	2.0662	3.76
VA	21.6001	22.55
NC	27.8155	6.87
Total	100.0000	99.99

Sources: Unpublished NMFS General Canvass data, except North Carolina landings have been adjusted by NCDMF personnel to exclude southern flounder landings.

Table 73. Input data used to simulate the summer flounder population using the GENMOD model.

von Bertalanffy Growth Parameters (MAFMC 1988)

$L\infty = 82.67$
$K = 0.1731$
$t_0 = -1.039$
(Note: maximum age is 15 and length is in centimeters)

Length-weight Relationship (MAFMC 1988)

$\log W = -5.5484 + 3.2263 (\log TL)$
(Note: length is in millimeters and weight is in grams)

Lengths at maturity for female flounder (G. Shepherd pers. comm.)

Length (inches)	% mature
9.1	38
13.2	72
16.6	90
19.4	97
21.7	99
23.6 and larger	100

Ricker Stock Recruitment (S-R) model (derived from Chang and Pacheco 1975)

$\alpha = 2.53$
$\beta = .0151$
Variance = 0.75

Table 74. The Estimated Percent of Successful Anglers Landing 1 to 42 Summer Flounder (MRFSS Type A fish) per Day, 1986-90 Combined.

Catch/ trip	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	5136	55.6	5136	55.6
2	1670	18.1	6806	73.7
3	951	10.3	7757	84.0
4	434	4.7	8191	88.7
5	355	3.8	8546	92.6
6	173	1.9	8719	94.4
7	122	1.3	8841	95.8
8	86	0.9	8927	96.7
9	52	0.6	8979	97.2
10	107	1.2	9086	98.4
11	12	0.1	9098	98.5
12	16	0.2	9114	98.7
13	24	0.3	9138	99.0
14	22	0.2	9160	99.2
15	20	0.2	9180	99.4
16	2	0.0	9182	99.4
17	3	0.0	9185	99.5
18	3	0.0	9188	99.5
19	4	0.0	9192	99.6
20	18	0.2	9210	99.8
21	2	0.0	9212	99.8
23	3	0.0	9215	99.8
25	1	0.0	9216	99.8
26	2	0.0	9218	99.8
27	3	0.0	9221	99.9
28	3	0.0	9224	99.9
29	1	0.0	9225	99.9
30	3	0.0	9228	99.9
33	1	0.0	9229	100.0
37	1	0.0	9230	100.0
40	2	0.0	9232	100.0
42	1	0.0	9233	100.0

Source: Unpublished NMFS MRFSS data.

Table 75. The Effect of Various Size and Possession Limits on 1986-90 Combined Summer Flounder Recreational Landings (MRFSS Type A fish). (The table contains the percent reduction in the Number of summer flounder killed by anglers. Reductions were calculated assuming a post-release mortality of 25% and are adjusted for the differential between impact of length limits relative to MRFSS type A fish and summer flounder measured by interviewers.)

	Size Limit (TL inches)					
Possession Limit	No	12"	13"	14"	15"	16"
No	-	5.0	11.3	26.0	41.4	53.7
1	42.7	47.1	51.6	64.4	74.6	79.9
2	28.4	33.2	38.2	51.9	64.5	72.1
3	19.9	24.7	30.2	44.3	58.0	67.1
4	14.7	19.6	25.3	39.4	53.7	63.7
5	11.1	16.0	21.8	36.2	50.9	61.5
6	8.7	13.5	19.5	33.9	48.8	59.8
7	6.9	11.8	17.8	32.3	47.3	58.6
8	5.5	10.4	16.5	31.0	46.1	57.7
9	4.4	9.3	15.4	30.1	45.3	57.0
10	3.5	8.5	14.6	29.3	44.6	56.5
11	3.0	8.0	14.1	28.8	44.1	56.1
12	2.6	7.5	13.6	28.4	43.7	55.8
13	2.1	7.1	13.2	28.0	43.3	55.5
14	1.8	6.8	12.9	27.7	43.1	55.3
15	1.5	6.5	12.7	27.5	42.8	55.1
16	1.4	6.3	12.5	27.3	42.7	54.9
17	1.2	6.1	12.3	27.1	42.5	54.8
18	1.0	6.0	12.2	27.0	42.4	54.6
19	0.9	5.8	12.0	26.9	42.3	54.5
20	0.7	5.7	11.9	26.7	42.1	54.4

Source: Unpublished NMFS MRFSS data.

Table 76. Recreational Summer Flounder Landings Expressed as the Percent of Annual Total for Each Bimonthly Sampling Period, 1985-89.

Months	Coast	ME-CT	NY-DE	MD-NC
J-F	0.02	0.00	0.00	0.10
M-A	2.00	0.03	0.02	8.14
M-J	26.06	19.04	27.75	24.26
J-A	51.01	47.44	54.64	42.56
S-O	18.60	33.49	17.58	15.45
N-D	2.31	0.00	0.01	9.48

Source: Unpublished NMFS MRFSS data.

Table 77. The Percent Reduction in the Number of Summer Flounder Killed by Anglers with the Implementation of Various Fishing Seasons, 1985-89. (Reductions were calculated assuming a combined effort transference/hooking mortality rate of 33%.)

Fishing season	Coast	ME-CT	NY-DE	MD-NC
5/1 to 12/31	-	-	-	5.5
6/1 to 12/31	10.1	6.4	9.3	-
6/15 to 12/31	14.5	9.6	14.0	-
7/1 to 12/31	18.8	12.8	18.6	-
5/15 to 9/30	13.5	14.4	10.6	-

Source: Unpublished NMFS MRFSS data.

Table 78. Possession Limits and Seasons with a 14" TL Minimum Recreational Fish Size that Most Closely Approximate a 47% Reduction in Exploitation for the Summer Flounder Recreational Fishery.

Fishing season	Coast	ME-CT	NY-DE	MD-NC
No season	3	2	2	6
5/1 to 12/31	-	-	-	10
6/1 to 12/31	5	3	-	-
6/15 to 12/31	7	-	3	-
7/1 to 12/31	10	4	4	-
5/15 to 9/30	6	5	3	-

Source: Unpublished NMFS MRFSS data.

Table 79. Percent Reductions in Exploitation Associated with the Combination of Recreational Limits Presented in Table 78.

Fishing season	Coast	ME-CT	NY-DE	MD-NC
No season	44.3	47.5	41.9	46.0
5/1 to 12/31	-	-	-	46.7
6/1 to 12/31	46.3	46.8	-	-
6/15 to 12/3	46.8	-	47.9	-
7/1 to 12/31	48.1	48.5	47.9	-
5/15 to 9/30	47.4	46.9	44.5	-

Source: Unpublished NMFS MRFSS data.

Table 80. Commercial and Recreational Landings and Discards Associated with 5.5" and 6.0" Effective Mesh, 14" Minimum Recreational Fish Size, Historical Mean Recruitment, Alternative Minimum Commercial Fish Sizes, and Fully-recruited F = 0.53.

5.5" minimum diamond mesh

		Commercial					Recreational		
Min. Size	Catch (000s)	Landings (000s)	Discards (000s)	% Discards	Landings (000lbs)	Catch (000s)	Landings (000s)	Discards (000s)	Landings (000lbs)
0"	8743	8743	0	0	11788	10919	4370	6549	7491
10"	8744	8246	358	4	11715	10923	4370	6553	7491
11"	8746	7921	825	9	11559	10930	4370	6560	7491
12"	8749	7540	1209	14	11387	10937	4370	6567	7491
13"	8758	6821	1937	22	10957	10951	4376	6575	7498
14"	8774	5717	3057	35	10051	10970	4393	6577	7518

6.0" minimum diamond mesh

		Commercial					Recreational		
Min. Size	Catch (000s)	Landings (000s)	Discards (000s)	% Discards	Landings (000lbs)	Catch (000s)	Landings (000s)	Discards (000s)	Landings (000lbs)
0"	6542	6542	0	0	10073	11140	4510	6630	7683
10"	6542	6433	109	2	10049	11141	4510	6631	7683
11"	6542	6193	349	5	9967	11144	4510	6634	7683
12"	6544	5976	568	9	9870	11148	4510	6638	7685
13"	6547	5513	1034	16	9590	11158	4514	6644	7688
14"	6555	4808	1747	27	9012	11170	4525	6645	7703

Table 81. The Estimated Number of Summer Flounder Landed by Recreational Fishermen, Maine to North Carolina, 1980 to 1989.

1980	22,202,000
1981	9,333,000
1982	15,989,000
1983	26,540,000
1984	26,227,000
1985	15,110,000
1986	11,970,000
1987	8,674,000
1988	12,489,000
1989	1,822,000
Average	15,036,000

Source: Unpublished NMFS MRFSS data.

Table 82 Summer Flounder Mesh Selectivity Studies

Size	Study	Month	ICES Gauge Mesh Size Retention Ave	Dry	Wet	L50	SD	Selection Factor	Total Fluke	< 14" Number	%	>= 14" Number	%	Fluke lbs	Bycatch lbs
1.5"	NC (a)	Dec	-	-	-	-	-	-	188	85	45.2	103	54.8	272	515
	NC (b)	Dec	-	-	-	-	-	-	192	90	46.9	102	53.1	282	345
	NC (c)	Jan	-	-	-	-	-	-	93	64	68.8	29	31.2	111	1,833
	NC (d)	Jan	-	-	-	-	-	-	211	180	85.3	31	14.7	127	326
	NC (e)	Dec-Feb	-	-	-	-	-	-	174	82	47.1	92	52.9	254	4,979
	NC (f)	Jan-Feb	-	-	-	-	-	-	154	82	53.2	72	46.8	226	2,407
	NC (g)	Dec,Feb	-	-	-	-	-	-	162	85	46.7	97	53.3	269	891
	NC (h)	Nov-Dec	-	-	-	-	-	-	367	251	68.4	116	31.6	-	-
2.25"	LI S (a)	May	2.3	-	-	-	-	-	1,983	1,092	55.1	891	44.9	2,110	10,989
2.5"	LI M (a)	May	2.6	-	-	-	-	-	170	29	17.1	141	82.9	262	6,042
	LI M (b)	May	2.5	-	-	-	-	-	1,492	482	32.3	1,010	67.7	1,992	25,301
	LI S (b)	May	2.5	-	-	-	-	-	2,950	1,485	50.3	1,465	49.7	3,231	13,283
3.0"	NJ N	Sept	-	2.5	2.6	-	-	-	274	185	67.5	89	32.5	-	-
	NJ C	Sept	-	3.2	3.3	-	-	-	490	370	75.5	120	24.5	-	-
	NJ S	Sept	-	2.7	2.8	-	-	-	186	99	53.2	87	46.8	-	-
	NJ All	Sept	-	-	-	-	-	-	950	654	68.8	296	31.2	-	9,945*
	NC (a)	Dec	2.9	2.8	-	-	-	-	304	97	31.9	207	68.1	529	1,065
3.5"	NC (b)	Dec	3.8	3.8	-	-	-	-	292	164	56.2	128	43.8	337	349
4.0"	NC (c)	Jan	4.5	4.7	-	11.0	0.51	-	192	104	54.2	88	45.8	297	2,783
4.5"	NC (d)	Jan	5.0	5.2	-	12.8	0.35	-	107	52	48.6	55	51.4	138	303
	NC (h)	Nov-Dec	4.4	-	-	-	-	-	306	157	51.3	149	48.7	-	-
5.0"	NJ N	Sept	-	4.4	4.4	-	-	-	157	97	61.8	60	38.2	-	-
	NJ C	Sept	-	4.6	4.7	-	-	-	325	195	60.0	130	40.0	-	-
	NJ S	Sept	-	4.4	4.4	-	-	-	153	92	60.1	61	39.9	-	-
	NJ All	Sept	-	-	-	-	-	-	635	384	60.5	251	39.5	-	1,716*
	NC (e)	Dec-Feb	5.2	5.2	-	12.6	3.41	-	133	36	27.1	97	72.9	199	630
5.5"	NJ N	Sept	-	5.0	4.8	-	-	-	107	36	33.6	71	66.4	-	-
	NJ C	Sept	-	5.2	5.7	-	-	-	223	110	49.3	113	50.7	-	-
	NJ S	Sept	-	5.2	5.0	-	-	-	128	57	44.2	72	55.8	-	-
	NJ All	Sept	-	-	-	-	-	-	459	203	44.2	256	55.8	-	2,265*
	LI M (a)	May	5.8	-	-	14.7	0.24	2.52	136	6	4.4	130	95.6	223	2,741
	LI M (b)	May	5.7	-	-	14.9	0.10	2.62	671	53	7.9	618	92.1	1,125	6,045
	LI S (a)	May	5.6	-	-	12.8	0.08	2.29	1,872	760	40.6	1,112	59.4	2,255	8,823
	LI S (b)	May	5.6	-	-	13.6	0.08	2.45	1,542	460	29.8	1,082	70.2	1,974	7,011
	NC (f)	Jan-Feb	5.7	5.9	-	14.3	2.52	-	89	9	10.1	80	89.9	178	658
6.0"	NC (g)	Dec,Feb	6.3	6.2	-	16.9	2.40	-	96	15	15.6	81	84.4	235	400

* = fish, not lbs.
Note: All letter footnotes after the studies are used to match control and experimental sets.
Sources: Anderson, *et al.*, 1983; Gillikin, *et al.*, 1981; Gillikin, 1982; and New Jersey, 1985.

Table 83. Summer Flounder Retention Level by Mesh Size

Retention Percent	Mesh Size 4.5"	5.0"	5.5"	Mesh Selection Factors*	Adjusted R^2
10%	8.4	9.3	10.2	1.86	0.27
25%	9.8	10.9	12.0	2.18	0.45
50%	11.1	12.3	13.5	2.46	0.88
75%	11.6	12.9	14.2	2.58	0.81
90%	11.8	13.2	14.5	2.63	0.81

Note: The mesh selection factor is the calculated ratio between the retention percent and the mesh size (i.e., 2.46 is 13.5" divided by 5.5"). Overall mesh selection factors were developed by pooling all appropriate data from the previous studies and was derived as the best estimate of the slope, through linear regression techniques.
* All R^2 values were significant.
Source: Pooling of all data from Anderson *et al.*, 1983; Gillikin *et al.*, 1981; Gillikin, 1982; and New Jersey, 1985.

Table 84. State Laws for Summer Flounder: ME to NC.

Maine

Size limits:	13" possession restriction. It is also illegal to possess groundfish (including summer flounder) aboard any vessel rigged for groundfishing that has its head or tail removed and is less than the legal size limit.
Gear restrictions:	5.5" minimum mesh size for trawls, Scottish seines, bottom tending gillnets and bottom tending seines. Regulations exist regarding the placement of stop seines and fish weirs. Additional Gear/season restrictions for specific locations are detailed in Department regulations.
Area closures:	Groundfish (summer flounder) spawning closure in Booth Bay and Sheepscot Bay from May 1 to June 30.
Seasons:	See above.
Licenses:	A Commercial license is required for the harvest, transport, and sale of fish that are not for personal use: $20 for individual, resident operators; $53 for resident operator with crew; $200 for nonresident operator and crew. No license is required for fish Taken with hook and line for personal use. There is no recreational license, except for Atlantic Salmon.
Other:	Nonresidents are required by law to report all groundfish (summer flounder) catches.

New Hampshire

Size limits:	13" possession restriction.
Gear restrictions:	Mobile fishing Gear may not be used in State waters between April 16 and Dec 14. Use of trawls and drag seines are prohibited in Piscataqua River or its tributaries north of the Portsmouth Memorial Bridge.
Area closures:	See above
Seasons:	None specific to summer flounder.
Licenses:	Resident Commercial saltwater fishing license: $26; no sport fishing license. Residents are not required to have a license to sell fish caught by hook and line, but a $200 minimum license fee is required for nonresidents.

Massachusetts

Size limits:	14"
Gear restrictions:	Minimum mesh sizes for mobile trawl gear: * North of Cape Cod: - 5.5" required year round. Permitted small mesh exemptions are allowed for underutilized species (e.g., dogfish and ocean pout) with no bycatch of regulated species. * South of Cape Cod: 5.5" required Nov. 1 - April 14; 3.5" required June 16 - Oct. 31; and no minimum required April 15 - June 15 (squid season).

* East of Cape Cod: 5.5" required year round.

Gillnets may not exceed 2,400 feet; mesh size of gillnets must be greater than 6" stretched measure.

Area closures: Buzzards Bay is closed to trawling year round. State waters from Nauset Light around Monomoy west to Succonessett Point, Mashpee are closed to trawling from May 1 - Oct. 31. All waters south of Cape Cod banned to gillnetting April 1 - Nov. 15. (See Mass. regulations for additional closures.)

Seasons: See above

Licenses: Commercial fishing licenses: Vessel license ranges from $130 to $260, depending on length; license for individuals = $65 each. There is no sport license for fish caught for personal use. A license to sell fish caught with hook and line is $35, and applies to any individual selling fish

Rhode Island

Size limits: 14" possession restriction.

Gear restrictions: Trawling is prohibited in the upper portion of Narragansett Bay from Nov 1 - July 1; 5" cod end minimum mesh size in a portion of central Narragansett Bay from Nov 1 - Feb 28. Numerous specific gillnet regulations by geographic location and season; trap and fyke net regulations regarding leaders, distance from shore, distance between traps, etc.

Area closures: Numerous restrictions on the location of traps off the Island of Rhode Island, the Sakonnet River, and in Narragansett Bay. Cannot set, haul, and/or maintain a seine within 0.5 mile of the seaward entrance of several ponds/rivers; significant portion of the State is closed to various forms of netting.

Seasons: Fish traps must be out of the water Jan 1 - end of Feb.

Licenses: Multipurpose Commercial licenses allow for harvest and sale of fish: $150, with additional fees for specific Gear types. There is no sport license to fish for personal use.

Connecticut

Size limits: 14" possession restriction.

Gear restrictions: Cod end minimum mesh size of 4.5" in trawls from Nov 15 - May 14, and 3" from Aug 1 - Nov 14. Gillnet minimum mesh size 3"; Pound, trap, fyke, and weir minimum mesh: 2".

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

Seasons: None except as noted above

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

use fishing with trawls and other specific Gear will require a Commercial license.

New York

Size limits: 14" possession restriction.

Gear restrictions: No minimum mesh size for trawls at the present time.

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

Seasons: None

Licenses: A Commercial license is required for the harvest and sale of fish: Resident: $100, Nonresident: $1,000. (The nonresident harvest license may only be purchased in January.) A nonresident license which allows landing only: $250. There is no sport license for fish caught for personal use.

New Jersey

Size limits: 13" possession restriction.

Gear restrictions: Trawls fishing for summer flounder must have a 4.5" minimum mesh size in the cod end. (A summer flounder trip is defined as one in which 20% of the weight of the catch is comprised of summer flounder.) Gillnets may not exceed 2,400 ft in length from Feb 1 - May 15, and may not exceed 1,200 ft from May 15 - Dec 15.

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

Seasons: Gillnets cannot be fished from Dec 16 - Feb 1.

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

Delaware

Size limits: 13" possession restriction.

Gear restrictions: Trawls, purse seines, power operated seines, and runaround gillnets are prohibited. A single gillnet cannot exceed 200 yards in length; a series of connected gillnets cannot exceed 500 yards; a fyke net cannot exceed 72" in diameter; fish traps may not exceed 125 cubic ft and must have an escape panel. There is a moratorium on issuance of new Commercial (> 200 ft) gillnet permits until the number of fishermen falls below 30.

Area closures: Areas within a 0.5 mile sector at the mouths of all major tributaries to the Delaware River and Bay are closed to all fixed Gears; numerous specific areas closed to Commercial fishing.

Seasons: From April 1 - May 10, Commercial fishermen cannot set over 1,000 yards of fixed gillnet from one vessel; from May 10 to Sept 30, Commercial fishermen cannot set over 1,000 yards of drifting gillnet from one vessel; drift gillnets cannot be set from 2,400 hours Friday - 1,600 hours Sunday during this period; specific seasonal closures for gillnets in certain areas.

Licenses: Commercial food fishing license is required for the harvest and sale of fish: Residents: $150; Nonresidents: $1,500. Additional fees are levied for the use of specific Gear types. There is no sport license for fish caught for personal use.

Maryland

Size limits: 13" possession restriction, with a 5% tolerance (by number) for Commercial fishermen only.

Gear restrictions: Trawls prohibited within one mile of the coastline, and in Chesapeake Bay. Use of monofilament gillnets prohibited, except in coastal bays and the Atlantic Ocean; several specific gillnet restrictions exist for Chesapeake Bay; minimum mesh sizes for pound nets, haul seines, and fyke nets are 1.5"; purse seines prohibited.

Area closures: There are numerous specific locations where trawl, gill, seine and/or other net Gear are restricted.

Seasons: None

Licenses: A tidal fish license is required to catch, buy, or sell fish from tidal waters for Commercial purposes: Resident: $35, Nonresident: $100. Additional fees are levied to validate the license for individual Gear types; for example: nets, seines, trawls, and pots used in the ocean: $100, hook and line: $25. There is a mandatory 2 year waiting period for any Commercial fishing Gear license. Chesapeake sport fishing license: $5.

Virginia

Size limits: 13" possession restriction, with a 10% (or 2 fish, whichever is greater) enforcement tolerance.

Possession limits: Summer flounder = 10 fish per day. (A voluntary 6 fish per day limit is encouraged, as well as not making use of the 2 undersized fish tolerance.)

Gear restrictions: Trawls and encircling gillnets are prohibited in Virginia waters. Minimum mesh sizes: pound nets: 2"; haul seines over 200 yards: 3"; gill nets = 2-7/8". The gill net limit increases to 3" on 1/1/92.

Area closures: Fish trout lines cannot be set on the sea side of the eastern shore.

Seasons: Haul seining in the Chesapeake Bay or its tributaries is prohibited on Sundays. (This prohibition will be rescinded as of 7/1/90.)

Licenses: Commercial licenses are required for specific fishing Gears, with the fee dependent on the Gear type. There is no sport fishing license, and no license is required to sell hook and line caught fish.

Other: Virginia has developed a State management plan for summer flounder. It proposes: a zero tolerance on undersize fish for all Gears except pound nets; special licenses for seafood sellers and Commercial hook and line fishermen; and limited and delayed entry programs. It also requests the Mid-Atlantic Council to adopt: a 5.5 minimum mesh size for trawls when targeting summer flounder; individual State quotas for summer flounder; and to request that North Carolina either prohibit trawling in the northern portion of its waters from November - February, or establish a 5.5" minimum mesh size during that same period.

North Carolina

Size limits: 13" possession restriction.

Gear restrictions: A 5.5" minimum mesh requirement was issued for the cod ends of trawls used in the Atlantic Ocean within 3 miles of the beach from the NC/VA State line to Beaufort Inlet. This requirement extends from 1 November 1990 to 30 April 1991, and must be reissued to take effect in subsequent years.

Trawl nets may not be used in internal, coastal fishing waters for finfish, however an unlimited quantity of legal size flounder may be retained as a bycatch in the trawl fisheries for crab and shrimp. (Non-flounder bycatch is limited to 1,000 pounds per trip). Purse seines are prohibited except for menhaden and Atlantic thread herring; no net may be towed by more than one vessel except in long haul (seine) fishing operations.

Area closures: Numerous specific Gear restrictions by geographic area. Trawls are prohibited within one half mile of the beach between the Virginia line and Oregon Inlet. Trawling is prohibited in designated nursery areas.

Seasons: Several specific seasonal restrictions pertaining to gillnets. The Fishery Director may, by Proclamation, establish fishing Gear specifications for trawls in the territorial sea to protect small flounder from Oct 1 - April 30.

Licenses: A Commercial license is required for vessels, with fees dependent on vessel length (nonresidents have an additional $200 surcharge). An inland sport fishing license is necessary for some portions of tidal waters. A license is required to sell fish caught by hook and line, but there is a $500 exemption per 12 month period.

Other: North Carolina is considering revising trawl regulations in internal, coastal waters as follows: limit finfish bycatch to 200 lbs (including flounder) in the crab and shrimp fisheries; require a 5" - 5.5" minimum mesh from Nov 1 - March 31 in several key river systems (Paplico, Pungo Bay, Neuse, and New River), or alternatively, close them to trawling during this period.

Sources: All personal communication: ME - Honey, NH - Nelson, MA - McKiernan, RI - Sisson, CT - Simpson, NY - Zawacki, NJ - Scarlett, DE - Cole, MD - Speir, VA - Varnell, and NC - McCoy.

Table 85. The Impact of Mesh and Minimum Size Regulations on Commercial Trawl Landings of Summer Flounder Based on NEFC Weighout Data, 1985-1989 Combined. (The percent discarded (D) and the percent reduction (PR) in number of fish killed by Commercial fishermen were derived using selectivity curves. The percent reductions assume an 80% mortality of discards and 25% mortality of fish escaping from the net.)

	Mesh Size (inches)									
Min Size	4.0		4.5		5.0		5.5		6.0	
(TL inches)	D	PR	D	PR	D	PR	D	PR	D	PR
None	-	*	-	1	-	5	-	14	-	21
11	*	*	*	1	*	5	*	14	*	21
12	1	*	1	2	1	5	*	14	*	21
13	8	2	8	3	6	6	4	14	3	22
14	22	5	22	6	19	8	15	17	11	24
15	44	9	44	10	41	13	37	21	29	27
16	58	12	57	13	55	16	51	24	44	30

* = <1.0%
Note: Mesh sizes are inside stretch measurements.

Table 86. The Impact of Mesh and Minimum Size Regulations on North Carolina Commercial Trawl Landings of Summer Flounder, 1985-89 Combined. (The percent discarded (D) and the percent reduction (PR) in number of fish killed by Commercial fishermen were derived using selectivity curves. The percent reductions assume an 80% mortality of discards and 25% mortality of fish escaping from the net.)

	Mesh Size (inches)									
Min Size	4.0		4.5		5.0		5.5		6.0	
(TL inches)	D	PR	D	PR	D	PR	D	PR	D	PR
None	-	2	-	6	-	15	-	26	-	38
11	6	3	4	7	2	15	1	27	1	38
12	15	5	11	8	7	16	4	27	3	39
13	37	9	34	13	27	20	20	30	14	41
14	53	12	50	16	44	24	35	33	26	44
15	71	16	69	20	65	28	57	38	48	48
16	79	18	78	22	75	30	70	40	62	51

Note: Mesh sizes are inside stretch measurements.

Table 87. Results of Experimental Trawls Conducted off North Carolina

Date	Number of Nets	Type of Net (ft)	No. of Tows	Tow Times (min)	Total Time for Day (hours)	Turtles Caught
12/11/90	2	70′ standard	6	90	18	2 Lk
12/17/90	1	72′ standard	3	30		None
	1	72′ standard	3	60		1 Cc
	1	72′ standard	6	90	13.5	1 Cc, 1 Lk
	1	72′ w/Jones TED	3	30		None
	1	72′ w/Jones TED	3	60		None
	1	72′ w/TED w/funnel	6	90	13.5	None
12/19/90	1	72′ standard	3	60		None
	1	72′ standard	1	45		None
	1	72′ standard	3	90	8.25	1 Cc
12/19/90	1	72′ w/super shooter	3	60		None
	1	72′ w/super shooter	1	45		None
	1	72′ w/super shooter	3	90	8.25	1 Lk
12/29/90	1	50′ standard	3	70	3.5	1 Cc
01/10/91	1	78′ standard	4	90	6	None

Note: Lk = *Lepidochelys kempi* (Kemp's ridley turtle), Cc = *Caretta caretta* (loggerhead turtle).
Source: North Carolina Division of Marine Fisheries, unpublished data.

Table 88. Cetaceans and Turtles Found in Survey Area

Scientific name	Common name	Est. Minimum Number in Study Area	Endan-gered	Threat-ened
LARGE WHALES				
Balaenoptera physalus	fin whale	1,102	X	
Megaptera novaeangliae	humpback whale	684	X	
Balaenoptera acutorostrata	minke whale	162		
Physeter catodon	sperm whale	300	X	
Eubalaena glacialis	right whale	29	X	
Balaenoptera borealis	sei whale	109	X	
Orcinus orca	killer whale	unk		
SMALL WHALES				
Tursiops truncatus	bottlenose dolphin	6,254		
Globicephala spp.	pilot whales	11,448		
Lagenorhynchus acutus	Atl. white-sided dolphin	24,287		
Phocoena phocoena	harbor porpoise	2,946		
Grampus griseus	grampus (Risso's) dolphin	10,220		
Delphinus delphis	saddleback dolphin	17,606		
Stenella spp.	spotted dolphin	22,376		
Stenella coeruleoalba	striped dolphin	unk		
Lagenorhynchus albirostris	white-beaked dolphin	unk		
Ziphius cavirostris	Cuvier's beaked dolphin	unk		
Stenella longirostris	spinner dolphin	unk		
Steno bredanensis	rough-toothed dolphin	unk		
Delphinapteras leucas	beluga	unk		
Mesoplodon spp.	beaked whales	unk		
TURTLES				
Caretta caretta	logggerhead turtle	4,017		X
Dermochelys coriacea	leatherback turtle	636	X	
Lepidochelys kempi	Kemp's ridley turtle	unk	X	
Chelonia mydas	green turtle	unk		X

Source: University of Rhode Island 1982.

Table 89. Average Number of Days on the Fishing Grounds for North Carolina Vessels Participating in the Winter Trawl Fishery for Summer Flounder, 1980-89

Month	Deepwater	Inshore	Total Fishery
Jan	18	18	18
Feb	16	16	16
Mar	14	16	15
Apr	18	12	16
Sep	-	3	3
Oct	-	10	10
Nov	-	18	18
Dec	19	18	19

Source: Monaghan pers. comm.

Table 90. The Effect of Various Possession Limits and a 14"TL Minimum Size on 1986-90 Combined Summer Flounder Recreational Landings (MRFSS Type A fish). (The table contains the percent reduction in the number of summer flounder killed by anglers. Reductions were calculated assuming a post-release mortality of 25% and are adjusted for the differential between impact of a 14" length limit relative to MRFSS type A fish and summer flounder measured by interviewers.)

	Coast	ME-CT	NY-DE	MD-NC
NO	26.0	15.6	17.9	37.4
1	64.4	58.2	56.0	75.0
2	51.9	47.5	41.9	64.7
3	44.3	40.4	33.9	57.3
4	39.4	35.7	29.3	52.7
5	36.2	32.5	26.4	48.6
6	33.9	29.9	24.3	46.0
7	32.3	27.9	22.9	44.3
8	31.0	26.2	21.6	43.0
9	30.1	24.7	20.8	42.0
10	29.3	23.3	20.2	41.2

Source: Unpublished NMFS MRFSS data.

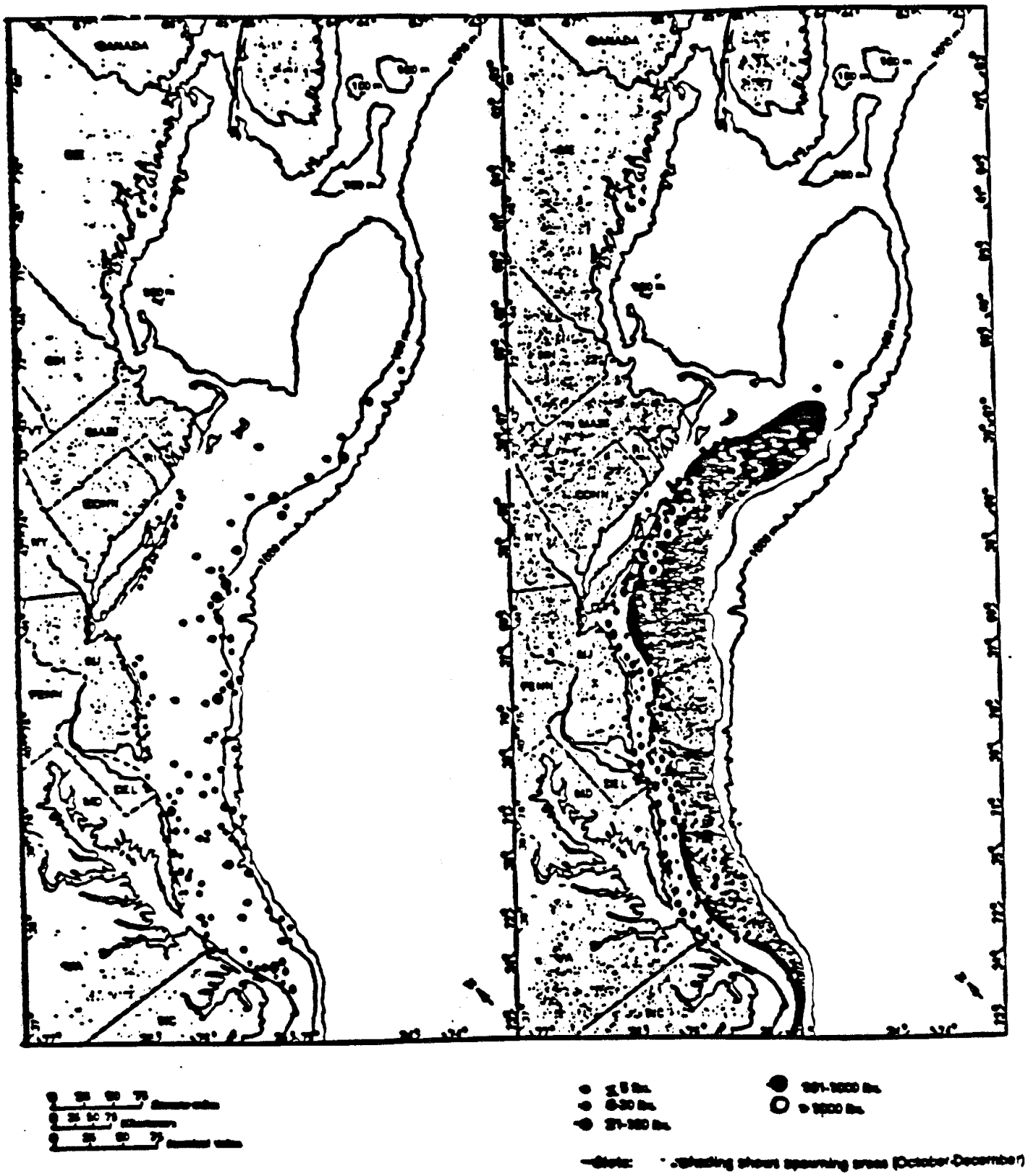


Figure 1. Seasonal Distribution of Summer Flounder Based Upon NEFC Surveys, 1973 and 1974. Spawning Areas Indicated by Shading. Left side is Spring Distribution and Right side is Autumn Distribution.
Source: Grosslein and Azarovitz, 1982.

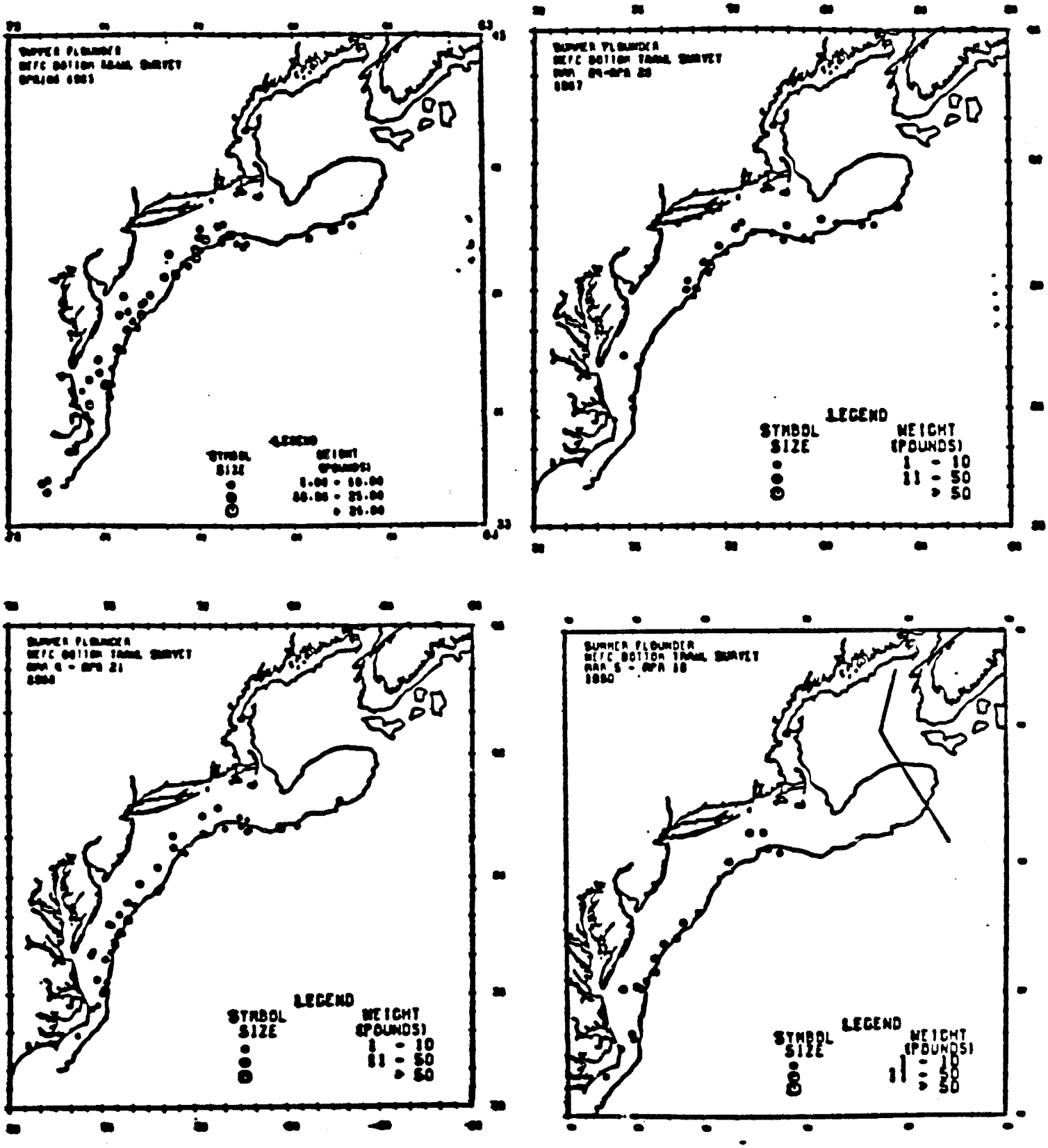
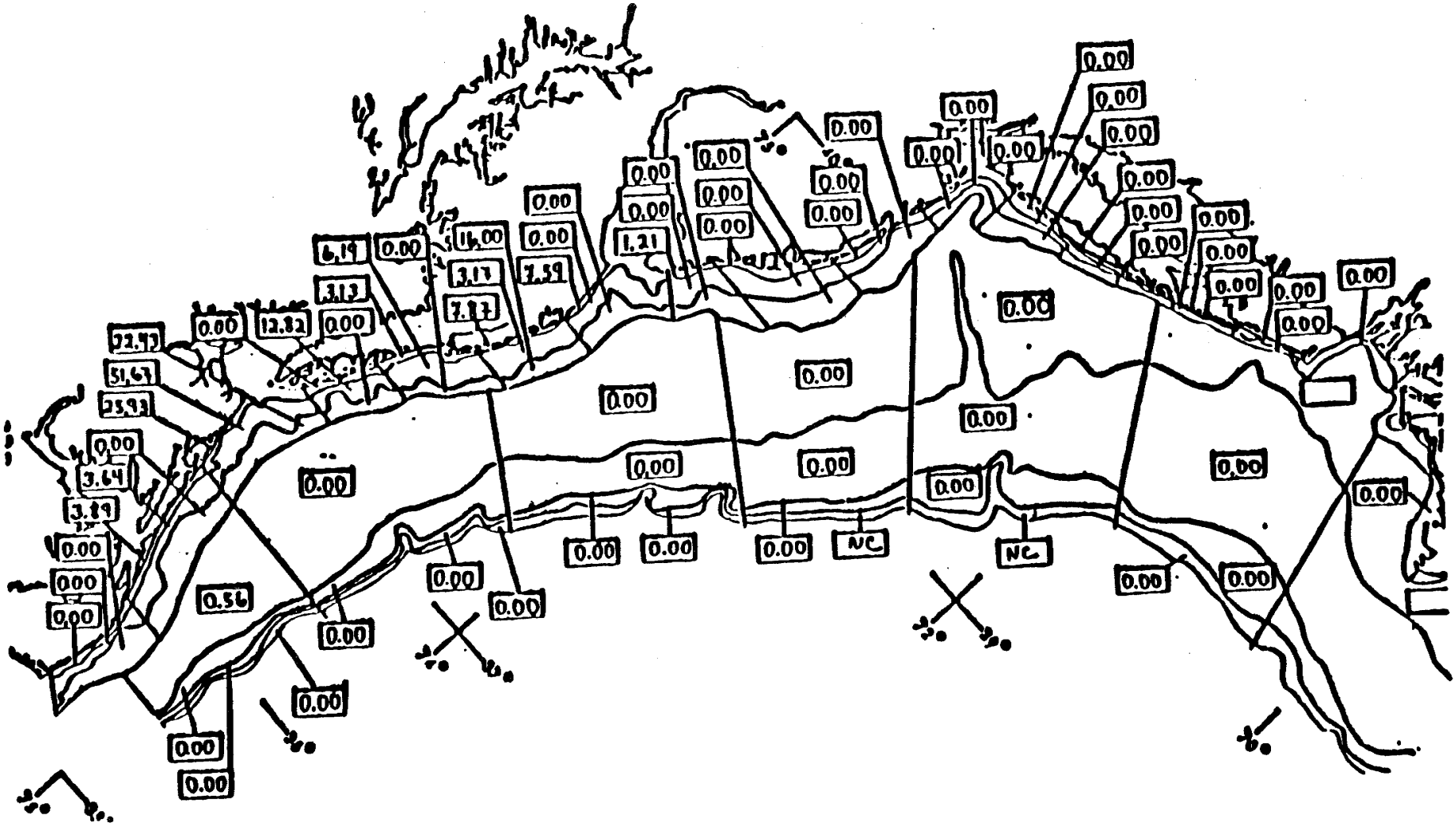


Figure 2. Summer Flounder Catch (lbs) Per Tow in NEFC Bottom Trawl Surveys, 1985, 1987, 1988 and 1990.

Source: unpub. prelim. NMFS data.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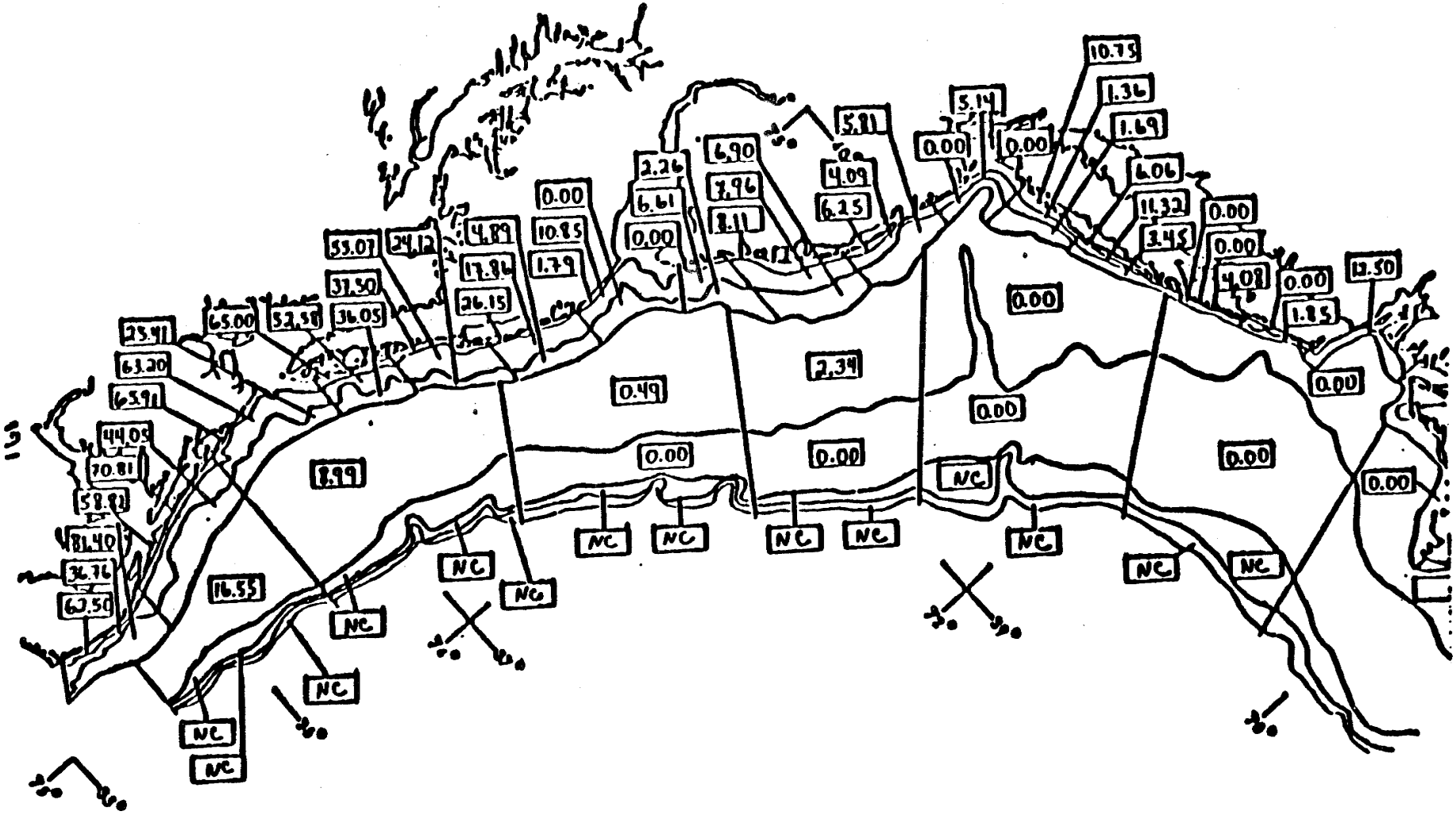


Figure 4. Percentage of Young of the Year Summer Flounder Caught by NEFC Trawl Survey During the Autumn, 1967-1979.

Source: Azarovitz et al., 1980.

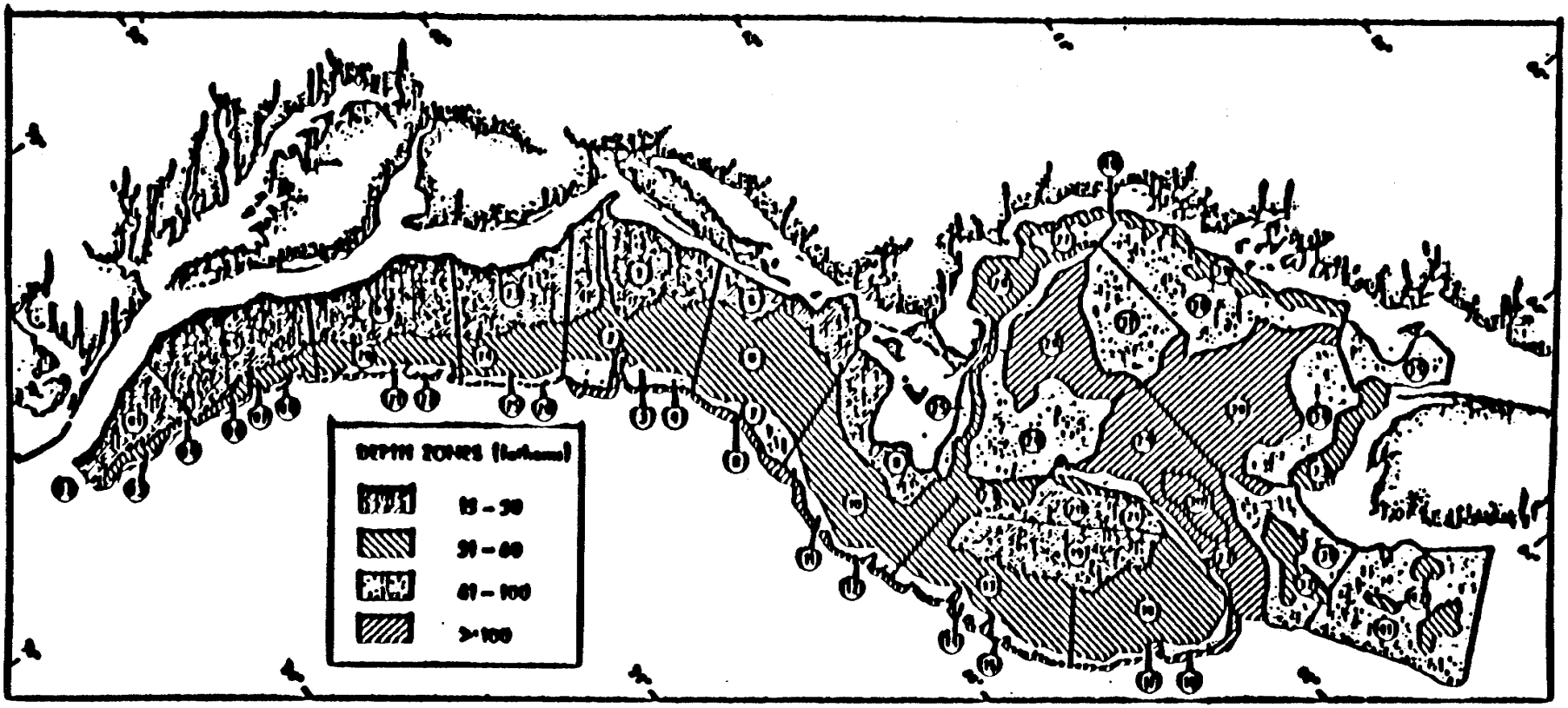


Figure 5. Northwest Atlantic NEFC Trawl Survey Strata.

Source: Clark, 1978.

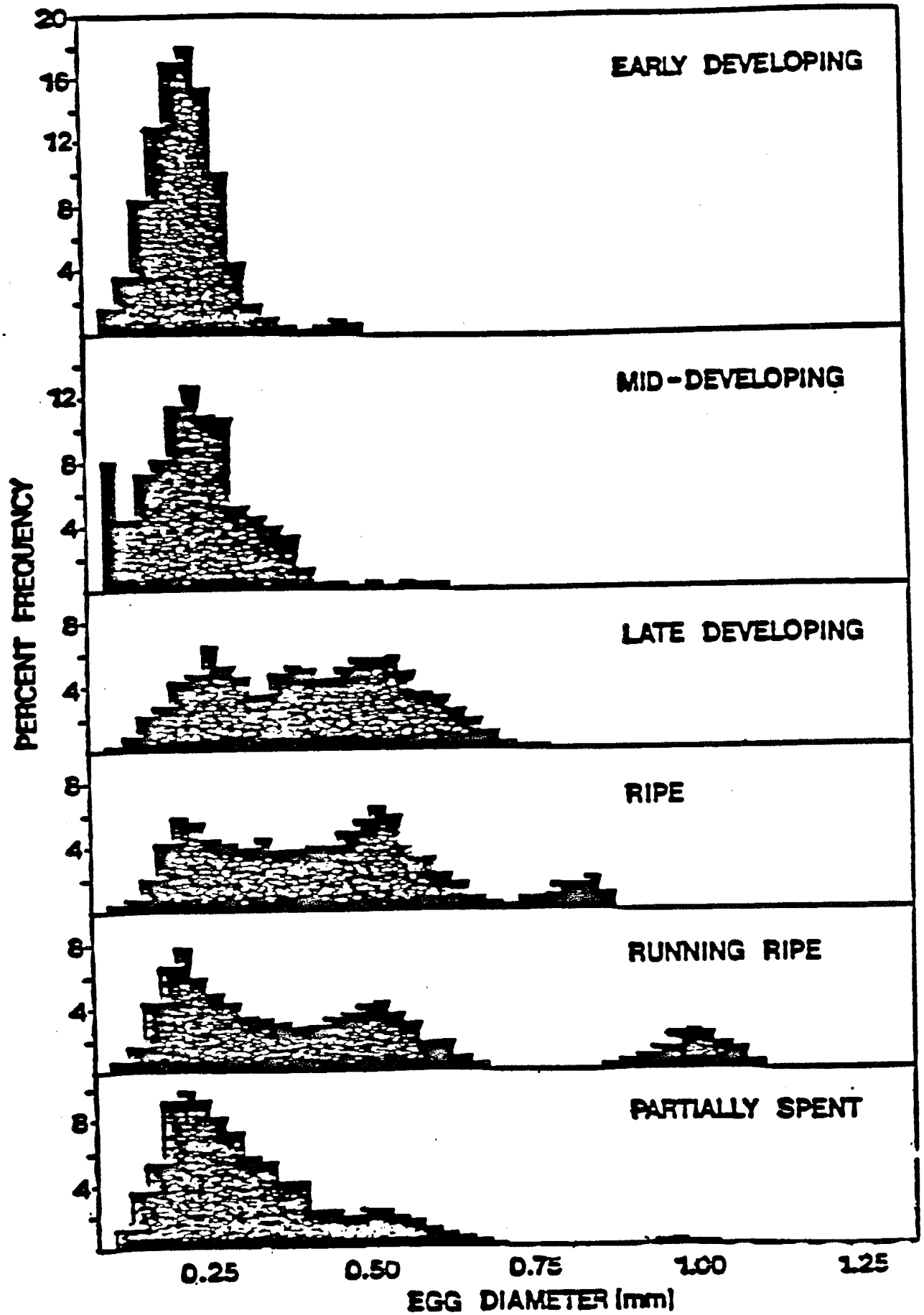


Figure 6. Egg Diameter Frequencies of Summer Flounder.

Source: Morse, 1981.

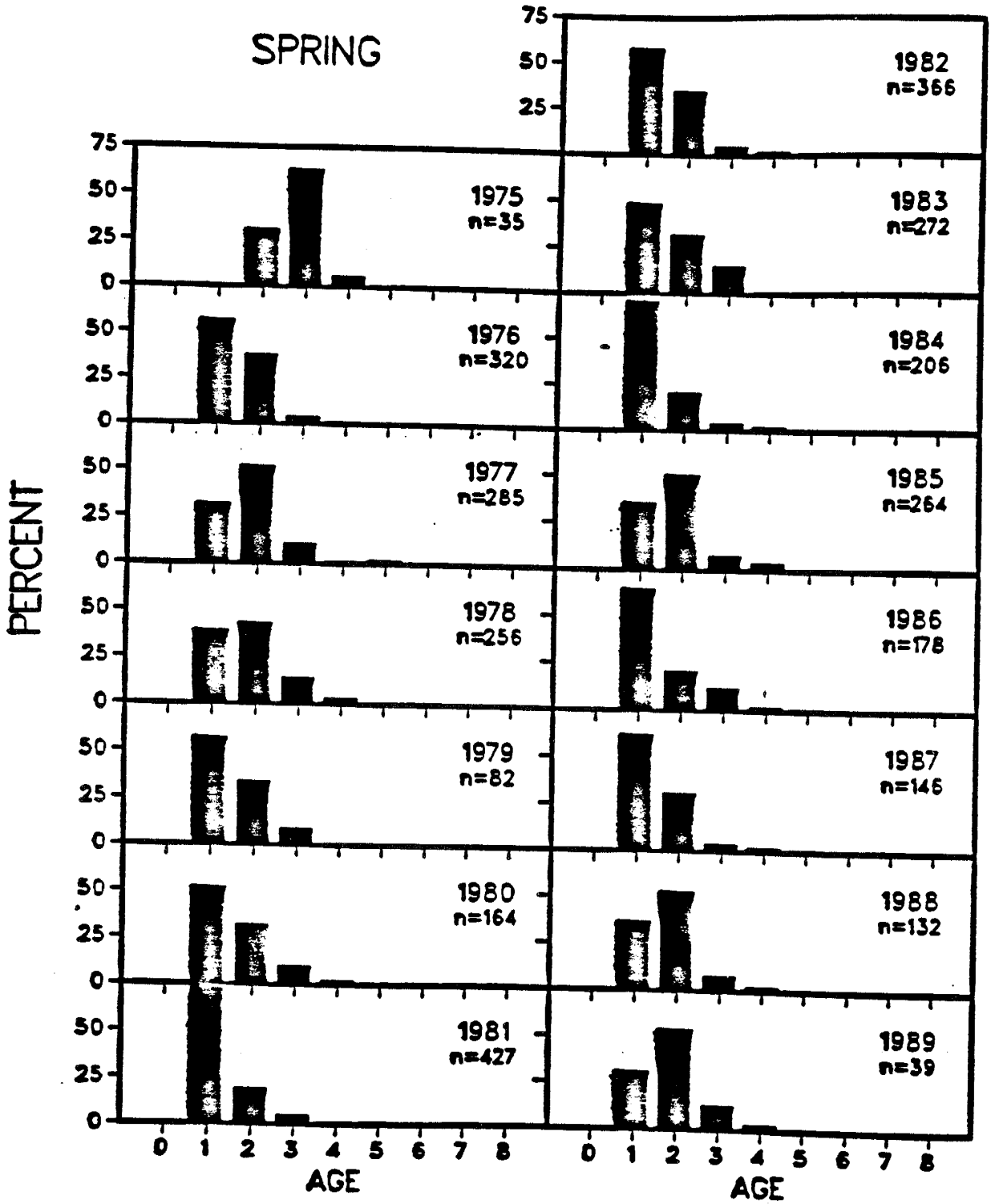


Figure 7. Age composition (percent) of NEFC Spring bottom trawl survey samples of summer flounder during 1975-1989.

Source: Almeida pers. comm.

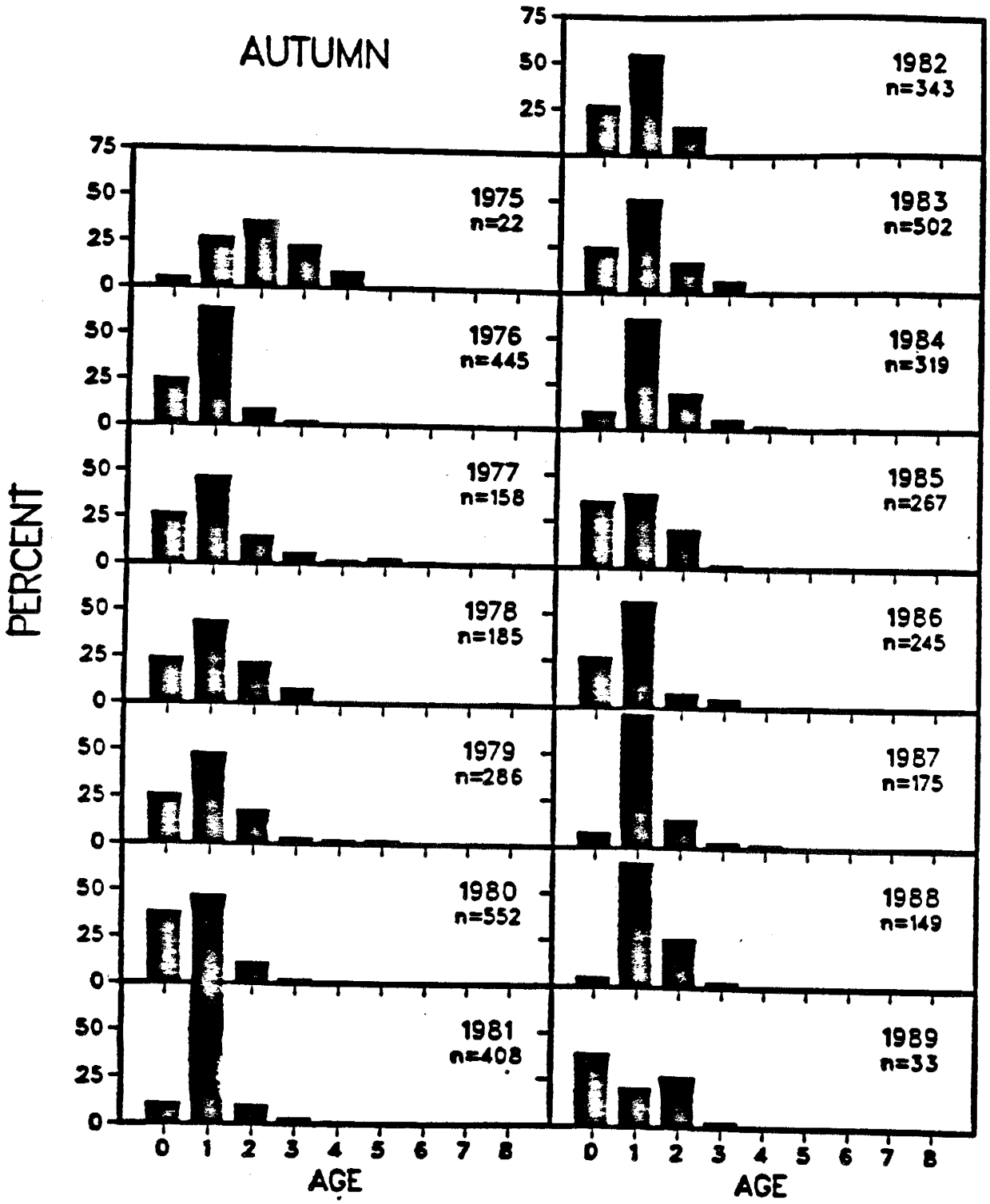


Figure 8. Age composition (percent) of NEFC Autumn bottom trawl survey samples of summer flounder during 1975-1989.

Source: Almeida pers. comm.

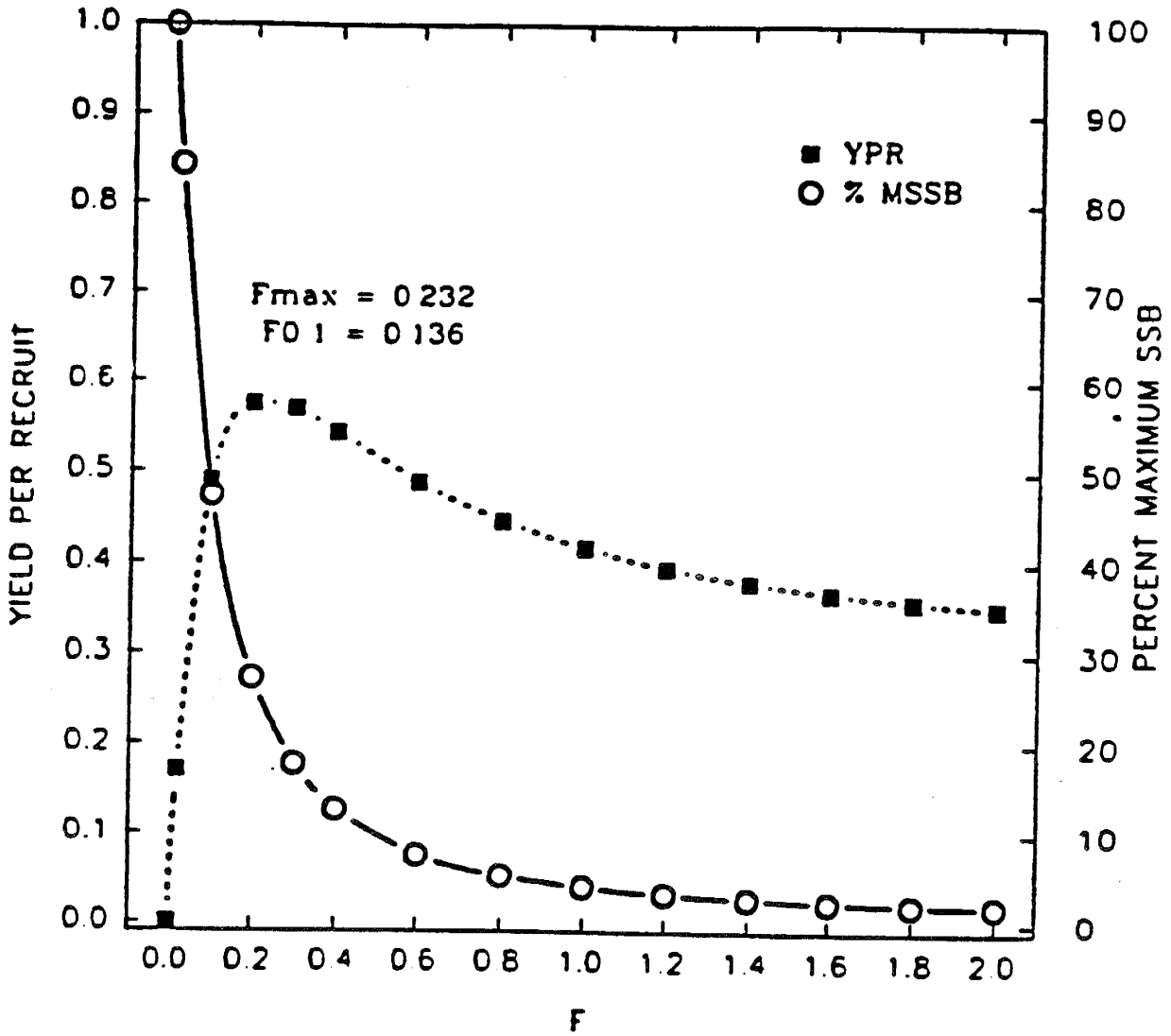


Figure 9. Results of revised yield per recruit analysis for summer flounder 1990.

Source: USDC 1990b

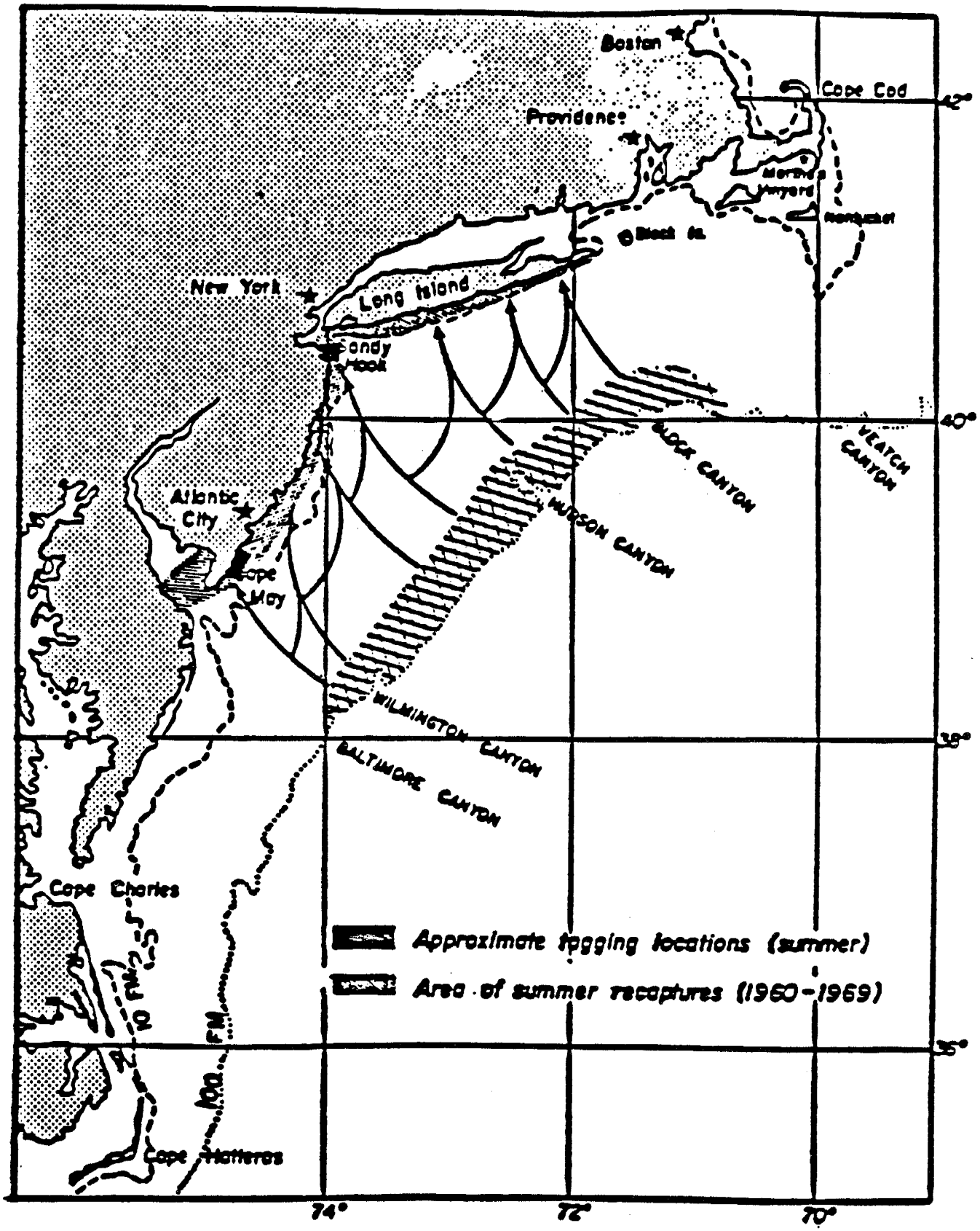


Figure 10. Summer Flounder Inshore Movements and Summer Flounder Distribution from Tagging Study by Murawski (1970). Source: Freeman, pers. comm.

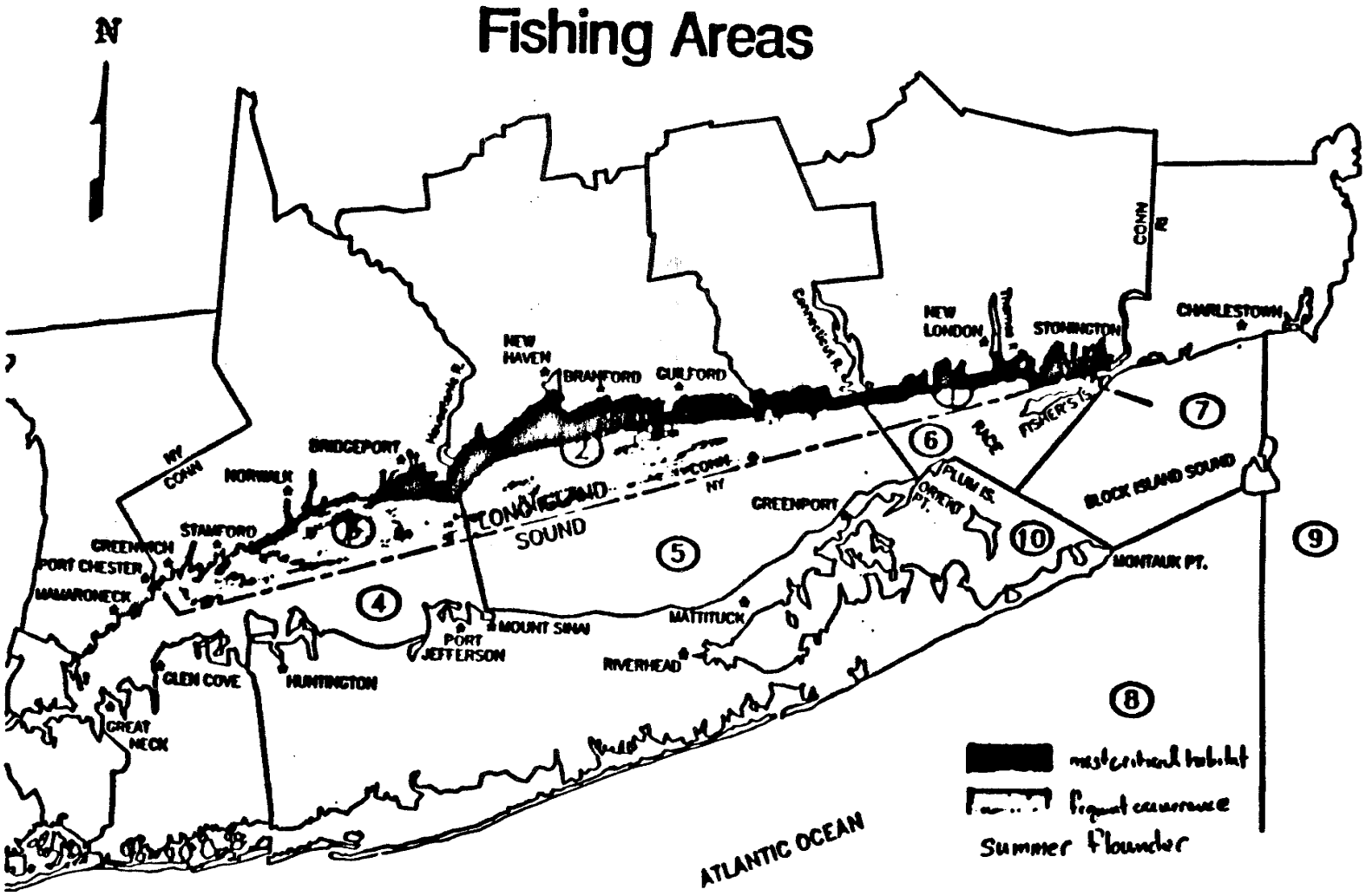


Figure 11. Summer Flounder Habitat in Connecticut

Source: Simpson pers. comm.

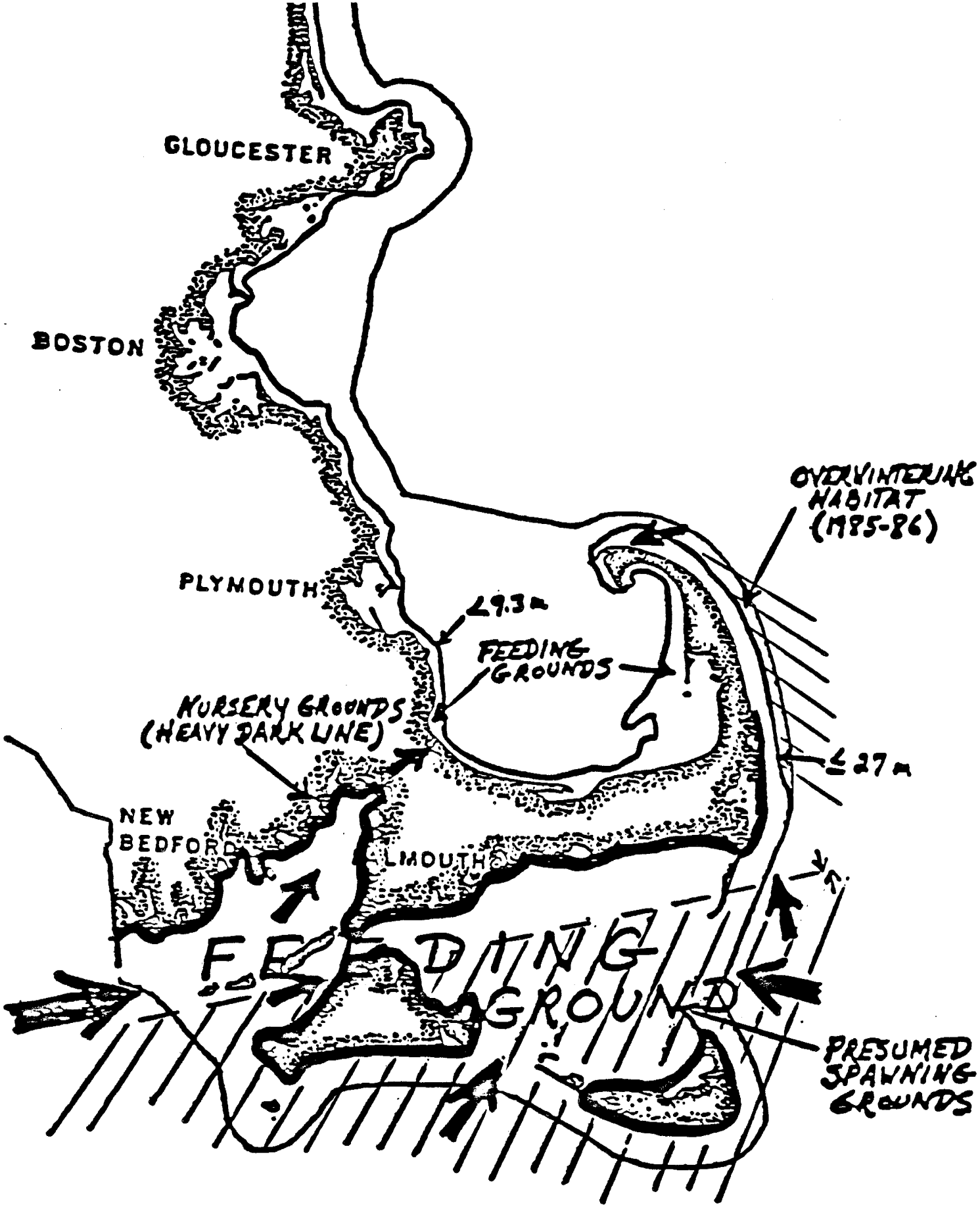


Figure 12. Summer Flounder Habitat in Massachusetts.
Source: Howe, pers. comm.

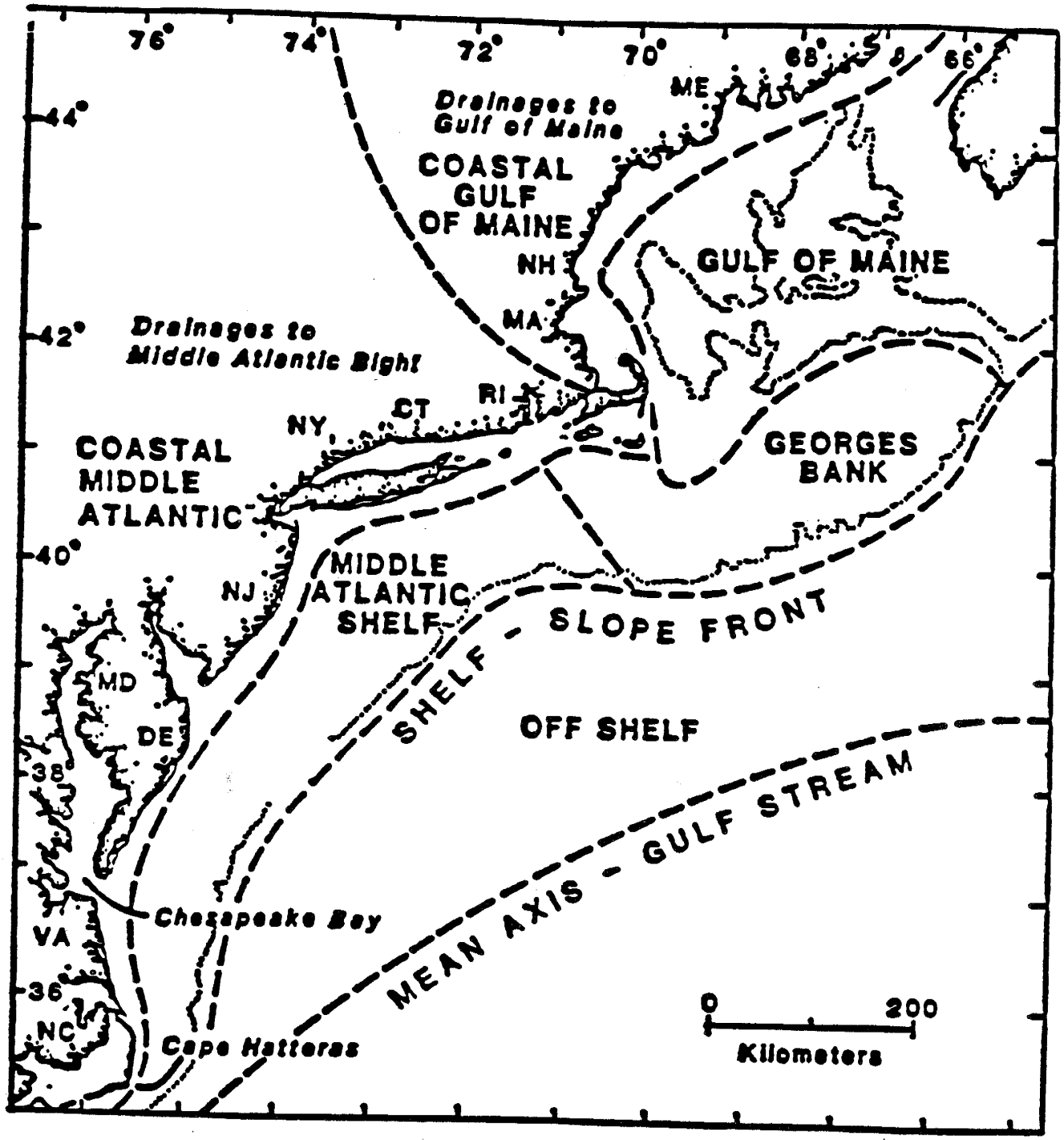


Figure 13. Northeast Regional Action Plan (RAP) Water Management Units.

Source: USDC, 1985 b

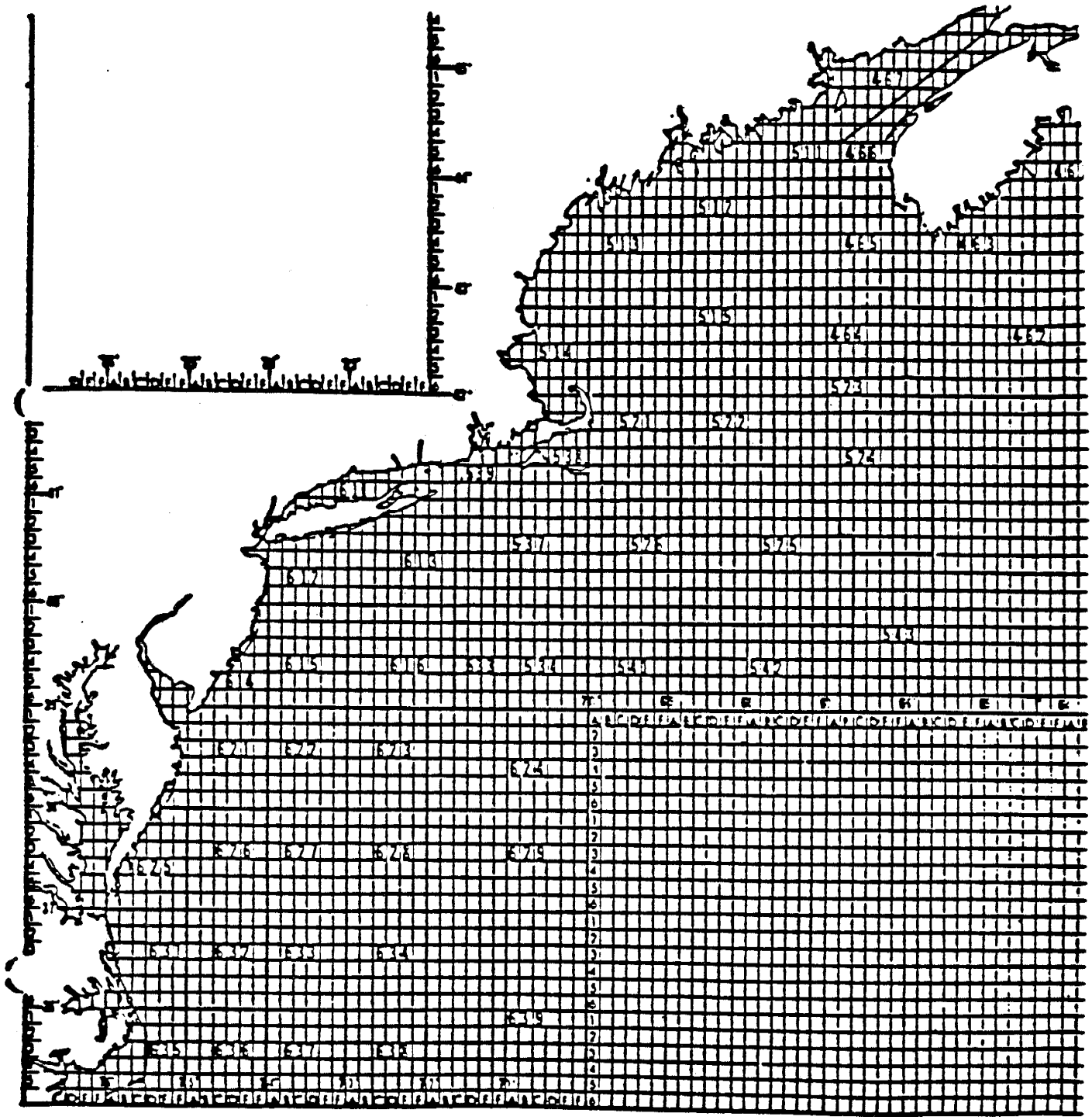


Figure 1.4. Northwest Atlantic Statistical Reporting Area.

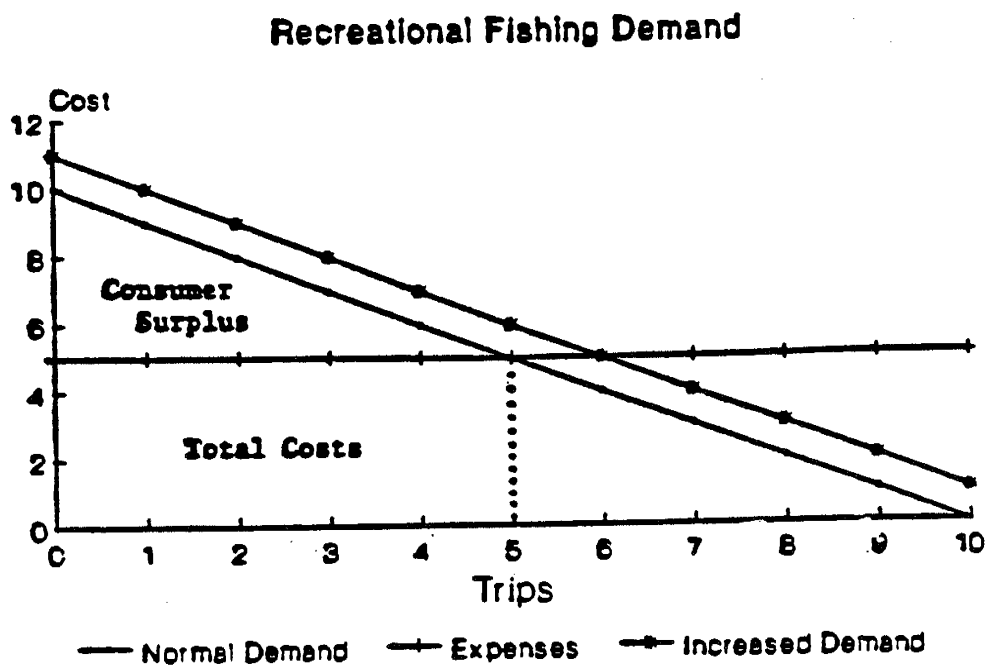


Figure 15. Theoretical Expenditures and Consumer Surplus Associated with Recreational Fishing

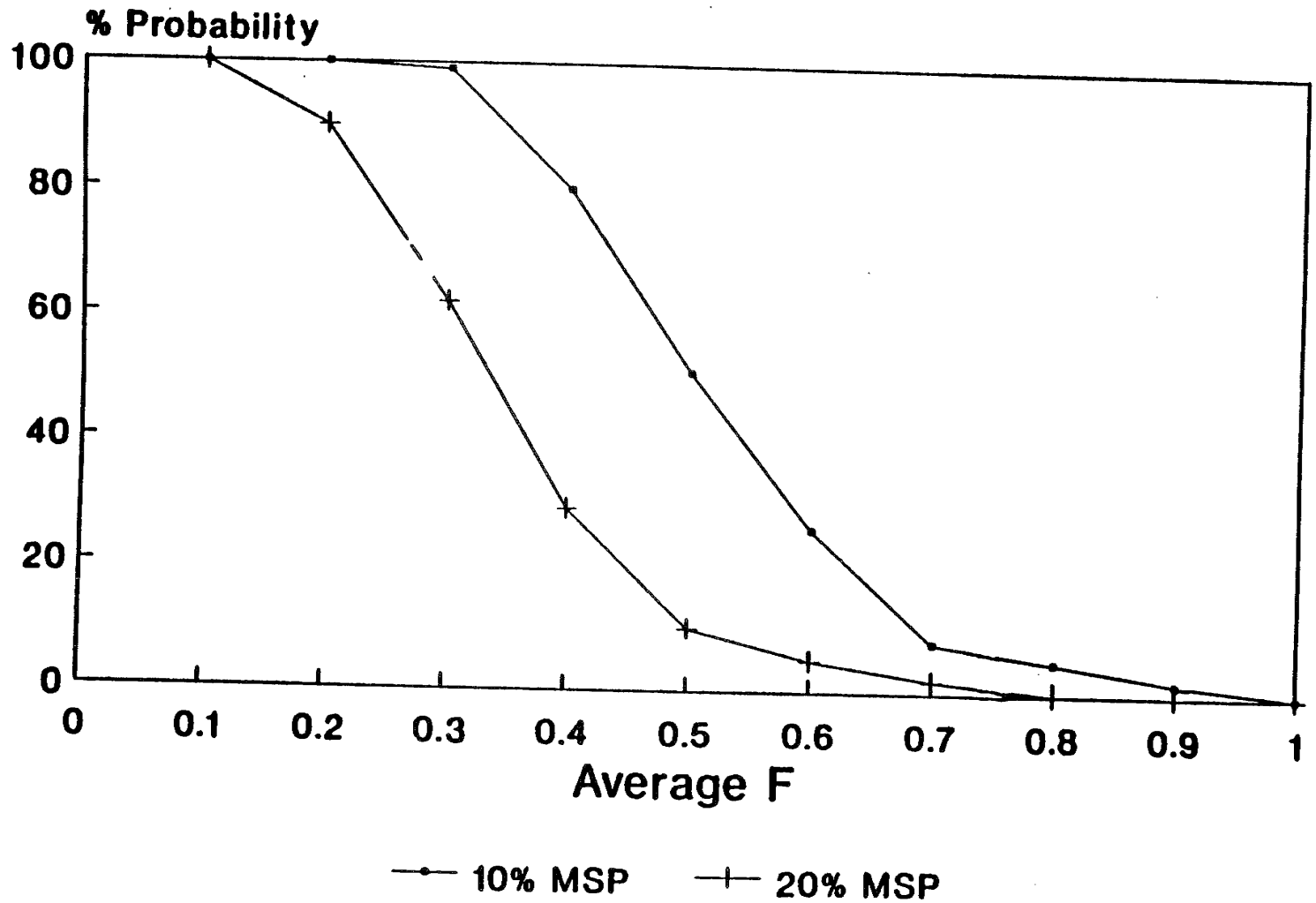


Figure 16. The Probability Associated with Reaching a 10% or 20% Maximum Spawning Potential (MSP) in 5 Years for Various Levels of F.

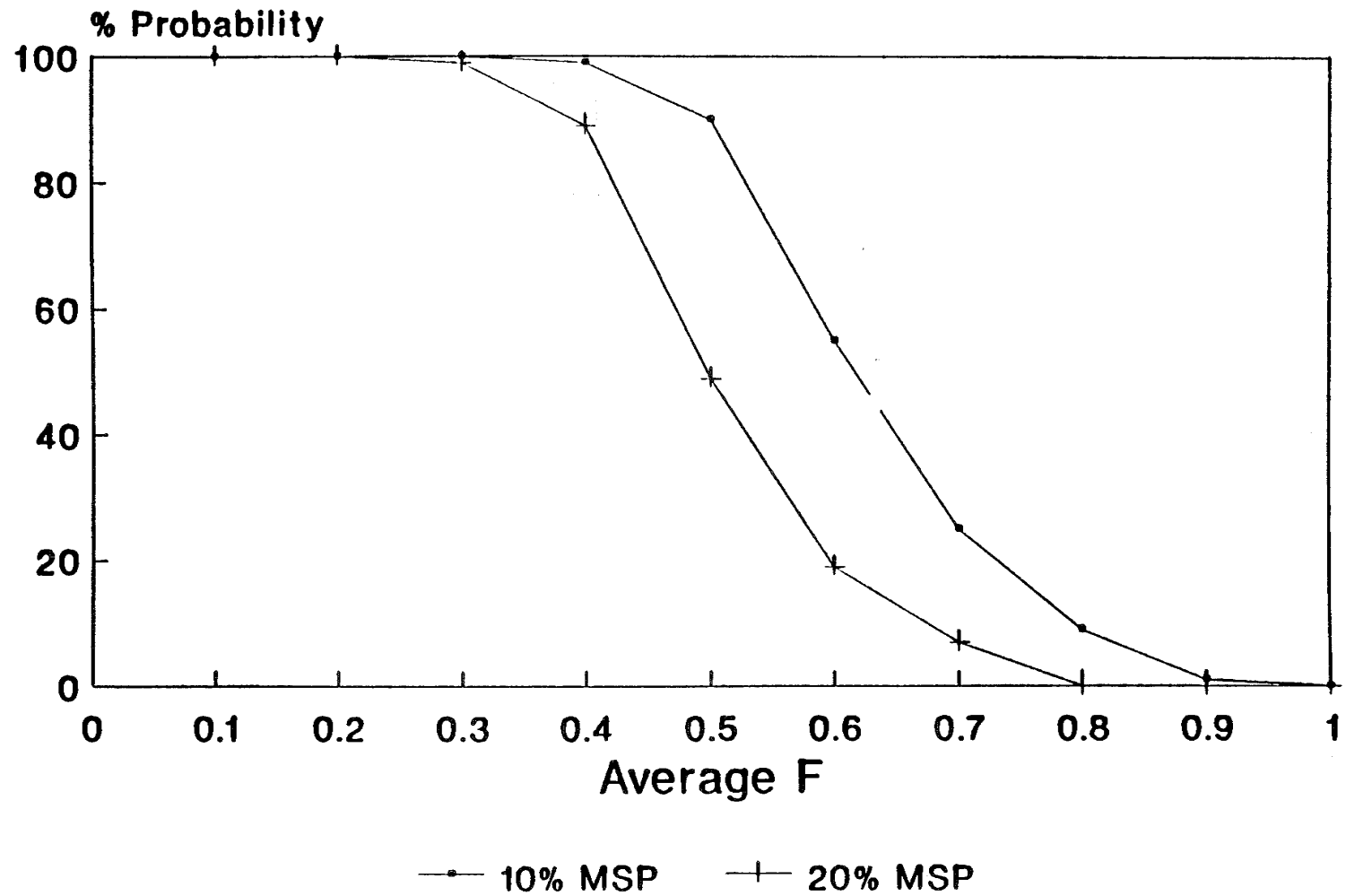


Figure 17. The Probability associated with Reaching a 10% or 20% Maximum Spawning Potential (MSP) in 10 Years for Various Levels of F.

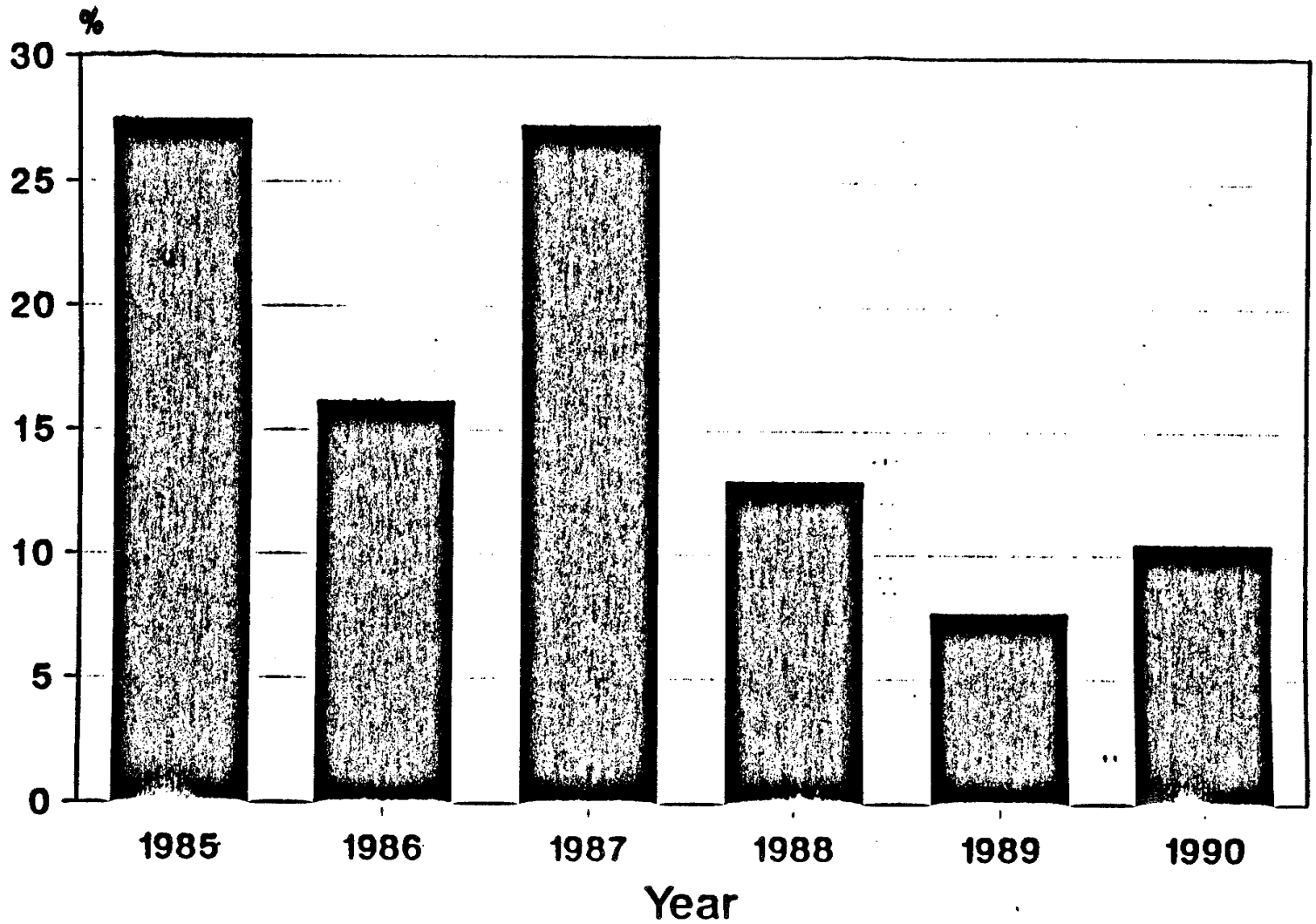


Figure 18. The Amount of Summer Flounder (% of total) less than 13" TL Landed by Recreational Anglers, 1985 to 1990.

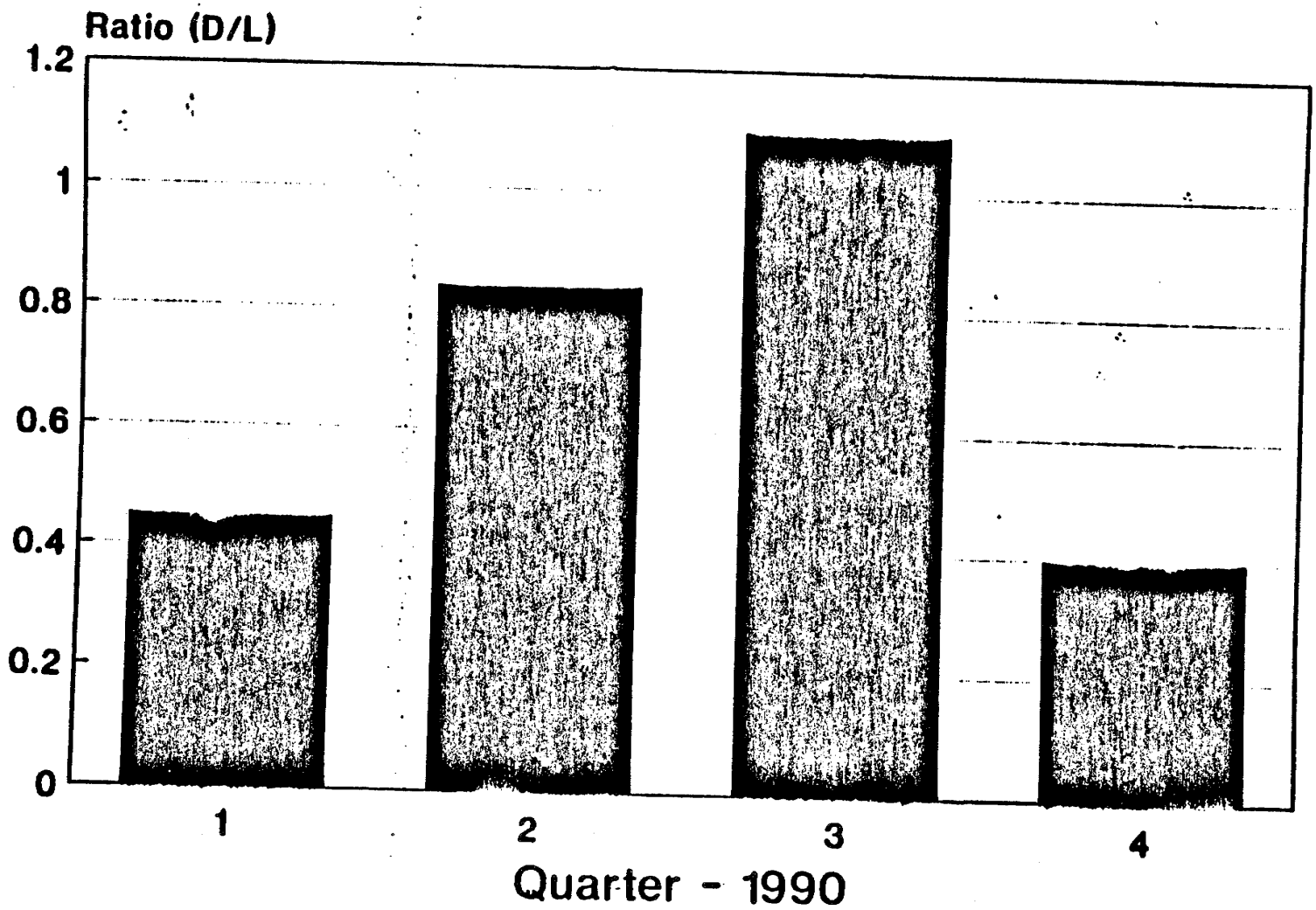


Figure 19. The Ratio of Discarded to Landed Summer Flounder in Each Annual Quarter, 1990.

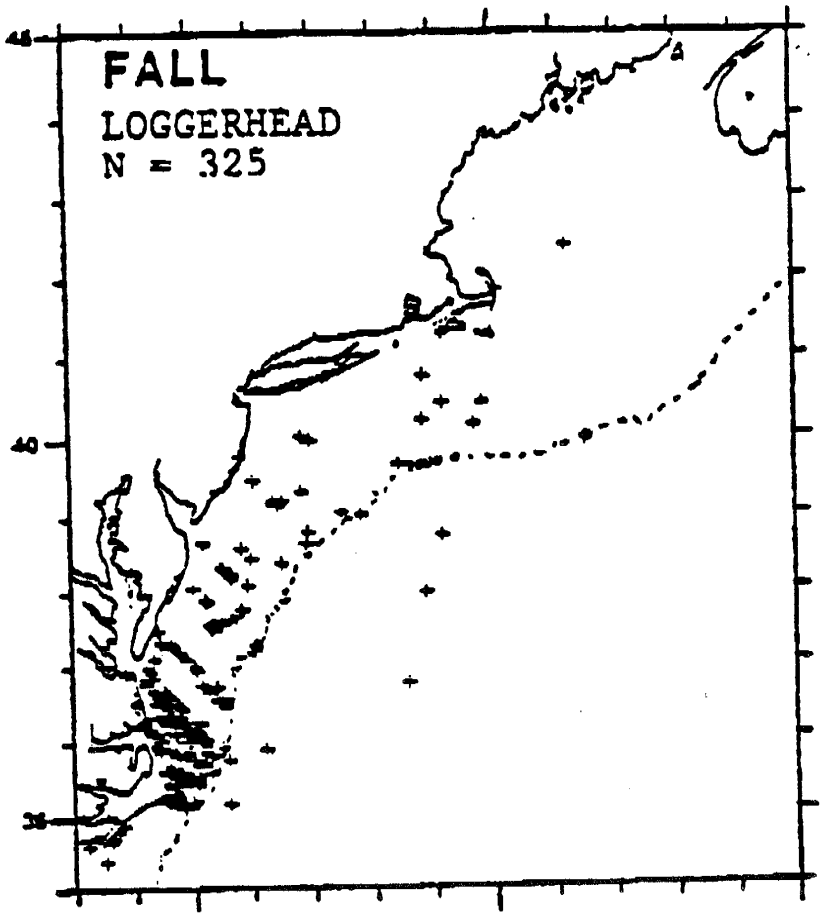


FIGURE 20. Fall (Sept.22-Dec.21) distribution of loggerhead sea turtles. From CeTAP, 1982.

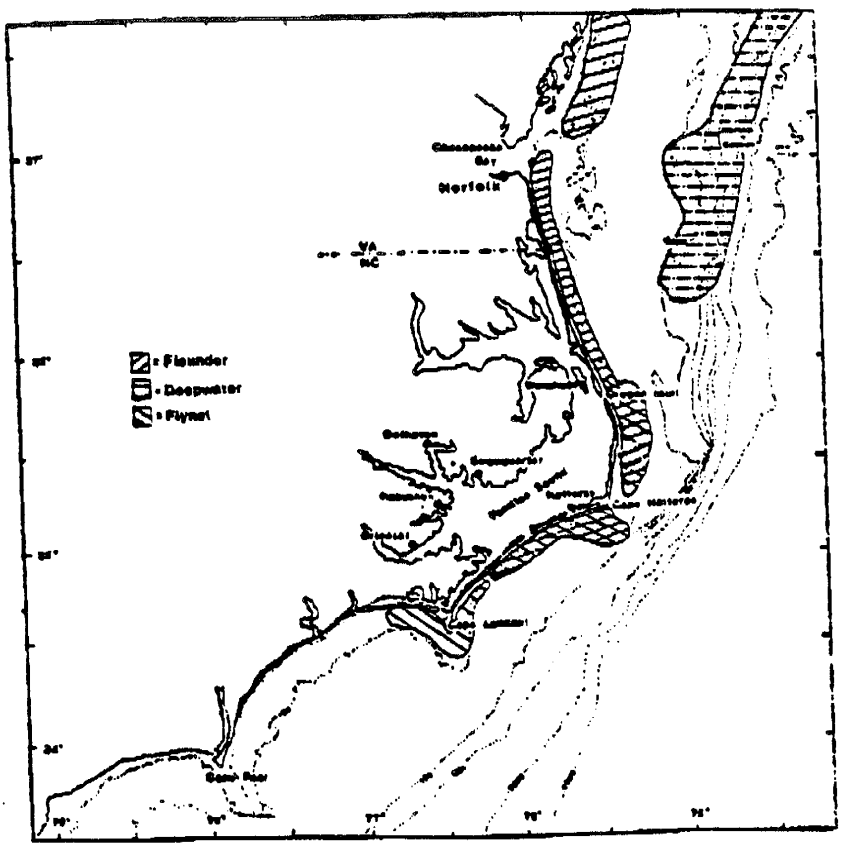
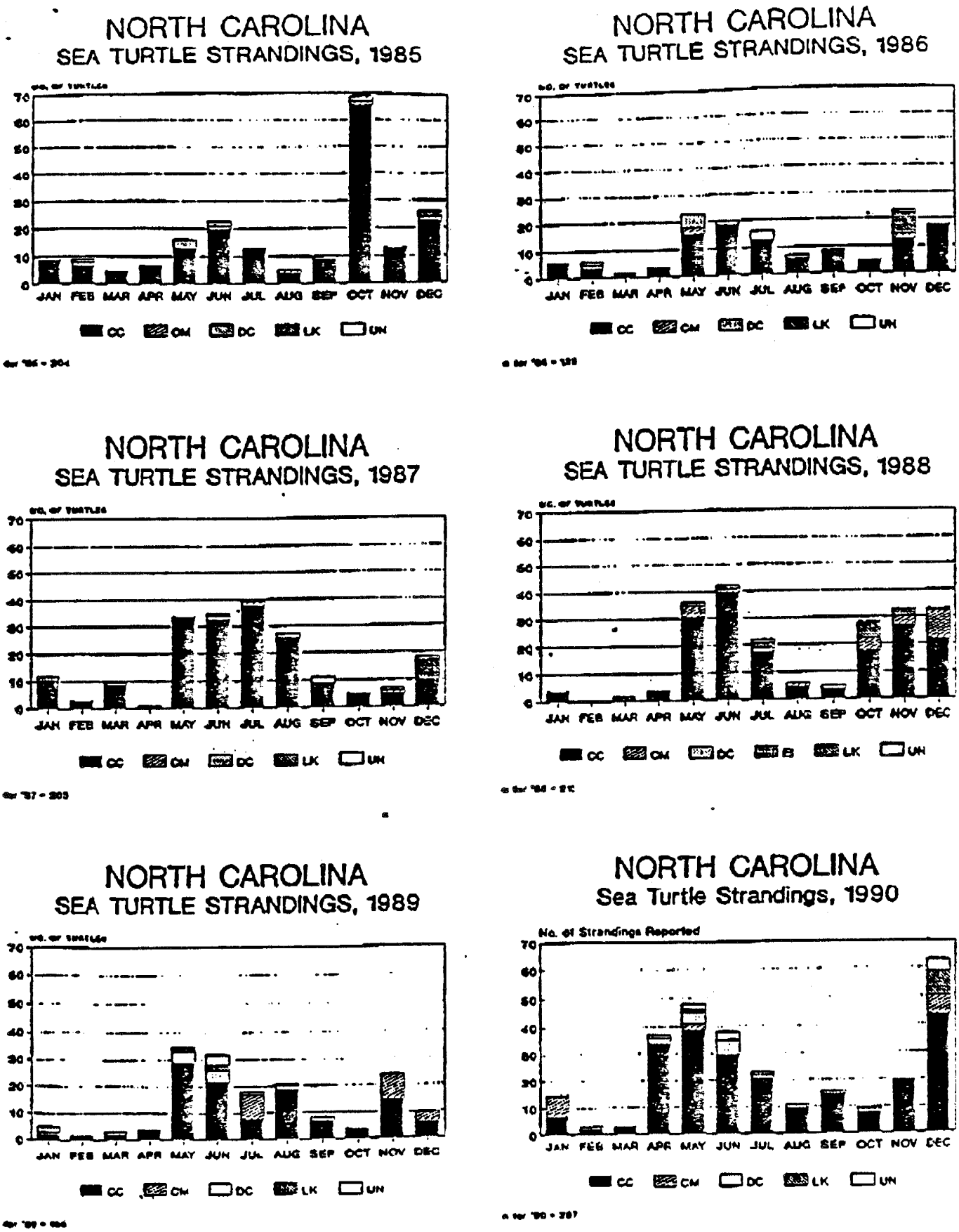


FIGURE 21. Fishing grounds of North Carolina winter (Oct.-Jan.) trawl fishery. From Ross, 1991.

Figure 22.
From NMFS, SEFC. STSSN Database



CC=Caretta caretta CM=Chelonia mydas DC=Dermochelys coriacea EI=Eretmochelys imbricata LK=Lepidochelys kempi UN=Unidentified

APPENDIX 1. ALTERNATIVES TO THE AMENDMENT

Appendix 1 is printed as it was in the hearing draft of Amendment 2 so that it is possible for the reader to follow the comments made by the public during the review process although several of the alternatives were adopted by the Council as part of the provisions of the final version of Amendment 2. These changes are explained in section 9.0. To further assist the reader, the preferred alternative from the hearing draft is reprinted following the discussion of Alternative 14 at the end of this Appendix 1.

1. GENERAL PROVISIONS

All of the alternatives except no action (2) include: a moratorium on entry of additional vessels into the commercial fishery and on entry of additional party and charter boats; summer flounder may be bought from and sold at point of landing only by vessels with moratorium permits; mandatory logbooks for all permitted vessels (weekly reporting for the quota based alternatives and monthly reporting for the non-quota based alternatives); and permits and mandatory reports for dealers. Management measures (for example, quotas, possession limits, size limits, mesh size, and closed seasons) are frameworked, reviewed annually, and adjusted as necessary. All minimum mesh size alternatives would require that only nets of at least legal size be on board when taking summer flounder.

These general provisions are detailed in 9.1 as part of the preferred alternative, except as they may be changed by special alternatives 8 and 9 dealing with modifications to the moratorium.

2. TAKE NO ACTION AT THIS TIME

2.1. Description

This would mean that the FMP (MAFMC 1988 and MAFMC 1990) would remain in effect. The FMP currently has the following provisions:

1. It is illegal to possess summer flounder less than 13" total length (TL) and it is illegal to possess parts of summer flounder less than 13"to the point of landing.

Vessels with permits issued pursuant to this FMP would be required to fish and land pursuant to the provisions of this FMP unless the vessels land in States with larger minimum fish sizes than those provided in the FMP, then the minimum fish sizes would be required to meet the State limits.

3. Foreign fishermen would not be permitted to retain summer flounder since US fishermen, by definition, would be harvesting the Optimum Yield (OY).

4. Vessels fishing commercially for summer flounder, either directly or as a bycatch in other fisheries, and vessels for hire in the recreational fishery (party and charter boats) would be required to obtain annually renewable permits.

5. States with minimum sizes larger than those in the FMP and minimum mesh regulations are encouraged to maintain them.

6. After three years of Plan implementation the Council would begin to annually examine fishing mortality estimates of age 2 summer flounder to measure the effectiveness of the size limit relative to the FMP's objectives. If the Council finds that the fishing mortality of age 2 summer flounder has increased, based on the following adjustment criteria, and if the NMFS Northeast Regional Director concurs with the Council, the minimum fish length would be increased by the NMFS Northeast Regional Director to a minimum fish length of 14" TL.

The adjustment criteria are (1) estimated fishing mortality from the NEFC spring survey and (2) estimated fishing mortality from a virtual population analysis (VPA) which would be tuned using commercial and

recreational fishery CPUE indices. If a three year trend of either of these mortality estimates increases, an increase in the minimum fish length would be required.

The trend in post-FMP fishing mortality rate (age 2 fish) estimated from the NEFC spring survey will be measured relative to the baseline level defined from pre-FMP fishing mortality rates (age 2 fish) from NEFC survey data (catch at age available from 1976-1989). Likewise, the trend in post-FMP fishing mortality rates (age 2) estimated from virtual population analysis (VPA) will be measured relative to the baseline level defined from pre-FMP fishing mortality rates (age 2) from VPA (catch at age also available from 1976-1989). Best estimates of discards will be incorporated into both the catch-at-age data and commercial catch per unit effort (CPUE) data. Catch per unit effort indices to be used to tune the VPA will be evaluated from standardized fishing power analyses of commercial and recreational fisheries data. Candidate data series for CPUE indices include (but are not limited to) NEFC commercial weighout (1976-1989), North Carolina winter trawl fishery (1982/83 - 1988/89) and Marine Recreational Fishery Statistics Survey (MRFSS) (1979-1989) data.

2.2. Evaluation

This alternative would not achieve the fishing mortality rate reduction strategy. Therefore, it would not reduce overfishing to the F_{max} target level. Hence, it could not be approved.

3. ALTERNATIVE VESSEL MORATORIUM PROVISIONS

3.1. Description

The following moratorium provisions are based on those being considered by the New England Fishery Management Council for the Northeast Multispecies FMP (NEFMC 1990). They could be implemented in the Summer Flounder FMP together or combined with the provisions of the preferred alternative.

A. To be issued a Summer Flounder Permit for 1992 a vessel must meet one of the following criteria:

1. hold a valid Summer Flounder Permit as of 26 January 1990, and show proof of landing summer flounder during the time period 1 January 1989 through 26 January 1990; or

2. for a charter or party boat, hold a valid Summer Flounder Charter and Party Boat Permit as of 26 January 1990, and show proof that it carried recreational fishing parties for a fee during the time period 1 January 1989 through 26 January 1990; or

3. show written proof that a vessel was under construction, reconstruction, or was under written contract for purchase as of 26 January 1990, and landed summer flounder by 26 January 1991, or if a charter or party boat, show proof that it carried recreational fishing parties for a fee as of 26 January 1991.

B. For the permits issued for 1993 and beyond, eligibility requirements described above will be based on the preceding calendar year.

C. Any Summer Flounder permit held by a vessel that is lost or destroyed will become invalid. However, the owner may (within one year) apply for a replacement permit for a vessel, not to exceed a 10% increase in length, GRT, or fish hold capacity, as listed on the vessel permit, in the case of party or charter boats, not to exceed a 10% increase in passenger carrying capacity, as described on the USCG certificate.

D. Transfer: A permit issued under this proposal is not transferable or assignable except to a new owner. Any transfer or assignment to a new owner must be in writing and must be sent to NMFS in order that a permit may be issued in the name of the new owner.

E. Appeal of permit denial

1. Any applicant denied a permit may appeal such denial. Any such appeal must be in writing. Any of the following grounds may form the basis for review:

i. the denial was based on mistaken or incorrect information or data;

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

iii. applicant has new or additional information which might change the initial decision.

2. The applicant will have the right to an oral hearing.

F. Vessels may change gear types within the fishery. The Council should encourage vessels to shift effort to more selective types of fishing (that is, less discards and waste).

G. Upgrading: any vessel with a valid Summer Flounder permit will not be allowed to increase length, GRT, or fish hold capacity. In the case of party and charter boats, they will not be allowed to increase passenger carrying capacity.

3.2. Evaluation

The primary advantage of alternative 3 relative to the preferred alternative is that, should it be adopted by the New England Council as an amendment to the Multispecies FMP as well as by the Mid-Atlantic Council through this Amendment, then the entry rules for both FMPs would the identical, an advantage in that many fishermen participate in both fisheries.

Alternative 3 allows replacement vessels to increase 10% in length, GRT, fish hold capacity, and passenger carrying capacity. The preferred alternative requires that replacement vessels have the same GRT, length, and passenger carrying capacity as the vessels being replaced. Clearly, not permitting an increase in capacity of replaced vessels would tend to minimize increased in fishing power.

Alternative 3 prohibits existing vessels from being expanded (upgraded) in their capacity (length, GRT, fish hold capacity, or passenger capacity), while the preferred alternative is silent on modifications to existing vessels. Clearly, limiting or prohibiting expansion of existing vessels, as well as replacement vessels, maintains the equality of the moratorium. An example of vessel modification under a moratorium occurred in the surf clam fishery when a new center section was added to a vessel to increase its carrying capacity.

4. COMMERCIAL QUOTA, 14" MINIMUM SIZE LIMIT, AND 6.0" MINIMUM DIAMOND MESH (RECREATIONAL AS IN THE PREFERRED ALTERNATIVE OR 8 OR 9)

4.1. Description

4.1.1. Minimum net mesh

The commercial otter trawl fishery would be managed by a minimum diamond mesh net size of 6.0" or 6.5" (square mesh) applied in the cod end during the first year of implementation and throughout the body of the net during the second and subsequent years following implementation, unless the fish are landed in a State with a larger minimum net mesh size, in which case the State limit would prevail.

Only nets of at least the legal size would be allowed on boats taking summer flounder. Any combination of mesh or liners that effectively decreases the mesh below the minimum size is prohibited.

4.1.2. Minimum fish size

It would be illegal to possess summer flounder less than 14" total length (TL). It would be illegal to possess parts of summer flounder less than 14" to the point of landing.

4.1.3. Commercial quota

The quota setting process is specified in the preferred alternative (9.1.2.2). Quotas would be distributed to

the States based on their share of commercial landings for the period 1980-1989 (Table 72) minus any landings in that State in excess of its quota for the year prior to that for which the quotas are being set.

The annual commercial quota will be set at a range of between 0 and the maximum allowed by the adopted fishing mortality rate reduction strategy.

The quota must apply throughout the management unit, that is, in both State and Federal waters. All commercial landings in a State would count toward that State's quota. When a State's quota has been caught, taking summer flounder would be prohibited in that State. A commercial vessel may catch, retain, and sell up to 100 lbs of summer flounder per trip if it has a moratorium permit.

It is the responsibility of each State to assure that its quota is not exceeded. The Regional Director may prohibit taking summer flounder in the EEZ by fishermen of any State not in compliance with this FMP. Noncompliance by the State would include any failure to prohibit taking summer flounder after any annual quota has been reached. If the inaction of one or more States leads the Regional Director to conclude that the FMP will be adversely affected, he may close the entire EEZ.

4.2. Evaluation

This alternative would establish a commercial quota in 1992 of 9 million pounds based on a minimum mesh size of 6.0", a minimum commercial fish size of 14" TL and a minimum recreational fish size of 14" TL (Table 80). This quota assumes an average level of recruitment in 1989, 1990 and 1991. The quota will be calculated each year to reflect the most current information on recruitment, stock status, and level of compliance.

A 14" TL minimum fish size and a 6.0" minimum mesh would result in a higher discard rate than the preferred alternative. Approximately 27% of the fish that would be caught and landed with a 6.0" mesh would now be discarded (Table 80). In addition, the quota associated with this mesh/minimum fish size combination initially would be lower than that associated with the preferred alternative. Finally, although some States now require fishermen to use 5.5" mesh to harvest summer flounder, none require the use of a 6.0" mesh. The combined effect of a lower quota and gear modification for all commercial summer flounder fishermen would now impose a greater economic burden than that necessary to achieve the objectives of the plan.

5. COMMERCIAL QUOTA, 13" TL MINIMUM COMMERCIAL FISH SIZE LIMIT, AND 6" NET MESH MINIMUM SIZE LIMIT (RECREATIONAL AS IN THE PREFERRED ALTERNATIVE OR 8 OR 9)

5.1. Description

This is the same as alternative 4 except that the minimum fish size for commercial fish would be 13", subject to change during the annual monitoring process.

5.2. Evaluation

This alternative would establish a commercial quota in 1992 of 9.6 million pounds based on a minimum mesh size of 6.0", a minimum commercial fish size of 13" TL and a minimum recreational fish size of 14" TL (Table 80). This quota assumes an average level of recruitment in 1989, 1990 and 1991. The quota will be calculated each year to reflect the most current information on recruitment, stock status, and level of compliance.

A 13" TL minimum fish size and a 6.0" minimum mesh would result in a lower discard rate than the preferred alternative. Approximately 16% of the fish that would be caught and landed with a 6.0" mesh would now be discarded (Table 80). However, the quota associated with this mesh/minimum fish size combination would be lower than that associated with the preferred alternative. Finally, although some States now require fishermen to use 5.5" mesh to harvest summer flounder, none require the use of a 6.0" mesh. The combined effect of a lower quota and gear modification for all commercial summer flounder fishermen would now impose a greater economic burden than that necessary to achieve the objectives of the plan.

6. 14" TL MINIMUM FISH SIZE, 6.0" (DIAMOND MESH) MINIMUM NET MESH SIZE, AND SEASONAL CLOSURES (RECREATIONAL AS IN THE PREFERRED ALTERNATIVE OR 8 OR 9)

6.1. Description

The commercial fishery would be managed by a minimum net mesh size of 6.0" (diamond mesh) or 6.5" minimum mesh (square mesh) applied in the cod end during the first year of implementation and throughout the body of the net, unless the fish are landed in a State with a larger minimum net mesh size, in which case the State limit would prevail, and a minimum fish size in the commercial fishery with the ability to change the minimum fish size annually as part of the review process.

It would be illegal to possess summer flounder less than 14" total length (TL). It would be illegal to possess parts of summer flounder less than 14" to the point of landing.

Fishing for summer flounder could be prohibited from January through June during at least the first year in order to meet the F target level of 0.53.

The minimum fish size, minimum mesh size, and seasonal closure would be reviewed annually by the Summer Flounder Monitoring Committee and could be adjusted in accordance with the process set forth in the preferred alternative.

States with minimum mesh regulations larger than in the FMP are encouraged to maintain them.

Because there is a relatively low probability of detection of an offense, even with only legal mesh on board, the penalty for those detected must be sufficient to provide an adequate deterrent. Nets of the same size can be double bagged or used as liners. Therefore, it is recommended that penalty for the first offense of a mesh regulation be a six month loss of permit and the penalty for a second offense be a one year loss of permit.

6.2. Evaluation

6.2.1. Introduction

This is the major commercial fishery alternative to the preferred alternative in that it replaces the commercial quota with seasonal closures. The minimum fish size and minimum net mesh are continued, as are the recreational management measures.

6.2.1. Seasonal closures

The impacts of seasonal closures for summer flounder are difficult to predict because fishing effort can be transferred to periods when the fishery is open, and thus mortality on the targeted species is not decreased. The only way that mortality is actually reduced by closing seasons is that effort becomes more costly. Closures of short duration will result in nearly all effort simply being shifted. The longer the closure the higher proportion of effort transferred to other species, thus reducing fishing mortality on those species that are being managed.

Average monthly statistics for 1980-1989 for summer flounder landings were examined to evaluate possible seasonal closures (Tables 22-25). A potential seasonal closure could occur in October through December, a period when MARMAP data indicate that summer flounder egg abundance peaks in all areas from Georges Bank to Cape Hatteras. Thirty three percent of all summer flounder landings occurred during this calendar quarter (Table 23). The major problem with an October through December closure is that 28% of October, 72% of November, and 79% of December landings are in Virginia and North Carolina (Table 24).

A January through June closure appears more equitable in terms of impacts among the States, while reducing landings by 53% (Table 25). An additional benefit of a closure during this period would be that the fishery occurs substantially (61%) in the EEZ. Therefore, a substantial saving could be realized by prohibiting taking summer flounder in the EEZ during those months, even without comparable action by the States.

In order to understand the impacts for prohibiting taking summer flounder, it is necessary to consider the species that are caught in conjunction with summer flounder. Weighout data indicate that summer flounder accounted for 18% of the average otter trawl trip (for trips when any summer flounder was landed) in 1983, a value that increased to 30% in 1988 and fell to 20% in 1989 (Table 29). For the same period and trips, *Loligo* landings increased steadily from 6% in 1983 to 24% in 1989 while landings of miscellaneous species (largely yellowtail flounder, among the economically valuable species,Table 33) fell from 50% in 1983 to 27% in 1989.

If landings data where trips landing 100 pounds or more of summer flounder are examined (Table 31), the 1983-1989 average summer flounder share was 31% (as opposed to an average 24% for all trips landing summer flounder; Table 29). The *Loligo* and miscellaneous species shares fall slightly for these restricted trips as opposed to the all trips values (11% to 10% and 32% to 30%, respectively), but those five categories continue to be the most important landings other than summer flounder.

Based on the average number of days fished for North Carolina vessels (Table 89), it is estimated that only about 10% more effort could possibly be expended by those vessels already in the fishery. Thus, effort transference is estimated to be between 10 and 35%.

Clearly, a seasonal closure provision would need to be described in a framework manner so that the length and time of the closure could be adjusted from year to year based on the condition of the resource and the effectiveness of other management measures.

6.2.2. Size limit and mesh size

A 14" TL minimum fish size and a 6.0" minimum mesh would result in a higher discard rate than the preferred alternative. Approximately 27% of the fish that would be caught and landed with a 6.0" mesh would now be discarded (Table 80). In addition, although some States now require fishermen to use 5.5" mesh to harvest summer flounder, none require the use of a 6.0" mesh. The combined effect of a lower quota and gear modification for all commercial summer flounder fishermen would now impose a greater economic burden than that necessary to achieve the objectives of the plan.

6.2.3. Conclusion

The system based on fish size, mesh size, and seasonal closure, even when coupled with a moratorium on the entry of additional vessels, is difficult to manage since effort cannot be accurately forecasted and the fishery cannot be closed. Therefore, the management system must always respond to what previously happened. The measures for the upcoming year must account for not only the target mortality for that year, but the amount that the target for the current year will be exceeded. The quota based preferred alternative allows the fishery to be closed (at least to a bycatch level), so the absolute amount that the target mortality level can be exceeded is far less with a quota based system than with alternative 6.

It is not unreasonable to conclude that, if effort were underestimated for several years that the fishery would need to be closed all year. Weather and related considerations present absolute limits to effort transfer, but, within those limits, the longer the closure periods, the more effort the fishermen will apply during the open periods to meet market demand and maintain their incomes. The effort that is applied will likely become more and more costly to the fishermen as the closed periods get longer because the open season will increasingly be those months when summer flounder are least available.

7. IMPOSE TRIP LIMITS IN THE COMMERCIAL FISHERY

7.1. Description

This measure could theoretically be used alone or in conjunction with the minimum fish size, minimum mesh size, and/or seasonal closure measures previously discussed. An annual commercial fishery target catch would be established following the procedures set forth in preferred alternative for commercial quotas. The maximum quantity of fish that could be landed on each trip would then be calculated, the objective being to not exceed

the target catch while keeping the fishery open as long as possible. A moratorium on entry would be absolutely necessary if trip limits would have even the remotest chance of working.

7.2. Evaluation

A trip limit is a mechanism for addressing the problem of continual application of additional effort identified in section 7.2.4. A given vessel may make as many trips as it can, but the maximum quantity of summer flounder landed on each trip is determined. If there is a moratorium, then the number of vessels potentially making trips is fixed. The remaining variable is the number of trips a given vessel can make in a period of time. The fishery, therefore, would be more closely managed with alternatives 6 and 7 combined than with alternative 6 alone.

However, this increased control comes at the price of significantly increased enforcement effort. With alternative 6, enforcement effort is limited to the fish and mesh size (in common with all of the commercial alternatives) and to making sure summer flounder are not landed during a closed season. Alternative 7 adds to those costs the need to inspect a sufficiently large sample of vessels as they land to assure that the trip limit is adhered to by the fishermen. Given the temporal and spatial nature of the summer flounder fishery, this means that virtually every harbor large enough to dock a commercial vessel between North Carolina and Massachusetts (if not New Hampshire and Maine also) would need to be visited by enforcement officers frequently enough so that fishermen would not feel safe landing more than the legal trip limit.

8. RECREATIONAL HARVEST LEVELS

8.1. Description

Coastwide recreational harvest levels would be allocated to the States based on 1980-1989 recreational landings data (Table 72). As with the commercial quotas, the recreational target would be modified on an annual basis to reflect changes in stock status. States would have to have the ability to attain the recreational target by a system of size limits, possession limits, seasonal closures, and other means unless the State wanted to allocate its target harvest level between sectors in its recreational fishery (for example, party boats, charter boats, and private recreational fishermen). If the State wanted to allocate its recreational target harvest level between recreational sectors, then its recreational target would need to be managed as a true quota, with a real time system to account for catch and the provision to close the fishery when necessary.

It is the responsibility of each State to assure that it implements measures compatible with the Federal FMP. The Regional Director may prohibit taking summer flounder in the EEZ by recreational vessels (party, charter, and private boats) of any State not in compliance with this FMP, including any failure to prohibit taking summer flounder after any annual quota has been reached. If the inaction of one or more States leads the Regional Director to conclude that the FMP will be adversely affected, he may close the entire EEZ.

The States would be required to demonstrate to the Summer Flounder Monitoring Committee that their regulations complied with the FMP.

8.2. Evaluation

This alternative would replace the coastwide management for the recreational fishery of the preferred alternative with State by State management. Each State would have the option of managing by quotas, size limit, possession limit, seasonal closure, or other method, as long as the Summer Flounder Monitoring Committee concluded that the State's system complied with the FMP (that is, had a reasonable chance of assuring that the fishing mortality targets were not exceeded). If the State chose to assign the target catch to specific sectors, then the mortality targets would automatically become quotas.

This system gives the individual States much more flexibility than the coastwide system that would be imposed by the preferred alternative. However, the price of that flexibility is a need for greater State involvement in monitoring the fishery than would be the case with a coastwide program. If the State choose to allocate between recreational sectors (for example, between party and charter boats and private fishermen), then the

monitoring burden would be counting harvested fish against the quota, clearly a major burden for the States.

Another potential negative impact of this alternative is that fishermen operating from adjacent ports could be fishing under significantly different rules. This is simply a result of the fact that the percentage reduction in fishing mortality would be applied the same to each State, but the resultant absolute reduction would vary significantly based on the State's historical share of the recreational catch (Table 72). It is likely that this could lead to party and charter boat customers patronizing vessels operating in States with limits more liberal than other States.

The advantage to this alternative is that it allows closure of the recreational fishery of a particular State by that State and by the Regional Director if the State does not act. Therefore, it has a high probability of not exceeding the fishing mortality targets.

9. REGIONAL POSSESSION, FISH SIZE, AND SEASONAL MANAGEMENT OF THE RECREATIONAL FISHERY

9.1. Description

This would be the same as the preferred alternative, but the possession limit and season would be determined on a regional basis. The regions proposed are Maine through Connecticut, New York through Delaware, and Maryland through North Carolina. There are several examples of first year possession limits and seasons for a 14" minimum recreational fish size limit for which the Council is soliciting comments (Table 90).

9.2. Evaluation

MRFSS data were used to analyze the impact of recreational limits on a subregional basis. The Atlantic coast was divided into three geographic areas: Maine through Connecticut, New York through Delaware, and Maryland through North Carolina. These areas reflect subregional differences in availability of summer flounder (section 5).

MRFSS intercept data from the years 1986 to 1990 were used to determine the impact of alternative bag/size limits on recreational landings. Based on this analysis, possession limits with a 14" minimum size, had the greatest impact on landings in the most southern area, Maryland through North Carolina (Table 90). In addition, the percent reduction associated with the implementation of 14" minimum size was greatest in this area, 37.4%.

Recreational landings data from 1985 to 1989 indicated peak landings occurred in the July - August period in each area (Table 77). In the northern and middle area, all of the landings occurred between May and October whereas in the south, summer flounder were landed throughout the year. Assuming a combined effort transference/hooking mortality rate of 33%, the implementation of various seasons would have reduced exploitation by 5.5% to 18.8% in those years depending on the length of the season and the area (Table 77).

Combinations of recreational limits and seasons were examined to determine which limits had an associated reduction of approximately 47% (Table 78). Without a season, a 2 fish possession limit combined with a minimum size of 14" TL would have had an associated reduction of 48% and 42% for the Maine through Connecticut and New York through Delaware regions, respectively (Table 79). Alternatively, a 6 fish possession limit and no season would have reduced exploitation by 46% in the area from Maryland through North Carolina.

The implementation of a season would allow for larger possession limits in each area. For example, a fishing season extending from 1 May to 31 December in the south, Maryland through North Carolina, would allow for a possession limit of 10 fish; the associated reduction would be 47% (Table 79). Alternatively, the season could only extend from 15 May to 30 September in the New York through Delaware area if a 3 fish possession limit was implemented. In addition, a 5 five fish possession limit could be implemented from Maine through Connecticut but with a longer season extending from 15 June to 31 December.

This alternative recognizes subregional differences in availability of summer flounder as well as in the way that

the recreational fishery has been prosecuted in the past. It would allow for identical regulations in States within each of the three areas. However, it could also cause confusion and resentment among participants in neighboring States from different areas, for example, Connecticut and New York. In addition, fishermen operating from adjacent ports could be fishing under significantly different rules with the likely result that party/charter boat customers would patronize vessels operating in States with more liberal limits.

10. PERSONS MAY SELL SUMMER FLOUNDER AT POINT OF LANDING ONLY TO A DEALER THAT HAS A DEALER PERMIT ISSUED PURSUANT TO THIS FMP. (Note: this alternative was adopted as part of the final Amendment 2.)

10.1. Description

This provision would mirror the provision in the preferred alternative that only operators of vessels with commercial permits may sell summer flounder. If only persons with dealer permits are allowed to purchase summer flounder from those vessels, and both vessel operators and dealers are required to submit reports (as in the preferred alternative), then the dealer reports will provide a valuable check on landings of summer flounder for purposes of quota monitoring.

10.2. Evaluation

The intent of this alternative is to improve the system for accounting for summer flounder entering commerce. The preferred alternative provides that summer flounder may be sold only by persons operating from vessels with commercial permits. The monitoring system depends on vessel and dealer logbooks. While there are requirements that must be met to obtain a commercial vessel permit (pursuant to the proposed moratorium) there are no requirements to obtain a dealer permit except that a dealer must file reports of the summer flounder the dealer purchases.

Therefore, this alternative would not create a special class of dealers. It would eliminate the sale of summer flounder by the fishermen to a consumer unless the consumer chose to apply for a dealer permit. It would not rule out the vessel selling directly to a restaurant or similar institutional customer so long as the customer obtained a dealer permit and filed the necessary reports.

11. REQUIRE THAT OWNERS OR OPERATORS OF FISHING VESSELS DERIVE MORE THAN 10% OF THEIR ANNUAL INCOME FROM FISHING IN ORDER TO RENEW THEIR ANNUAL SUMMER FLOUNDER PERMIT.

11.1. Description

The only criteria in the preferred alternative for maintaining a vessel permit under the moratorium is that the vessel is presumed to have retired from the fishery if it fails to land any summer flounder for 52 consecutive weeks (section 9.1.2.1.1.1). This alternative would add a requirement that a vessel owner or operator must obtain at least 10% of his/her annual income from fishing in order to maintain eligibility for the permit.

11.2. Evaluation

The eligibility requirements for the moratorium are relatively liberal in that there is a simple need to document activity in the summer flounder fishery.

The surf clam moratorium also had reasonably simple eligibility rules. There was a rule that failure to land surf clams during any 52 consecutive week period was presumed to constitute retirement from the fishery. That provision was not terribly effective and, when that moratorium was finally replace by an allocation system in 1990, vessels that had not fished since the earliest days of the moratorium still had permits and were eligible for allocations.

The SAFMC FMP for Coastal Migratory Pelagic Resources (mackerels) requires that: "All fishermen who apply for permits must be able to show they derived more than ten percent of their earned income from commercial fishing, i.e., the sale of one's catch, during the previous calendar year." The regulations for this SAFMC FMP

require that a "sworn statement" is necessary to show they derived 10% of their income. Similar requirements exist for the draft NMFS Shark FMP. The Gulf of Mexico Fishery Management Council established a 50% income requirement in order to annually renew a permit. This 50% income requirement was also adopted in Amendment 4 to the South Atlantic Fishery Management Council Snapper - Grouper FMP.

This limitation of permits to fishing vessels (commercial, party, and charter) is not intended as economic distribution , but rather as a means of achieving an equitable reduction in catch by all user groups. In order to prevent large numbers of recreational fishermen from fishing under the commercial permit system, not selling their catches, and causing the commercial quota to be exceeded through this uncounted catch, the permit limitation to commercial, charter, and party boats has been added. The 10% of earned income from fishing was judged to be sufficient to include those who may be partially dependent on social security , retirement benefits, or investments.

While there clearly is no commitment at this time to replace the summer flounder moratorium with an allocation system, equity suggests that there not only be a performance requirement to maintain a permit, but that the permit holder have some economic reliance on the fishery.

12. DEDUCT COMMERCIAL SUMMER FLOUNDER BYCATCH PRIOR TO QUOTA DISTRIBUTION.

12.1. Description

The preferred alternative includes a commercial quota that is calculated coastwide and then distributed to each of the States in the management unit based on the historical commercial landings distribution. The preferred alternative also allows for a 100 pound boxed catch of summer flounder before the large mesh net is required and after a closure of the summer flounder fishery. This summer flounder bycatch in other fisheries must be counted against the quota, which represents all fishing mortality on summer flounder. The preferred alternative required that the bycatch be counted throughout the year, so that closure of the directed fishery can be projected and implemented in a manner that the bycatch after closure will not result in the quota being exceeded.

This alternative 12 would require that the overall quota be reduced by the estimated amount of summer flounder bycatch before the State by State quota distribution is made.

12.2. Evaluation

To understand this alternative, it is necessary to review the basic provisions of the preferred alternative. Summer flounder may be landed and sold only by vessels with commercial moratorium permits, whether the vessel lands 1 pound or 10,000 pounds. If the vessel has more than 100 pounds of summer flounder boxed or 1 or more summer flounder in the hold, a legal mesh net must be in use and no other nets may be on board. The large mesh fishery may be closed by the State or the Regional Director to assure that the quota is not exceeded. However, vessels may not be prohibited from landing the 100 pounds per trip of boxed summer flounder.

It must also be understood that anticipated discards of undersized summer flounder are deducted from the catch estimates before the coastwide quota is calculated. Summer flounder landings for sale would be tracked by the vessel and dealer reports to NMFS. The remaining source of fishing mortality would be the catch and discard of summer flounder by vessels that did not qualify for summer flounder permits; mortality that would need to be estimated from sea sampler surveys and interviews with captains through the weighout or State systems.

The preferred alternative is based on all of these estimates and projections being made by each State, based on NMFS data, and backed up by analyses by the Council and NMFS to assure that the States act in a timely manner. This alternative 12 takes the responsibility for estimating the bycatch away from the States by deducting it prior to quota distribution.

It order to reduce the chances of exceeding the quota, it is likely that this alternative would result in generous

bycatch estimates, particularly in the early years of FMP implementation. Given the probable size of quotas in the near future, long closures of the directed fishery are likely, and the price of flounder during the bycatch only periods would likely be such that every vessel that could legally land the 100 pounds would do so. In 1989, weighout data (excludes CT, DE, and NC) show that there were 5,613 trips that landed between 1 and 99 pounds of summer flounder (Table 53), with an average for the 1983-89 period of 5,552 trips. If it is assumed that the average number of trips prevails in 1991 and each one of those trips takes the legal 100 pounds/trip catch, that would account for 555,200 pounds, or 5% of the anticipated maximum quota for that year (section 9.1.2.3.1).

13. ALLOW CERTAIN TYPES OF NETS ON BOARD (Note: this alternative was adopted as part of the final Amendment 2.)

13.1. Description

The preferred alternative includes a provision that only legal mesh may be on board a vessel after the vessel has any summer flounder in the hold or more than 100 pounds of summer flounder boxed.

There is some indication that certain nets, for example, fly nets and nets used in the directed *Loligo* squid fishery, can retain negligible quantities of summer flounder. The Council is seeking input during the hearing process that could result in an enforceable definition of such nets so that the preferred alternative could allow an exemption to the one mesh on board rule for these nets.

It is recognized that many of these nets incorporate design modifications made by individual fishermen. However, the flexibility that could result from an exemption for these nets justifies further exploration of this matter.

One other possible aspect of this alternative would be to define such gear and allow its use provided the vessel owner or operator pays for the cost of having an observer on board while such gear is in use. This is because there is some indication to suggest that these types of nets do not retain summer flounder if they are fished appropriately, but that operating modifications (such as towing speed) does allow significant amounts of summer flounder to be caught.

13.2. Evaluation

The disadvantage to such an exemption is to complicate enforcement at sea by the Coast Guard.

The advantage is that certain vessels could operate with two nets on board, such as the North Carolina fly net fishery has done in the past.

14. COMMERCIAL FISHERY LANDING WINDOW

14.1. Description

Vessels with commercial permits issued pursuant to this FMP may only land summer flounder during periods specified by the Regional Director. The purpose of this requirement is to facilitate enforcement of the provisions of this FMP.

14.2. Evaluation

The landing window provided through this alternative is intended to improve the probability that violations would be detected. Given that there are limits on the absolute number of enforcement officers and that summer flounder are landed in virtually every port throughout the management unit, if landings are permitted during any time period, the chances that an enforcement officer will observe a given landing are extremely small. This situation is complicated by the fact that enforcement officers work a normal government work week, so work at night might require authorization for overtime. Hence, if landing is restricted to certain daylight hours, the probability of an enforcement officer observing the offloading is improved, so the probability

of detecting a violation is improved.

VERBATIM REPRINT OF PREFERRED ALTERNATIVE FROM AMENDMENT 2 HEARING DRAFT

9.1.2 Specification of Preferred Management Measures

9.1.2.1. Permits and fees

9.1.2.1.1. Vessel permits and fees

9.1.2.1.1.1. General

Any owner or operator of a vessel desiring to take any summer flounder within the US EEZ, or transport or deliver for sale, any summer flounder taken within the EEZ, must obtain an annual permit for that purpose if the vessel meets the criteria set forth in 9.1.2.1.1.2. This section applies to the owners of party and charter boats (vessels for hire). A recreational vessel, other than a party or charter boat (vessel for hire), is exempt from the permitting requirement if it catches no more than the recreational possession limit, multiplied by the number of persons on board, of summer flounder per trip.

"Take" means to catch and retain on board 100 pounds or more of summer flounder in boxes or any unboxed summer flounder in the hold. It does not include fish from the most recent tow on deck and not yet sorted.

A given vessel may have both a commercial permit to catch and sell and a party or charter boat permit if the vessel meets both qualification requirements. However, such a vessel may not fish under the commercial rules if it is carrying passengers for a fee.

The owner or operator of a US vessel may obtain the appropriate permit by furnishing on the form provided by NMFS information specifying, at least, the names and addresses of the vessel owner, the name of the vessel, official Coast Guard number, directed fishery or fisheries, gear type or types utilized to take summer flounder, gross tonnage of vessel, the permit number of any current or previous fishery permit issued to the vessel, radio call sign, registered length of the vessel, engine horsepower, year the vessel was built, type of construction, type of propulsion, navigational aids (e.g., Loran C), type of echo sounder, type of computer, crew size including captain, fish hold capacity (to the nearest 100 lbs), quantity of summer flounder landed during the year prior to the one for which the permit is being applied, principal port of landing, the home port of the vessel, and number of passengers the vessel may carry (for party and charter boats).

An applicant for a permit under this FMP must agree to fish in accordance with Federal rules whether they are fishing in the EEZ or State waters.

Permits expire: (1) when the owner or operator retires the vessel from the fishery (it is a rebuttable presumption that failure to land any summer flounder for 52 consecutive weeks constitutes retirement from the fishery), or (2) on 31 December of each year, or (3) when the ownership of the vessel changes; however, the Regional Director may authorize continuation of a vessel permit for the summer flounder fishery if the new owner so requests and the vessel meets the relevant criteria of eligibility set forth in 9.1.2.1.1.2. Applications for continuation of a permit must be addressed to the Regional Director.

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

The Federal costs of implementing an annual permit system for the sale of summer flounder shall be charged to permit holders as authorized by section 303(b) (1) of the Magnuson Act. In establishing the annual fee, the Regional Director will ensure that the fee does not exceed the administrative costs incurred in issuing the permit, as required by section 304(d) of the Magnuson Act. Proper accounting for administrative costs will include labor costs (salary and benefits of permitting officers plus prorated share of secretarial support and supervision at both the NMFS regional and headquarters levels), computer costs for creating and maintaining

permit files (prorated capital costs, time share and expendable supplies), cost of forms and mailers (purchase, preparation, printing and reproduction), and postage costs for application forms and permits.

9.1.2.1.1.2. Moratorium on entry of additional commercial vessels and party and charter boats

There will be a moratorium on entry of additional vessels into the summer flounder fishery. Vessels with documented landings of summer flounder for sale between 26 January 1989 and 26 January 1990 qualify for a permit to land and sell summer flounder under this moratorium program. Operators or party or charter boats may obtain a party or charter boat moratorium permit if (1) they can document the boat operated as a party or charter boat (carried fishermen for a fee) from a port in the management unit (Maine through North Carolina) between 26 January 1989 and 26 January 1990 and (2) they attest (through a sworn statement) that the boat participated in the summer flounder fishery while operating as a party or charter boat. Under the moratorium, vessels and permits together may be bought and sold. Vessels that involuntarily leave the fishery (for example, vessels that were sunk or burnt) may be replaced with vessels of the same Gross Registered Tonnage (GRT) and overall registered length as the vessel being replaced. In addition to the above two criteria, any replacement of a party and charter boat is also required to have the same passenger carrying capacity as the vessel it replaced. Vessels that are judged unseaworthy by the Coast Guard for reasons other than lack of maintenance may be replaced by a vessel with the same GRT and vessel registered length for commercial vessels and, in addition to the two preceding criteria, the passenger carrying capacity for party and charter boats. Permits may not be combined to create larger replacement vessels. The moratorium terminates at the end of the fifth year following implementation unless extended by FMP amendment. The moratorium may be replaced at any time by FMP amendment establishing an alternative limited entry system.

The moratorium applies to all party and charter boats, as well as to commercial vessels. However, a party and charter boat permit is not a license to sell summer flounder as is a commercial permit.

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

1. The vessel landed and sold summer flounder or operated as a party or charter boat in the management unit for summer flounder between 26 January 1989 and 26 January 1990; or

2. The vessel was under construction for, or was being rerigged for, use in the directed fishery for summer flounder on 26 January 1990 and provided the vessel is participating in the summer flounder fishery prior to implementation of this Amendment. For the purpose of this paragraph, "under construction" means that the keel has been laid, and "being rerigged" means physical alteration of the vessel or its gear had begun to transform the vessel into one capable of fishing commercially or as a party or charter boat for summer flounder; or

3. The vessel is replacing a vessel of substantially similar harvesting capacity which involuntarily left the summer flounder fishery during the moratorium, and both the entering and replaced vessels are owned by the same person. "Substantially similar harvesting capacity" means the same GRT and vessel registered length for commercial vessels and, in addition to the two preceding criteria, the passenger carrying capacity for party and charter boats.

4. Vessels that are judged unseaworthy by the Coast Guard for reasons other than lack of maintenance may be replaced by a vessel with the same GRT and vessel registered length for commercial vessels and, in addition to the two preceding criteria, the passenger carrying capacity for party and charter boats.

9.1.2.1.2. Dealer permits and fees

Any dealer of summer flounder must have a permit maintained at their principal place of business. A dealer of summer flounder is defined as a person or firm that purchases summer flounder from a vessel owner or operator for resale.

An applicant must apply for a dealer permit in writing to the Regional Director. The application must be signed by the applicant and submitted to the Regional Director at least 30 days before the date upon which the

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

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

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

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

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

9.1.2.2. Summer Flounder FMP Monitoring Committee

The Summer Flounder Monitoring Committee will be made up of staff representatives of the Mid-Atlantic, New England, and South Atlantic Fishery Management Councils, the ASMFC, the Northeast Regional Office of NMFS, the Northeast Fisheries Center, and the Southeast Fisheries Center. The MAFMC Executive Director or his designee will chair the Committee.

The Summer Flounder Monitoring Committee will annually review the best available data including, but not limited to, commercial and recreational catch/landing statistics, current estimates of fishing mortality, stock status, the most recent estimates of recruitment, VPA results, target mortality levels, beneficial impacts of size/mesh regulations, as well as the level of noncompliance by fishermen or States and recommend to the Council and ASMFC Board commercial (annual quota, minimum fish size, and minimum mesh size) and recreational (possession and size limits and seasonal closures) measures designed to assure that the target mortality level is not exceeded. The Committee will also review the gear used to catch summer flounder to determine whether gear other than otter trawls needs to be regulated to help assure attainment of the fishing mortality rate target and propose such regulations as appropriate. The Regional Director would publish this proposal in the *Federal Register* for public comment. Following the review period, the Regional Director will set the final quota and other management measure adjustments for the year.

9.1.2.3. Commercial management measures

9.1.2.3.1. Commercial quota

The quota setting process is specified in 9.1.2.2. Quotas would be distributed to the States based on their share of commercial landings for the period 1980-1989 (Table 72) minus any landings in that State in excess of the previous year's quota.

The annual commercial quota will be set at a range of between 0 and the maximum allowed by the adopted fishing mortality rate reduction strategy. The commercial quota includes all landings for sale by *any* gear.

All landings by any vessel that has a commercial moratorium permit (permit to sell) counts against the quota, whether the summer flounder are caught with an otter trawl, a scallop dredge, hook and line, or any other gear. If the vessel does not have a commercial moratorium permit, the fish may not be sold and the recreational rules on size, possession, and season apply.

The annual commercial quota would be based on the recommendations of the Summer Flounder FMP Monitoring Committee to the Council and ASMFC Board. The Council and ASMFC Board would consider those recommendations and submit their recommendations to the Regional Director and the ASMFC. The Regional Director and the ASMFC will set the commercial quota annually.

The commercial quota in 1992 would be a maximum of 11 million pounds assuming a minimum mesh size of 5.5", a minimum commercial fish size of 13" TL, and a minimum recreational fish size of 14" TL. This quota is based on current information and assumes an average level of recruitment in 1989, 1990 and 1991. The quota will be calculated each year to reflect the most current information on recruitment, stock status, and level of compliance.

The 1992 quota may be revised prior to plan implementation to reflect additional information on stock status. If 1990 and 1991 recruitment is lower than expected than the quota will be lower than the maximum 11 million pounds. Several factors will be considered when determining the 1992 quota including: the highly overfished nature of the stock ($F > 1.4$), the low spawning stock size (currently 2-3% of maximum), the fact that an average or above average year class has not been produced recently (1989 and 1990 year classes were no better than average, while the 1988 year class was poor), recruitment estimates for 1989 and beyond are based on a barely significant correlation between the NEFC VPA estimates and the VIMS survey (which has a short time series), and finally, 1992 projections are based on 1989 numbers- at-age from the VPA.

The quota must apply throughout the management unit, that is, in both State and Federal waters. All commercial landings in a State would count toward that State's quota. When a State's quota has been caught, fishing for and/or landing summer flounder would be prohibited in that State.

Using data collected through this FMP (section 9.1.3), NMFS will monitor the fishery and inform each of the States of the State's landings relative to that State's quota.

It is the responsibility of each State to assure that its quota is not exceeded. Each State must submit to the Council and Regional Director a plan setting forth the means by which the State will manage the quota, size limit, and mesh regulation. Each State's plan will be reviewed by the Monitoring Committee. Until the Committee determines that a State's plan is adequate to implement the FMP, the State will be considered not in compliance with the FMP. This provision is considered extremely important, particularly in the first year or two that the FMP is implemented, since few, if any, States will have measures in effect to rapidly implement the FMP (particularly the quota provision). This provision will allow the Regional Director to close the EEZ summer flounder fishery to vessels of a particular State early enough in the year to assure that there is quota remaining for the fishery in the State's territorial sea and internal waters and for vessels taking advantage of the 100 pound bycatch rule. Without this provision, States would exceed their quotas the first year, have the overage deducted from the second year's quota, and likely never be able to receive a full quota in subsequent years.

A State would be allowed to submit a plan for each year or to submit a framework plan setting forth criteria and schedules for actions to assure compliance with the FMP.

The Regional Director may prohibit taking summer flounder (as defined above) in the EEZ by fishermen of any State not in compliance with this FMP. Noncompliance by the State would include any failure to prohibit taking summer flounder after the annual quota has been taken. If the inaction of one or more States leads the Regional Director to conclude that the FMP will be adversely affected, he may close the entire EEZ to summer flounder fishing.

The Regional Director shall close the commercial fishery for summer flounder in the EEZ if the commercial fisheries for summer flounder have been closed in all coastal States.

Since the Regional Director may close the EEZ to fishermen from a particular State, it is necessary to establish in which State a fishermen (vessel) resides. For purposes of this provision, a vessel is from the State that is shown as the address of the vessel owner in the annual permit application. This address may not be changed during the year unless the owner submits evidence acceptable to the Regional Director that the owner or

operator has legally changed his/her permanent address. Evidence might include a drivers license or voter registration card. The objective of the provision is to assure that fishermen are bound by the actions (or inaction) of their State rather than skipping from State to State to escape the provisions of the FMP.

9.1.2.3.2. Commercial fish size limitations

It is illegal to possess summer flounder less than 13" total length (TL). It is also illegal to possess parts of summer flounder less than 13" to the point of landing.

Vessels with commercial permits issued pursuant to this FMP are required to fish and land pursuant to the provisions of this FMP unless the vessels land in States with larger minimum fish sizes than those provided in the FMP, in which case the minimum fish size would be required to meet the State limits. States with minimum size larger than those in the FMP are encouraged to maintain them.

The minimum fish size may be changed annually, if appropriate, following the Summer Flounder FMP Monitoring Committee process set forth in 9.1.2.2.

9.1.2.3.3. Minimum mesh requirement.

Vessels using otter trawls may only fish with 5.5" minimum diamond mesh or 6" minimum square mesh, inside measure, applied throughout the cod end for at least 75 continuous meshes forward of the terminus of the net may take more than 100 lbs of summer flounder during the first year following FMP implementation. In the second and subsequent years, the minimum mesh size would apply throughout the entire net. Mesh would be allowed to be larger than the minimum size, but it could be no smaller than the minimum size. If the fish are landed in a State that has a larger minimum net mesh size, the State limit would prevail. States with minimum mesh regulations larger than those established in this FMP are encouraged to maintain them.

Only nets of at least the legal size would be allowed on boats taking summer flounder. Any combination of mesh or liners that effectively decreases the mesh below the minimum size is prohibited. Otter trawl vessels retaining more than 100 lbs of summer flounder may not have any net, or any piece of net not meeting the mesh size requirements, on board.

A fishing vessel shall not use any device, gear, or material, including, but not limited to, nets, net strengtheners, ropes, lines, or chaffing gear, on the top of the regulated portion of a trawl net; except that, one splitting strap and one bull rope (if present), consisting of line or rope no more than 2" in diameter, may be used if such splitting strap and/or bull rope does not constrict in any manner the top of the regulated portion of the net. "Top of the regulated portion of the net" means the 50% of the entire regulated portion of the net which (in a hypothetical situation) would not be in contact with the ocean bottom during a tow if the regulated portion of the net were laid flat on the ocean floor. For the purpose of this paragraph, head ropes shall not be considered part of the top of the regulated portion of a trawl net.

Since it will be difficult to detect a violation of the minimum mesh net regulation, the penalty for individuals detected of such a violation must be sufficient to provide an adequate deterrent. Nets can be double bagged or used as liners. Therefore, it is recommended that the penalty for the first offense be a six month loss of permit and the penalty for a second offense be a one year loss of permit. After imposition and expiration of such a penalty, if the individual fishes without penalty for three consecutive years, the earlier offenses are expunged from the record.

The minimum net mesh size could be changed annually, if appropriate, following the Summer Flounder FMP Monitoring Committee process set forth in 9.1.2.2. Based on the recommendations of the Summer Flounder Monitoring Committee and Council, the Regional Director, by regulatory amendment, shall implement regulations on gear other than otter trawls to achieve discards of summer flounder equivalent to the discards with otter trawls given the minimum net mesh requirements. This provision is intended to address the problem that could develop if gear currently not in significant use in the summer flounder fishery are developed as a way of avoiding the minimum otter trawl mesh rule.

9.1.2.4. Recreational Fishery Measures

The recreational fishery throughout the management unit would be managed through an annual evaluation of a framework system (section 9.1.2.2) of possession limits, size limits, and seasonal closures. Recreational landings would be compared to annual target harvest levels established through the FMP Monitoring Committee process to determine if modifications to the recreational possession limit and size limit are required for the following year or if the fishery needed to be closed for certain periods.

The annual recreational possession limit, size limit, and season will be set at a range of between 0 and the maximum allowed by the adopted fishing mortality rate reduction strategy. It would be illegal to possess parts of summer flounder less than the minimum size to the point of landing.

Clearly, within limits, there are various combinations of possession limits and seasons for a given size limit that will attain the fishing mortality rate target for a particular year. The length and timing of a seasonal closure are primary determinants in this consideration. Obviously, a closure during months when the fishery is not prosecuted at a significant level will not be particularly useful. Also, a very short closure may not be useful since it will allow fishermen the opportunity to expend greater effort in the months immediately before and after the closure.

Given the above and given a 14" minimum recreational fish size, five optional possession limit and season combinations for the first year of FMP operation have been identified:

a 3 fish possession limit and no closed fishing season;

a 5 fish possession limit and a fishing season from 1 June through 31 December;

a 6 fish possession limit and a fishing season from 15 May through 30 September;

a 7 fish possession limit and a fishing season from 15 June through 31 December; or

a 10 fish possession limit and a fishing season from 1 July through 31 December.

The Council would like comments on these optional ways of implementing this alternative.

On vessels with several passengers, the number of summer flounder contained on the vessel may not exceed the possession limit multiplied by the number of people aboard the vessel.

It is the responsibility of each State to assure that it implements measures compatible with the Federal FMP. The Regional Director may prohibit landing summer flounder in the EEZ by recreational vessels (party, charter, and private boats) of any State not in compliance with this FMP. If the inaction of one or more States leads the Regional Director to conclude that the FMP will be adversely affected, he may close the entire EEZ to summer flounder fishing.

9.1.2.5. Other measures.

Persons may buy summer flounder at the point of landing only landed by a vessel that has a commercial moratorium permit issued pursuant to this FMP.

All summer flounder on vessels fishing with a mesh smaller than the legal minimum size must have any summer flounder on board boxed in a manner that will facilitate enforcement personnel knowing whether the vessel has enough (100 pounds or more) summer flounder on board to meet the minimum mesh size criterion. Any unboxed summer flounder on board a vessel fishing with a net smaller that the legal minimum is considered a violation of this FMP. A box holds 100 pounds of summer flounder and is approximately 36" long, 15" wide, and 12" high (approximately 3.75 cubic feet).

No foreign fishing vessel shall conduct a fishery for or retain any summer flounder. Foreign nations catching

summer flounder shall be subject to the incidental catch regulations set forth in 50 CFR 611.13, 611.14, and 611.50.

9.1.3. Specification and Sources of Pertinent Fishery Data.

9.1.3.1. Domestic and foreign fishermen.

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

Commercial catch data must be submitted on a weekly basis in order to monitor the fishery and enable the Regional Director to forecast when a closure will be needed.

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

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

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

In addition, dealers with permits issued pursuant to this FMP must submit weekly reports showing at least the quantity of summer flounder purchased and the name and permit number of the vessels from whom the summer flounder was purchased.

Buyers that do not purchase directly from vessels are not required to submit reports under this provision. Entities which acquire fish from both vessels and other dealers should report only those primary level purchases which originate from vessels.

APPENDIX 2. REGULATORY IMPACT REVIEW

1. INTRODUCTION

1.1. Purpose

The purpose of this document is to present an analysis of the proposed regulations for Amendment 2 the Summer Flounder Fishery Management Plan (FMP). This document has been prepared in compliance with the procedures of the National Marine Fisheries Service (NMFS) to implement Executive Order (E.O.) 12291. The document also contains an analysis of the impacts of the Plan relative to the Regulatory Flexibility Act and the Paperwork Reduction Act of 1980.

1.2. Description of User Groups

The fishery is described in Sections 7 and 8 of Amendment 2.

1.3. Problems Addressed by Amendment 2

The problems to be addressed are discussed in Section 4.2 of Amendment 2.

1.4. Management Objectives

The objectives of Amendment 2 are to:

1. Reduce fishing mortality in the summer flounder fishery to assure that overfishing does not occur.

2. Reduce fishing mortality on immature summer flounder to increase spawning stock biomass.

3. Improve the yield from the fishery.

4. Promote compatible management regulations between State and Federal jurisdictions.

5. Promote uniform and effective enforcement of regulations.

6. Minimize regulations to achieve the management objectives stated above.

1.5. Provisions of Amendment 2

The management measures are presented in Sections 3 and 9.1 of Amendment 2. Other alternatives are presented in Appendix 1 to Amendment 2.

2. REGULATORY IMPACT ANALYSIS

The impacts of the management measures are presented in Section 9.2 of Amendment 2. Other alternatives are evaluated in Appendix 1 to Amendment 2.

3. DISCUSSION OF THE BENEFITS AND COSTS OF THE AMENDMENT

E.O. 12291 requires that a benefit-cost analysis of all proposed regulations be performed.

3.1. Costs

Management costs are discussed in section 9.2.

3.2. Benefits

The benefits of Amendment 2 are discussed in section 9.2.

3.3. Benefit - Cost Conclusion

The benefits and costs of Amendment 2 are discussed in section 9.2.

4. Other E.O. 12291 Requirements

E.O. 12291 requires that the following three issues be considered:

1. Will the Plan have an annual effect on the economy of $100 million or more.

2. Will the Plan lead to an increase in the costs or prices for consumers, individual industries, Federal, State, or local government agencies or geographic regions.

3. Will the Plan have significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of US based enterprises to compete with foreign based enterprises in domestic or export markets.

The FMP should not have an annual effect of $100 million or more. The exvessel value of summer flounder landings has increased from about $16 million in the early 1980's to a peak $41 million in 1988 (Table 46). Exvessel value dropped to $28 million in 1989, due to a nearly 15 million pound decline in landings, but a rise in average price to $1.56 per pound helped to temper the effect on revenues to harvesters. The Sport Fishing Institute estimated that 10% to 15% of the $1.05 billion in retail sales directly related to Mid-Atlantic marine recreational fishing in 1985 could be attributed to summer flounder (Table 64), making it second only to bluefish in importance to anglers. Amendment 2 is intended to allow the summer flounder resource to rebuild, thereby assuring larger catches in the future.

The FMP is not expected to lead to an increase in costs or prices to consumers (section 9.2).

Cost and benefit data are presented and analyzed in section 9.2.2 of Amendment 2.

The benefits and costs do not include any value for the increased reproductive stability of the population that will occur with a decreased fishing mortality rate and the concurrent spreading out of various age classes in the catch. These biological benefits are most apparent when one views the risk associated with compressing the age composition of the catch to where only one or two year classes dominate, thereby increasing the risk of year class failure, potentially resulting in fishery wide collapse. It is impossible to value this insurance against stock problems at this time. However, the value is of a magnitude equal to or greater than the monetary costs accounted for. This is discussed in FMP sections 9.2.

Governmental costs are discussed in section 9.2.2.4.

The FMP should not have significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of US based enterprises to compete with foreign based enterprises in domestic or export markets.

5. Impacts of the Plan relative to the Regulatory Flexibility Act and the Paperwork Reduction Act of 1980.

The Regulatory Flexibility Act requires the examination of the impacts on small businesses, small organizations, and small jurisdictions. The impacts of Amendment 2 do not favor large businesses over small businesses.

The Paperwork Reduction Act concerns the collection of information. The intent of the Act is to minimize the Federal paperwork burden for individuals, small business, State and local governments, and other persons as well as to maximize the usefulness of information collected by the Federal government. The annual vessel

permit provision is continued from the existing FMP and should not result in a change in burden hours to fishermen. Amendment 2 would institute a permit system for dealers and reports by commercial fishermen, party and charter boat operators, and dealers.

As of 18 June 1991, 2,346 vessels held valid commercial permits for summer flounder and 8 for catcher/processor vessels. Additionally, there were 302 permits for charter or party vessels. A figure of 2,346 commercial vessels may be considered a high estimate for the number of commercial vessels that would report landings of summer flounder, as many owners obtain permits in order to retain the option to harvest, even though they may not have actually caught much summer flounder for some time. NMFS weighout data (which excludes Connecticut, Delaware, and North Carolina) indicate that, in 1989, 599 vessels landed some summer flounder (Table 52). During the 1983-1989 period, the largest number of commercial vessels landed summer flounder in 1984 (704; Table 52). North Carolina officials estimate there are about 90 vessels in the summer flounder fishery off that State (Hogarth pers. comm.). For purposes of this analysis, the high number of commercial vessels required to report is estimated at 2,300 and the low number is 800 (704 + 90, rounded).

The figure of 302 permits for party and charter vessels is probably quite low, however, since a great many boats simply have not applied for a Federal license. The Sports Fishing Institute estimated that, in 1985, there were 1,626 charter boats and 454 party boats operating from Maine through North Carolina (Table 63). The Council's party and charter boat survey was mailed to 592 vessels (Table 66). For the purposes of this analysis, a range of 500 - 1,000 party and charter boats will be assumed to be required to submit monthly reports for participating in the summer flounder fishery. Given the 15 May through 30 September season of this fishery, it is assumed that, on average, each vessel will submit 5 monthly reports per year.

The number of dealers which buy and sell summer flounder is perhaps the most difficult to estimate. The National Marine Fisheries Service specified 155 as the number of dealers in the Atlantic bluefin tuna fishery (USDC, 1990c). For the purposes of this analysis, a range of 150 - 400 weekly dealer reports will be utilized.

A summary of reporting requirements follows:

	Commercial	Party/Charter	Dealer
Number of units reporting	800 - 2,300	500 - 1,000	150 - 400
Reports per unit per year	12	5	52
Total Annual Reports	9,600-27,600	2,500-5,000	7,800-20,800

Summing together the end points of each range, the overall spread in the potential number of reports submitted to the government each year ranges from 19,900 - 53,400 reports from between 1,450 and 3,700 entities. Governmental costs of administering such a reporting program would have four major components: printing costs for the report forms, mailing costs for their postpaid return, labor costs in processing them, and capital costs for the computers which processors would use. In each of the sections that follow, calculations will first be made using the low end value of the annual reporting range, then followed with the result at the at the high end value.

All of these costs may be recovered as they are part of the cost of issuing permits.

Printing costs were estimated using the most recent such report which the Northeast regional office of NMFS purchased: surf clam and ocean quahog record books. Each record book contained 50 weekly report forms (and postpaid mailers) and was printed at a cost of $8.00 each ($8,000 for an order of 1,000 books). Assuming costs would be similar for summer flounder reporting books, first year printing costs for commercial vessel logs would equal (800 books) x ($8.00 per book) or $6,400 at the low end of the reporting range. At the high end of the reporting range the cost would be $18,400. Recall that while commercial vessels must mail their reports in monthly, the data are tow by tow, so the size of the logbooks, and, hence, the printing cost, would be similar to the surf clam and ocean quahog logbooks. For party and charter boats, since there are only 5 reports per boat per year, assume $4.00 per logbook, the printing cost would be $2,000 to $4,000. Dealer reports would be $1,200 to $3,200. Total printing costs, therefore, would be $9,600 to $25,600.

Annual mailing costs would include the cost of mailing out all the record books at the start of the year plus the regular postage for each report as it was returned to the government. The initial mailing would cost ($2.90

per book) x (1,450 books) or $4,205. Monthly mailings for commercial vessels would cost ($0.29 per report) x (12 reports per year) x (800 entities) or $2,784. Monthly reports for party and charter vessels would cost ($0.29 per report) x (5 reports per year) x (500 vessels) or $725. Weekly mailings from dealers would cost ($0.29 per report) x (52 reports per year) x (150 dealers) or $2,262. Total mailing costs would then equal $9,976 at the low end of the reporting range. At the high end of the reporting range the cost would be $26,216.

Labor costs would equal the salary of a GS-5 government employee (Step 1 = $16,973) plus overhead of 29.5% overhead (benefits and taxes) or $21,980 per person per year. At an average of 5 minutes to process one commercial vessel report (Geyer, pers. comm.), the annual amount of time required to process commercial information would equal (5 minutes per report) x (12 reports per year) x (800 vessels reporting) or 107 days of processing time. Monthly reports from party and charter vessels would be expected to take longer to process than weekly reports, as would dealer reports which describe landings from multiple vessels. Using a figure of 15 minutes for each of these, party and charter boats would require (15 minutes per report) x (5 reports per year) x (500 vessels reporting) or 83 processing days. Dealers would require (15 minutes per report) x (52 reports per year) x (150 dealers) or 260 processing days. Totalled together from each sector, low end processing days would equal 450, or 1,167 days at the high end.

An average federal employee would work approximately 230 days per year assuming 24 paid vacation days, 6 days off for illness, and weekends. Dividing 450 processing days by 230 yields an average of 1.96 person years of processing time required, or a full time processing staff of approximately 2 people. With labor costs of $21,980 per person, the total labor costs for processing would equal ($21,980 per person) x (2 people) or $43,960. At the high end estimate of 1,667 processing days, a total staff of 8 people would be required at a cost of $175,840.

Finally, providing computer equipment for a processing staff would cost on the order of $3,000 per person for a 386 DOS based computer and the necessary accessories. For the entire staff this would cost ($3,000 per machine) x (2 people) or $6,000. Using the high end estimate of 8 staff, the cost would be $24,000. These costs would be reduced to maintenance costs in subsequent years since the computers are durable goods that can be expected to last approximately 5 years.

Totaling the costs across each of the four categories yields the following:

	Low End Range	High end Range
Printing costs	$9,600	$25,600
Mailing costs	9,976	26,216
Labor processing costs	43,960	175,840
Computer capital costs	6,000	24,000
TOTAL	$69,536	$251,656

6. Impacts of the Plan relative to Federalism.

The Amendment does not contain policies with federalism implications sufficient to warrant preparation of a federalism assessment under Executive Order 12612.

APPENDIX 3. PUBLIC HEARING SUMMARIES

31 July 1991, Fairhaven, MA

The Summer Flounder FMP Amendment 2 (Amendment 2) public hearing in Fairhaven, MA, was called to order at approximately 7:08 pm on 31 July 1991 by Mike Keene, Mid-Atlantic Council member serving as the hearing officer. Also present were Dave Pierce, Massachusetts Division Marine Fisheries and Atlantic States Marine Fisheries Commission (ASMFC) Summer Flounder Board and John Bryson and Judi Abbott, Mid-Atlantic Council staff. Fourteen members of the public were present. Mr. Keene made the opening remarks regarding Amendment 2 and commented on how the hearing would be conducted.

Mr. Bryson read the summary of Amendment 2, and asked for comments with regard to possession limits and season combinations, and advised the audience that suggestions be handed in by 21 August. The meeting was then opened to comments from the audience by Mr. Keene.

David Pierce, MA Division of Marine Fisheries, stated that fishing mortality is high (yellowtail flounder is a problem). Fourteen inch limit on summer flounder would also attract recreational fishing. Moratorium on commercial fisheries would be a problem. Would like to see NMFS, State, and Coast Guard monitor and enforce regulations. Multispecies fisheries will be discussed in detail at a later time.

Red Elk does not want to see a moratorium and did not agree with the overfishing statement. Noted that breeding and feeding ground is being polluted; how are these species going to survive?

Robert Morris was not in favor of limited entry.

Kenny Daniels was not in favor of seasonal closures.

Howard NIckerson felt that a window is not practical. New Bedford needs 24 hours.

Russell Cleary is against limited entry, only as a last resort should it be considered. He also is against income requirements and feels that our Plan limits commercial fishermen but not the recreational fishermen.

Mike Keene adjourned the hearing at 8:20 pm.

1 August 1991, Galilee, RI

The Amendment 2 public hearing in Galilee, RI, was called to order at approximately 7:13 pm on 1 August 1991 by Mike Keene, Mid-Atlantic Council member serving as the hearing officer. Also present were Bob Smith (New England Fishery Management Council) and John Bryson and Judi Abbott, Mid-Atlantic Council staff. Forty six members of the public were present. Mr. Keene made the opening remarks regarding the Amendment 2 and commented on how the hearing would be conducted.

Mr. Bryson read the summary of Amendment 2, asking for comments with regard to possession limits and season combinations, and advised the audience that suggestions be handed in by 21 August. The meeting was then opened to comments from the audience by Mr. Keene.

The following people spoke against the Plan as it stands.

Bob Smith, commercial fisherman, is against a moratorium, and stated that this is discriminatory against the New England and southern New England area. Since only large fish are taken in the New England area, he prefers to address this problem through a 16" minimum fish size, no minimum mesh size, and a line that would distinguish the mid-Atlantic and southern New England areas so that boats fishing in northern New England area would have to have a species permit. Mr. Smith is also opposed to logbooks.

Fred Mattera agreed with Bob Smith and made the following points: 1) mixed trawl plan for mixed fisheries;

2) go back to original plan; 3) summer flounder fisheries - decreased - feels effort was misdirected (yellowtail and cod fish were there when summer flounder should have been); 4) opposed to moratorium (limited entry); 5) against Summer Flounder FMP Monitoring Committee because he feels they have a one track mind; wants public process or input on decision making; 6) commercial quotas do not work for them because they cannot be enforced; 7) fish size - 13" is not reasonable for the New England area, rather 14" to 17"; 8) minimum mesh size - problem with Coast Guard, who say they can't enforce measurements; 9) would like to see 72 ° enforced - regarding permit, also deal with mixed trawl fishery; 10) concerned with cost of the permit and the administrative cost of processing the logbook data; 11) alternatives - a) 14" fish, 6" diamond mesh - wants 6" square and 5" diamond; b) #6. Seasonal closures - 14" minimum, and 6" diamond - disputes Virginia and North Carolina and what they catch - close down because they are full of roe.

Jim Mc Cauley stated that once the quota system is achieved for summer flounder, they go for yellowtail flounder and this fishery is already depressed. Jim questioned the science behind this whole process with regard to F_{max} and what this means. He also does not see the need for logbooks and catch records. With regard to a moratorium, his concern is for new vessels and buy back procedures. Jim would like to see a public forum conducted at the end of this year. Jim also feels that everybody should have a piece where quotas are concerned. Mr. McCauley's perception is that small fish are not caught in the NE area, so they should not be governed by our Plan which he feels is geared only to the Mid-Atlantic region. He also stated that they do not kill undersized fish there. With regard to the alternatives, 6" diamond mesh is not compatible; dealer permits have to intermesh - ties in with landing window to control it; and large mesh fly nets and squid nets will be disastrous for the New England area.

Craig Huntley had gotten quotes on what it would cost him to equip his boat with 6" cod nets for the record (Attachment A).

Paul Mercier opposes a moratorium and also does not support quotas, which he feels would increase pressure on that one type of species. With regard to mesh size, he would go after summer flounder, but would also want other fish as well. He felt that a mixed trawl fishery plan would be a good idea.

Lucy Sloan made the following points: 1) overfishing definition, 602 guidelines are illegal, the law has been amended in 301(b); 2) questions the Council minutes - why did we decide that Optimum Yield was all fish that had been caught; 3) wants a joint meeting between New England and Mid-Atlantic Fishery Councils; 4) define administrative fees - NMFS - permits and fees; 5) a moratorium would limit flexibility, perhaps anti-conservation; 6) cannot quantify things, such as bycatch - monitoring committee; 7) quotas do not work; 8) reference page 73 - NMFS will abuse - total control; 9) paper data - logbooks - bureaucracy where the fishermen will have to pay resulting in bankruptcy; weekly data will not work - incomplete; 10) closures - discriminates against Southern NE; 11) #'s 4, 5, 6, 7 - does discriminate against NE - safety consideration - no efficiency.

John Tarasevich feels this Plan will force him out of business, and overall will create a black market for summer flounder. He wants mixed trawl fishing, 16" size and is in favor of the 72 ° line. He is willing to take a cut elsewhere.

Eric Reid agreed with Ms. Sloan's comments (Attachment B). Mr. Reid wants optimum economic yield. He is opposed to quotas. Mr. Reid is in favor of 16" fish limit, area closures (November, December), and 72 ° line for this fishery. Reading from section 9.2.1.6, which says "conservation shall take into account and allow for variations among and contingencies in fisheries, fishery resources and catches"; if this part of the Plan is approved, it will be in violation of this section.

Jake Dykstra also questioned survey and data collection, stating that an educational guess is not good enough but wants the hard numbers. He feels the Regional Director should OK recreational permits before closing (permits should be for man and boat). He is opposed to a moratorium and quotas and felt that logbooks would be a bad idea. Investigate what other regions are doing to obtain their data. Questioned the validity of Section 9.2.2.7, redistribution of costs - destroys initiative and versatility. Also questioned Section 9.2.1.5, management - this Plan would destroy the fishery.

Joel Hovanesian questions sport fishermen definition - when they count and sell fish - feels this has nothing to do with the New England area. He enjoys mixed trawl fishery, catching summer flounder, but the 100 lb limit does not make sense because we would not be conserving anything at all - why kick dead summer flounder overboard? Stated that New England were not catching small fish, but rather southern boats fishing on summer flounder are working the beaches, catching small fish and killing them.

John Oleary also felt that New England was being blamed for killing small fish when this was not the case.

Harold Loftes, Jr. stated too, that New England proved that they were not killing the small fish. He is in favor of multispecies management.

Peter Mullen sees a spawning problem - protect them first and work outward.

Mr. Keene thanked the audience, assuring them that their comments would be aired by the Council at the next meeting in September. The meeting was adjourned at 9:30 pm.

7 Aug 1991, East Lyme, CT

An informational hearing on Amendment 2 was called to order at 7:30 pm on August 7, 1991. Eric Smith, CT DEP, was the hearing officer. Twelve members of the public were present.

Mr. Smith explained the purpose of the briefing and the fact that it was not a formal hearing. He encouraged anyone making a statement to also submit a written comment to the Mid-Atlantic Council by August 21, 1991.

Chris Moore, Mid-Atlantic Council staff, read the summary of the amendment, stating the objectives of the amendment, as well as detailing the management measures that the Council and ASMFC had adopted for purposes of public hearings. Dr. Moore also reviewed the alternatives to the proposed plan amendment.

Mr. Smith then opened the briefing for any comments or questions.

Pat Abate was concerned about how the proposed regulations would affect summer flounder fishing in State waters.

Brad Glas, a party boat operator, complained that public hearings on the amendment were poorly timed since they occurred during the fishing season. He stated that charter and party boat owners/operators would be unfairly affected by the provisions of the Plan, specifically the possession limits. He stated that possession limits would seriously impact their business. He was also concerned that the mates on these vessels would not be able to sell fish to the public. He suggested that a better way to manage the fishery would be to close the commercial market for the species. He stated that the only thing that fishery mangers have done in the last five years is make sure that fishery managers have jobs.

Claire Glas, National Party Boat Owners Alliance, stated that a person should not have to obtain another permit if they already have a NE Multispecies permit since owners/operators already had too many forms to file. She stated that she would support the income provision alternative that would only allow a person to obtain a permit if 10% of their annual income was derived from fishing. She was concerned about the fees that could be charged to obtain the permits.

Paul Young, charter boat operator, had questions about how the Plan would be implemented in State waters, specifically how the commercial moratorium and party/charter boat permit would work. He stated that trip limits would not work in the commercial fishery. He favored a seasonal closure during the spawning season and regional possession limits / seasonal closures. He stated that party/charter boat operators would be severely impacted by the recreational limits.

There were several comments by George Glas, Claire Glas, and Brad Glas regarding the proposed permit system and the impact on party/charter boat operators and mates ability to sell fish at the dock. They

suggested that a party/charter boat operator in possession of a commercial moratorium permit be able to sell fish at the dock to private individuals and not just dealers. Claire Glas wanted to know how may commercial/recreational representatives were on the Mid-Atlantic Council.

Paul Shante, recreational fishermen, stated that although the Plan would have economic impacts and hurt both commercial and recreational fishermen, it was necessary to preserve the summer flounder stocks. He stated that the Striped Bass Plan was a good example of the benefits derived from strict management.

The meeting adjourned at approximately 8:40 pm.

30 July 1991, Riverhead, NY

The Amendment 2 public hearing in Riverhead, NY was called to order at approximately 7:40 pm on 30 July 1991 by Gordon Colvin, Director of Marine Resources for the New York Department of Environmental Conservation and New York representative to ASMFC. Also present were Charlie Johnson, Mid-Atlantic Fishery Council member; John Mason, NY DEC; Kathi Rodrigues, NMFS; and John Bryson and Judi Abbott, Mid-Atlantic Council staff. Eighty nine members of the public were present.

Mr. Colvin made the opening remarks regarding the Amendment 2 and commented on how the hearing would be conducted.

Mr. Bryson read the summary of the Plan, asking for comments with regard to possession limits and season combinations, and advised the audience that suggestions be handed in by 21 August. Mr. Colvin invited those who wished to make a statement to come forward.

Mr. Robert Harter wants a 500 lb limit. He feels that a 5.5" mesh would eliminate mixed fishing (Attachment C).

Charlie Johnson commented on the need for reduction in mortality of recreational and commercial fisheries and urged that the estimated bycatch mortality be subtracted from the overall quota before it goes to the States (Attachment D). He is also in favor of the Regional Director closing the EEZ off a particular State to summer flounder fishing to reduce the current interjurisdictional concerns that have been expressed in other plans. Mr. Johnson, speaking for the New York Sportfishing Federation, endorsed the 6 fish possession limit with a fishing season from 15 May through 30 September.

Dennis Frederick is in favor of 6 fish per person per day, with a 14" size limit and a fishing season of 15 May through 30 September, and supported limited entry. He also stressed the need for data regarding the summer flounder stock be resolved and supports closure of the fishery on recreational and commercial fishing level to protect fall spawning from 30 September to 1 January. Limitations need to be placed on commercial fishing vessels with regard to mesh size and seasonal quotas to balance those being placed on the recreational and party/charter boat industry (Attachment E).

Fred Kieser is opposed to Mr. Harter's suggestions; he feels he only gets the leftovers.

Charles Wertz Jr., feels that a moratorium is unconstitutional.

Charles Wertz Sr., wants a new system for dividing the quota. Five inch cod end is supported by his group; feels the 5.5" diamond mesh is too drastic. Finally, the 10% income requirement is too low. A person should have to prove that they make 51% or more of their income from commercial fishing before they are issued a commercial permit (Attachment F)

Donna Pratt was in favor of 6 summer flounder, 14" limit, fishing season from 15 May through 15 September.

Mr. Ronald Schlueter Sr. is in favor of 15" fish and feels that the mesh size needs to be spread - cod end through the tunnel needs to be the same.

Rick Lofstad is in favor of 13" fish. He is not in favor of permits for summer flounder, and does not feel that logbooks would be the answer. Liked the idea of 5.5" mesh, although he agreed there would be a loss of fish. He also felt 6 fish limit was appropriate for recreational industry.

Anthony Bonventre supports 6 fish limit per day, 14" size.

Mr. Colvin thanked the audience and the hearing adjourned at 10:06 pm.

29 July 1991, Brooklyn, NY

The Amendment 2 public hearing in Brooklyn, NY at Kingsborough Community College, was called to order at approximately 7:32 pm on 29 July 1991 by Charlie Johnson, Mid-Atlantic Council member serving as the hearing officer. Also present were John Mason, NY DEC and John Bryson and Judi Abbott, Mid-Atlantic Council staff. Forty eight members of the public were present.

Mr. Johnson made the opening remarks regarding Amendment 2 and commented on how the hearing would be conducted.

Mr. Bryson read the summary of the Plan, asking for comments with regard to possession limits and season combinations, and advised the audience that suggestions be handed in by 21 August. The meeting was then opened to questions and comments from the audience by Mr. Johnson.

Tom Paladino of the Long Island Commercial Passenger Fishing Vessel Assn (LICPFVA), questioned the validity of the data used in recreational fishery by stating the overriding concern for the resource necessitating them supporting the preferred alternatives for the 6 fish limit and a fishing season from May 15 to September 30 (Attachment G). He did suggest regional or individual State management of recreational fisheries should continue to be explored. He opposed limit of entry but supported data collection through logbooks.

The following people also spoke in favor of Mr. Paladino's comments: Anthony Maio (preferring 8 fish and change date to 31 May); Tony Greco (feels that the "best available data" is bogus and not good enough - restrictions based on recreational data and not data taken or given by hook, line, and sinker fishermen, like charter/party boats); Stephen Kearney (dates and seasons review); Anthony Loperfido (preferring season from June 1 to September 31); Walter Specht (does not want resource deprived); John McCormick (change season from June 1 to September 30); Michael Danon (more summer flounder than 6 per man); Patrick Focazio (need for communication between interested parties); and Marty Haines (bag limit is a problem; consider 10 fish with season from June 1 to September 30; willing to give up October to get June 1st; has kept accurate logbooks; is in favor or 47% reduction).

Larry Risi would like the Council to consider the seasons and where the draggers are pulling up these fish and felt that there should be a 10 fish limit per person on party boats.

Kevin Bradshaw wants 10 fish limit, otherwise people would not want to bother.

Peter Leone also agreed, saying 5, 6, or 7 fish would not be worth the effort; preferred June, not May.

Victor Yurkins felt there were no fish to catch, and as a result he has lost his boat. Wants access to surveys taken and how data it obtained; this issue also addressed by Alan Dresner.

Alfred Kuhnle objected to a moratorium; licensing procedures need to be considered with regard to sports fishermen.

Mr. Johnson concluded the hearings at 9:26 pm.

6 August 1991, Wall, NJ

The hearing was called to order by Bruce Freeman (Mid-Atlantic Council member and New Jersey Division of Fish, Game, and Wildlife) at 7:00 pm. There were 87 members of public present including Mid-Atlantic Chairman Axel B. Carlson, Jr. Staff present were John Bryson and Joanna Dougherty. Mr. Freeman gave opening remarks and explained hearing format and procedure to be followed. Mr. Bryson reviewed the summary of the Plan and entertained questions from the audience for clarity only.

There were 21 people who commented.

Gary Dickerson, Manasquan Fishing Club, would like to see the Plan accepted, as written, in its entirety. Also appreciated the economic differences pointed out in the Plan between both recreational and commercial. If and when the Plan becomes adopted, would like to see a starting date (with respect to commercial) hopefully January 1, so that the quota can get caught before spawning season. He complimented Council on their work during the past year and a half in getting the Plan to where it is now, since the basic viewpoint of the Plan is to protect the resource.

Jack Colvin, rec fisherman, feels hearing is a waste of time, that it doesn't matter what the public said, the rules will be put into effect anyway. Disagreed with the limit on bluefish; feels there should have been a bounty on them. Feels Council is doing good job in conservation, but regarding summer flounder, they are wrong. Questioned why commercial can keep 12" fish when rec cannot keep one ... if the net cannot pull in 13" only, then change the net size. Again, the sports are being penalized but not the commercial. He said the Council should be stopped from gaining more power. He said the only way to stop this, is that soon they would have to get a salt water fishing license (which will probably happen in another year or two), or start class action suit. He then started to comment on tuna and shark, and Mr. Bryson asked him to keep his comments on summer flounder only. He feels Council doesn't know what they are doing regarding summer flounder.

Pat Donnelly, Manasquan Fishing Club, stated they have 80 members who voted on this proposal, passing unanimously, the 6 fish-14" limit, from May.

John Griffin, rec fisherman, finds Plan suspect. Council has thrown recreational fishermen with the commercial fishermen to try to offset rules that will be put on commercial. Fees are very suspect also. Referencing the second paragraph in the rules, regarding mates selling fish ... there is hardly ever enough for the mate to sell ... so there is no competition here. Council is just putting one group against the other.

Tom Fote, Jersey Coast Anglers, stated when Council begins a Plan, it's always in the right direction, but between Council and Congress, there are too many changes. Wants to see this Plan enacted as written. Would like Secretary of Commerce and National Marine Fisheries Service to stay out of it. (Mr. Bryson said he hoped that the fishermen who want this Plan would make this known to the proper authorities in Washington, who have been known to change the Plan.)

Robert Carvello, charterboat Autumn Mist, no problem with 6 to 7 fish limit. Gear usage is OK. Major complaint is "no sale" by anyone except the commercial fishermen. Why does NMFS insist on this clause? The money from fish is part of his mate's salary; why are we taking it away? Asked that this clause be removed. No problem with keeping logbooks, but how does he prove this? Would like to see environmental study done on the effects of NMFS supported squid joint venture held this year. (Mr. Bryson advised that there was no joint venture last year or this year, however, that it was applied for but not approved.) Would like to see copy of study that was taken on dragging. Questioned the price of flounder. (Mr. Bryson advised that the price of flounder is controlled by imports.) Would like to see study done on destruction of mussel and clam beds of inshore areas. These are all things that will bring summer flounder back. He mentioned that in New Jersey they landed tuna last year that would not bring $1.50 lb. These fish were trucked to Massachusetts and got $13 lb. This happened because the prices in New Jersey are being controlled. (Mr. Bryson advised that Council didn't say they had to sell to a licensed broker. The Plan says that "to sell" fish, they must have a permit. This license is obtainable by various people who have sold fish in the past.) Favors 6" mesh and 13" size.

Bill Devinsky, Silverton Fishing Club, said they have 50 members who prefer 6 fish possession limit with season of May-September, along with preferred alternative, as long as nothing in the proposal is changed.

Tom Brower, Fishermen's Coop, is against quota system for State's limit. Not fair that southern States are getting 11-12" fish under this quota, where Jersey has been abiding to 13-14". There is no way to keep track of recreational landings. Mr. Bryson pointed out that we took total commercial catch during the period talked about, and the total recreational catch during that period; the same percentages will be applied to each, which was how we arrived at the rec catch numbers and that's how we'll arrive at the quotas for commercial. They will be equated to past history. He's also against limited entry. Feels there are plenty of summer flounder; that we are wrong in our assessment. Mr. Bryson assured him that if we find a mistake has been made, that there are more fish that originally thought, it would be adjusted upward next year.

James Lovgren, NJ Farm Bureau/Pt. Pleasant Coop, feels the Council has done a thorough job with the Plan. He feels that fish are not just overfished, the habitat is polluted. Wants to see Secretary stop ocean dumping by 1992. New York dumps in the major spawning grounds. He feels recreational statistics are off by 50% ... basically feels data is incorrect. Made many comments regarding mesh size and having to buy new nets each year. Estimates average life of a summer flounder net is three years. Generally feels local boats will have a good season this year. Against limited entry.

Michael Popek, rec fisherman, fishes four to five days a week. 1989 was not a good year, 1990 was better, but 1991 is a good year. He catches up to 300 summer flounder per day. Feels more studies should be done; this is going to hurt a lot of people, both commercial and recreational. Would like to see commercial fishermen only be able to drag their net so far, then have to bring it up and empty it.

Don Marantz, Newark Bait & Fly Casting Club, has 100 members who voted for the 6 fish possession limit, May 15 to September 30, 14" fish. Concerned about pollution. Feels Coast Guard is too busy to enforce these regulations. Would like to see closed seasons on all spawning for summer flounder coastwide at different times. In favor of severe penalties for possession limits, overfishing, and illegal sizes. Wants to see Plan accepted, as written.

William Hammarstrom, party boat operator, stated the Council is on the right track. In favor of 5.5" mesh. Does not like 13" size limit. Should be able to keep 10-12" fish and let it be added to the tonnage catch. Approves of 6 fish limit, May- September, and will support it. Regarding dragging for summer flounder during spawning time ... suggests possibility of breeding summer flounder in hatcheries.

Rick Englesbe, IFF Fishing Club, has 40 members who agree with Plan, as written. Supports 6 fish, 14", May-September.

William Hauck, party boat operator, wants Council to consider 10 fish limit; customers will not travel for 6 fish. Would not oppose 15" limit. Feels there are a lot of fish. Wants Council to consider June 1-September 30. Mr. Bryson advised that 10 fish, during that length of time, would not be possible and still meet the requirements.

Hal Hagaman, party boat operator, is very nervous about this Plan. In favor of 10 fish limit, but would prefer 14", June 1- September 30.

Allen Hilliard, party boat operator, needs 10 fish; people will not come for 6. Favors 13" limit.

Tom Buban, party boat operator, needs 10 fish. In flavor of co- mingling catch; the party boat operators are in business just like commercial. Feels that these regulations will not be able to be enforced. Against 15" limit.

John Connell, party boat operator, would like to see 10 fish limit, June 1-September 30. Concerned about accuracy of data; he, personally, has never been questioned. Favors logbooks.

Ray Bogan, attorney, recommends 10 fish bag limit, June- September, which would work into 46% reduction. Against limited entry, especially for charter boats. Regarding data submission, members of his organization are dedicated to continuing that. He is against 10% of income derived from fishing as a commercial permit condition, would prefer 5%.

Marty Haines, speaking on behalf of United Boatmen, thanked the Council. United Boatmen is in favor of this Plan, which would reduce mortality rate by 47%, however, they need more than 6 fish; they want 10. Against limited entry. Regarding co- mingling, they need the # of fish X the # of people, as long as boat does not exceed what is allowed. Also, psychology needs to be considered. (These were basically the same comments presented at New England hearings.)

Lois Jenkins stated six fish is not enough; they need 8-10 with possible shorter seasons.

Dennis Lovgren, commercial & rep of Fishermen's Dock Coop, asked why should there be a 13" limit; 5.5" mesh size will only retain a certain amount of 14" fish. Can live with 5.5" bag. Against limited entry.

Mr. Freeman thanked everybody for attending and reminded them that additional comments must be received by August 21. Hearing was adjourned at 9:35 p.m.

6 August 1991 Cape May Court House, N.J.

There was a public hearing held on 6 August 1991 at the County Extension Office in Cape May Court House, N.J. on Amendment 2. Hearing moderator and Mid-Atlantic Council member Tom McVey convened the hearing at 7:00 pm. Also present were 50 members of the public. Dave Keifer represented the Mid-Atlantic Council staff.

Mr. Keifer reviewed the provisions of Amendment 2.

Nils Stolpe questioned the cost of the permits .

George Trotman, Long Beach Island Fishing Club, stated that he was concerned about the balance between the recreational and commercial harvest. He questioned what would be the equivalent recreational number if catch went to 11.2 million pounds in 1992. He further suggested that recreational numbers should be included in the Plan (40% of total) to preserve the historical balance. He expressed concern about possession limits on shore and thought and suggested a broader context be included in the Plan.

Daniel Cohen, Atlantic Cape Fisheries, stated the logbooks and landing windows be required for all fisheries.

George Kumor, Consumers United, stated that the summer flounder fishery is overfished and that the only thing that would save it is a moratorium and a government subsidy for those persons effected. He also called for more gear research, hook and line research, and the establishment of breeding hatcheries.

Wayne Halbruner, commercial fisherman, stated that all night dragging should be prohibited in the fishery.

Nils Stolpe, NJ Commercial Fishermen's Association, stated that the permit fees should be included in the plans in the future. He also discussed the fact that weekly reporting for commercial boats will put a strain on the National Marine Fisheries Service because there are a great many more boats in this fishery than most. He commented that the agency has not done a great deal with data it now has. He expressed a concern about the mixed trawl fishery under the provisions of the Plan.

Michael Deckard, recreational fisherman, stated that the Council should take the strictest measures that it can because there is very little resource left.

Paul Thomson, fisherman, stated that there are more summer flounder than in previous years and that the 13" size limit and mesh size should be maintained but there should be no bag limit.

Jesse Shivers, commercial fisherman, disagreed with the bag net size saying that it destroys too many fish. He was concerned with too much government regulation of the industry.

Jeff Eutsler, commercial fisherman, stated that weekly reports should be eliminated because they are used to

allocate quotas and eventually put the small boats out of business. He stated quotas are not necessary that mesh size will take care of the problem.

Tom Douglas, recreational fisherman, stated that a 14" size limit is too big because it makes it impossible for the recreational fisherman to catch any fish.

The hearing was ajourned at approximately 8:05 pm.

1 August 1991, Salisbury, MD

The meeting was called to order by hearing officer Bill Outten at 7:05 p.m. Present were Bill Outten (MD DNR), Chris Moore (MAFMC staff), Rick Cole (DE DNR), and Kathy Collins who served as recording secretary. Thirteen members of the public attended.

Opening statements were read by Bill Outten. Chris Moore presented the summary of Amendment 2. Mr. Outten then opened the hearing for comments and questions.

Richard Novotny of Maryland Saltwater Sportfishermen's Association read the attached statement dated July 29, 1991 into the record (Attachment H).

John Martin of Berlin, MD, stated that he favored a minimum mesh size and size limit. He explained that a bag limit without a size limit is not good. He said that with a 5" bag limit and 14" total length, some fish would be lost. He added that a 5.5" bag would let 14" flounder escape. He believes that a 5.5" bag would be best but would heavily impact the fishery. He said to give a little time to use a 5.5" bag, without other alternatives, like quotas, to see if that alone does the job in order to raise fishery stocks. It would make implementation and enforcement simpler.

David Martin of Martin Fish Company in Ocean City, MD, said he was for conservation measures. He is for a 5.5" bag size without a quota. He added that a quota would be drastic. He said there needs to be a provision for a moratorium. He said the 100 pounds is going to impact the offshore fishery because they stay out for 2 or 3 days and sometimes they need to change gear to fish for other species. The scallop fishery is allowed to have 500 pounds a day of bycatch and that includes flounder, or 5,000 pounds a trip. He said that is more than they are allowed and they catch the flounder, the scallopers shouldn't catch that much.

Sam Martin of Sea Fish, Inc. said that he is in favor of a 5.5" bag size because it will let a lot of juvenile flounder through. He is not in favor of a quota system because it would be detrimental. He is in favor of a 500 pound limit on offshore boats because this would help out a lot. He is also in favor, that, for an owner to obtain a commercial permit, he must earn at least 10% of his income from fishing.

Joe O'Hara, a sportfisherman from Ocean City, MD, said he cannot support one particular alternative but he could support a combination of them. He would recommend a 6" minimum mesh for commercial trawlers. He believes there should be a pound quota to keep fish that are landed because it is better than discarding dead fish. He thinks there should be a season closure of October through December. He added that if someone is double netting, they should loose their permit and the captain and the crew should be fined. He said that fish need to be protected during spawning. He thinks a 3 fish limit is good, leaving the rest to breed. He believes the states need to be charged with a wide dissemination of information on limits and release techniques.

Rick Cole of Delaware Department of Natural Resources said that under Section 9.2.2.2.4, moratorium on charter boats, that he would like to see some additional clarification in that section on whether charter boats that fished in state waters during the eligibility windows could get moratorium permits.

Sam Harrell of Georgetown, DE, supports the 5.5" bag limit. He believes there should be stiff penalties for those double bagging. He is against any kind of a quota system. He would go with 500 pounds with a 5.5" bag. He explained that the inshore fishermen don't have the chance offshore fishermen do because offshore fishermen catch all the fish.

Bill Outten, the hearing officer, adjourned the meeting at 8:05 p.m.

29 July 1991, Norfolk, VA

There was a public hearing held on 29 July 1991 at the Quality Inn Lake Wright, Norfolk, VA, on Amendment 2. Hearing moderator and Mid- Atlantic Council member Jack Travelstead convened the hearing at 7:00 pm. Mid-Atlantic Council member William Wells was also present. Also present were 45 members of the public. Dave Keifer represented the Mid-Atlantic Council staff.

Mr. Keifer reviewed the provisions of Amendment 2.

James Jones, Wanchese Fish Co., questioned the scientific data. He indicated that the ocean has changed, the fish have moved and are not in danger.

Sherry Jones, Wanchese Fish Co., stated the United States is attempting to put the small fishermen out of business. Management should target recreational fishermen, not commercial fishermen.

James Bingham stated he was interested in the recreational fishery. He prefers a 10 fish limit with the fishery closed January through July.

Bruce Graham, recreational fisherman, wants some kind of plan put into effect. Commercial fishermen catch undersized summer flounder. Trawlers are wrecking the industry. There should be a 5 year moratorium on commercial fishing.

Gregory Cooner, recreational fisherman, stated the size limit should be the same for both recreational and commercial fisheries. He does not like fishing for a few months, wants to fish all year. While sea bass fishing in March, he heard trawlers on the radio stating they had caught undersized summer flounder. There should be a 100% moratorium on everybody.

James Fletcher, United National Fisherman's Association, read from *Fisheries of the United States, 1990,* indicating that landing and value in the North Atlantic trawl fishery increased in 1990 over 1989. He stated that flounder landings increased 28% in the last 2 years. The 13" minimum size limit imposed by North Carolina caused a decrease in landings that resulted in a loss of $3 million. The decrease in landings did not result from a decline in the stock, but from the 13" rule, a decrease in the number of vessels, and a decrease in effort in the commercial fishery. A 5.5" tail bag will let an 18" summer flounder escape. Commercial fishermen in Virginia are not allowed to fish in Virginia, but they pay taxes in Virginia, taxes to support the Marine Resources Commission.

Gordon Eastlake, charter boat operator, stated that the fishery is over regulated and not enough time has passed to see if the 13" size limit works.

Eric Burnley, ACCA of VA, stated there was inadequate notice of the hearing for his Association to prepare a position; they will submit their comments in writing (Attachment I).

David Boyd stated that the catch of flounder is down in Virginia. Recommends the Plan be put into effect as soon as possible. Trawlers should be regulated.

Wil Laaksonen, VA Charter Boat Assn., prefers a six fish with an early season;1 May through 30 September. He has no argument with the 14" minimum fish size. The moratorium is needed in both the commercial and party and charter boat industries.

James Bolton, recreational fisherman, stated only the commercial fisherman say summer flounder are not in trouble.

Tim Daniels, Wanchese Fish Co., stated that the commercial fisheries can not make it with a fifty percent

reduction in catch. They can not raise the price in order to compensate for loss of catch.

Kenneth McNeilly stated that enforcement of current regulations should be increased before new rules are instituted.

Jeff Eutsler, commercial fisherman, prefers no quota system at all. Stated small boats can not catch as many fish as the larger boats. He did agree with the size limit but questioned the validity of the scientific information. Recommended that the fishery be studied longer before new regulations are put into effect.

Charles Henner, Portsmith Anglers, asked where the big fish are. Stated that all summer flounder are undersized in the grocery stores.

Peter Nixon, Lower Chesapeake Watermen, was concerned that the Regional Director could close the fishery in any State. He stated that this was a "loaded gun".

Walter Burrow asked how many Council members represented recreational fishermen and how many represented the commercial fisheries. Was concerned that the commercial fishermen did not have a voice.

Jeff Davidson , recreational fisherman, stated that the Council should get serious about bycatch in the fishery.

Fred Bachman, commercial fisherman, stated the size limit should be raised to sixteen inches 16" or a total moratorium should be imposed.

Joe Brady stated that the fishery is in trouble and that the Plan was a good starting point. He believes the 14"size limit should be imposed on the entire industry. He supported the preferred alternative.

The hearing was adjourned at approximately 8:15 pm.

30 July 1991, Manteo, N.C.

There was a public hearing held on 30 July 1991 at the Elizabethan Inn in Manteo N.C., on Amendment 2. Hearing moderator and South Atlantic Council member Dennis Spitsbergen convened the hearing at 7:10 pm. Jeff Ross and Beth Burns (NC Division of Marine Fisheries) were present, as were 31 members of the public. Dave Keifer represented the Mid-Atlantic Council staff.

Mr. Keifer reviewed the provisions of Amendment 2.

Jim Fletcher, United National Fisherman Association, questioned the validity of the statistics in the Plan. He also stated that not enough time has elapsed in order to study the fishery, and therefore Amendment 2 should not be put in place at this time. He further stated that all imports should be subject to the 13" size limit. He wanted state institutions to immediately be required to purchase only fish caught by US fishermen. He expressed concern about the fly net regulations and stated that all recreational fishermen should have an 18" size limit.

Jerry Schill, North Carolina Fisheries Association, reported on his participation in a Congressional Oversight Committee hearing on enforcement. He supported the 5.5" in mesh limit and the 13"size limit. He also stated that fly nets should be allowed.

Jeff Ross, North Carolina Marine Fisheries, read a statement on behalf of the North Carolina Division of Marine Fisheries (Attachment J).

Art Smith, Fishermans Seafood Inc., criticized the National Marine Fisheries Service's program for loaning money to fisherman to buy boats and enter the fishery and then impose restrictions on the fishery. He agreed with the moratorium, the size limit, and the mesh size but did not support fly net regulations.

Sherry Jones, Wanchese Fish Company, stated that the Coast Guard was not educated enough about fisheries to enforce regulations effectively. She further stated that the hundred pound box regulation would force fishermen to hire more crew.

Billy Tillett, Moon Tillett Fish Company, supported Amendment 2 and the preferred alternative. Believes that the Coast Guard and Council Committees should not be compensated in any way for their contribution.

James Jones, Wanchese Fish Company, was critical of the National Marine Fisheries Service because he was not able to obtain information from them and the data collected by observers on his vessel. Did not like the provision for observers being assigned to boats by the Regional Director at will.

Carl Edwards stated that he was against permits and logbooks. He supported the North Carolina Division of Marine Fisheries position on fly nets. He expressed a belief the Mid-Atlantic Council did not understand the diversity of the North Carolina fisheries . He was opposed to any quotas being imposed. He suggested that if the mesh sizes were to be changed the fishermen should be reimbursed for the expense by the government.

The hearing was adjourned at approximately 8:15 pm.

31 July 1991, Morehead City, NC

There was a public hearing held on 31 July 1991 at Carteret Community College, Morehead City, NC, on Amendment 2. Hearing moderator and South Atlantic Council member Dennis Spitsbergen convened the hearing at 7:10 pm. Dr. William Hogarth, Mike Street, and Rick Monaghan (NC Division of Marine Fisheries, John Mariner (NMFS) and Bill Cole and John Smith (US Fish and Wildlife Service) were present, as were 38 members of the public. Dave Keifer represented the Mid-Atlantic Council staff.

Mr. Keifer reviewed the provisions of Amendment 2.

Bill Hogarth supported the preferred alternative and urged immediate action because the Summer Flounder fishery is in trouble. He also urged that the National Marine Fishery Service put an emergency plan into effect immediately.

Rick Monaghan, North Carolina Marine Fisheries, read a statemement of the NorthCarolina Division of Marine Fisheries (Attachment J).

Jim Gilligan, Gilligan Seafood, stated that the 13" limit was too low and was concerned with the mesh size regulations as well as not allowing fly nets on boats who are fishing for summer flounder. He also stated that it is the ground cable that makes the difference and not the mesh size.

Melvin Sheppard, North Carolina Watermens Association, supported the statement made by the North Carolina Marine Fisheries Division. Also expressed a concern with the mesh regulations and the restrictions on fly nets.

Virgil Potter, Potter Seafood, wants to stay with the 13" size limit and the net provisions. Disagrees with the moratorium regulations. He stated that the National Marine Fisheries Service is responsible for the state of the fishery because the boat loans available caused increased activity in the summer flounder fishery.

Billy Smith stated that the size limit should be the same for both the recreational fishermen and the commercial fisherman.

Gary Smith, T.B. Smith, Indicated that the mesh size should be reduced to 4" and that the tail bag should have a 5.5" mesh size. He also questioned the validity of the recreational data and indicated he believed that it is wrong.

The hearing was adjourned at approximately 8:15 pm.

APPENDIX 4. RESPONSES TO COMMENTS ON AMENDMENT 2 TO SUMMER FLOUNDER FMP

Questionnaires were distributed at all of the hearings soliciting comments on the proposed measures and the alternatives. Persons were encouraged to fill them out and hand them in or take them home and mail them in. The results are tabulated below. Please note that the number of answers exceeds the number of questionnaires since multiple responses were possible. The non-preferred alternatives are described in Appendix 1.

It is interesting to note that the preferred alternative was supported by more respondents that any other course of action. Recall that the Council adopted mandatory sea sampling, selling only to permitted dealers, and provision for alternate nets in the final version of Amendment 2.

Summer Flounder FMP Amendment 1 Questionnaire Summary

	Fairhaven	Galilee	Lyme	Riverhead	Brooklyn	Wall	Cape May
Preferred alternative	-	-	-	8	4	8	-
Close the EEZ off a particular State	-	-	-	1	-	-	1
Mandatory sea sampling	-	1	-	4	-	4	-
2. Take no action	-	2	-	-	-	-	-
3. Alternative vessel moratorium -	-	-	1	-	-	-	
4. Quota, 14" size, & 6.0" mesh	-	-	-	2	-	1	-
5. Quota, 13" size, & 6" mesh	-	-	-	-	1	-	-
6. 14" size, 6.0" mesh, & seasons	-	-	-	4	1	3	-
7. Trip limits	-	-	-	1	-	4	-
8. Recreational harvest levels	-	-	-	6	-	-	-
9. Regional possession, size, & seasons -	-	-	6	1	1	-	
10. Sell only to dealer	-	-	-	5	2	1	-
11. More than 10% income from	-	-	-	4	-	1	-
12. Deducting bycatch	-	-	-	3	-	-	-
13. Alternate nets	-	1	-	6	1	-	-
14. Landing window	-	1	-	3	-	-	-
None of the above	-	1	-	-	-	-	-
No opinion	-	1	-	8	2	3	-

	Salisbury	Norfolk	Manteo	Morehead	Mail	Total
Preferred alternative	-	1	-	-	7	28
Close the EEZ off a particular State	-	1	-	-	4	7
Mandatory sea sampling	-	1	-	-	4	14
2. Take no action	-	-	-	3	2	7
3. Alternative vessel moratorium	-	1	-	-	1	3
4. Quota, 14" size, & 6.0" mesh	-	1	-	-	4	8
5. Quota, 13" size, & 6" mesh	-	-	-	-	-	1
6. 14" size, 6.0" mesh, & seasons -	1	-	-	1	10	
7. Trip limits	-	-	-	-	4	9
8. Recreational harvest levels	-	-	-	-	4	10
9. Regional possession, size, & seasons	-	1	-	-	5	14
10. Sell only to dealer	-	1	-	-	4	13
11. More than 10% income from	-	1	-	-	4	10
12. Deducting bycatch	-	1	-	-	4	8
13. Alternate nets	-	-	4	3	5	20
14. Landing window	-	-	-	-	1	5
None of the above	-	-	-	-	-	1
No opinion	-	-	1	-	2	17

Comments were also requested at the hearings on possible possession limits and open seasons for the recreational fishery. Options identified in the hearing document were a 3 fish possession limit and no closed fishing season; a 5 fish possession limit and a fishing season from 1 June through 31 December; a 6 fish possession limit and a fishing season from 15 May through 30 September; a 7 fish possession limit and a fishing season from 15 June through 31 December; or a 10 fish possession limit with a fishing season from 1 July through 31 December. All of the questionnaires and letters received by the Council were reviewed relative to this provision with the following tabulations. The second tabulation classifying all of the responses that did not specify fish minimum size the same as 14" minimum fish size responses because the possession limit - season discussion in the hearing document was based on a 14" minimum fish size, so respondents may have felt there was no need to comment on the minimum fish size. As shown in section 9, the Council ultimately chose 6 fish and 15 May through 30 September.

POSSESSION, SIZE, AND SEASON RESPONSES

Size	Fish	Season	Responses
	5	6/1-10/31	1
	5	6/1-12/31	2
	6	5/15-9/30	3
	6	5/1-9/30	1
	7,8,10	5/15-9/15	1
	10	6/1-9/30	3
13"	7	6/15-12/31	1
13"	10	6/15-12/31	1
13-14"	10	all year	1
14"		6/1-8/30	1
14"		5/15-9/30	1
14"	6	5/1-9/15	1
14"	6	5/15-9/30	1
14"	6	all year	1
15"	10	all year	1
15-16"	10	all year	1
Total			21

POSSESSION, SIZE, AND SEASON RESPONSES (IF NO FISH SIZE INDICATED, ASSUMED 14")

Size	Fish	Season	Responses
13"	7	6/15-12/31	1
13"	10	6/15-12/31	1
13-14"	10	all year	1
14"		6/1-8/30	1
14"		5/15-9/30	1
	5	6/1-10/31	1
	5	6/1-12/31	2
14"	6	5/1-9/15	1
	6	5/1-9/30	1
14"	6	5/15-9/30	4
14"	6	all year	1
	7,8,10	5/15-9/15	1
	10	6/1-9/30	3
15"	10	all year	1
15-16"	10	all year	1
Total			21

A number of comment letters were also received by the Council. Commenting agencies include the New England Fishery Management Council, the North Carolina Division of Marine Fisheries, and the Massachusetts Division of Marine Fisheries. Copies of these letters were distributed to the Demersal Species Committee, Summer Flounder Advisory Panel, and ASMFC Board when they met to review the hearings and comments and decide on the content of the final Amendment. Copies were distributed to the full Council when it met to receive the Demersal Committee's report. The Council voted the provisions to be contained in the final version of the Amendment. It was then forwarded to ASMFC for adoption through that organization's decision making process. Only after it had unanimously been adopted by the full membership of ASMFC was it returned to the Council for final adoption. Following are summaries of the most common comments.

Why is the commercial size limit 13" while the recreational size limit is 14"? A 14" commercial size, with a corresponding 6.0" minimum net mesh, was alternative 4 in the hearing document. It received very little support (8 questionnaires). A 14" minimum fish size in the recreational fishery was seen as reasonable because hooking and discard mortality is relatively low in the hook and line fishery. However, discard mortality in the trawl fishery is very high. Since no net size can be expected to take only a particular fish, it was determined that many 13" fish would be retained by the 5.5" mesh and it was a better conservation measure to retain and count those fish against the quota rather than require excessive discards. When this was explained to recreational fishermen, they agreed it was the better course of action. Also, while there has been no minimum net mesh regulation in the summer flounder fishery, there has been a 5.5" diamond mesh, 6" square mesh rule in the multispecies (groundfish) fishery for some time, and many summer flounder fishermen participate in that fishery also. The Council's conclusion, therefore, was to use the 13" fish, 5.5" mesh, in conjunction with the quota, in the commercial fishery to improve conservation over the current FMP, while minimizing impacts on the commercial fishery.

Why is the minimum net mesh required throughout the entire net, not just the cod end? This matter was reviewed by the Council and ASMFC and the final version of the FMP provides for the minimum mesh size in the cod end only, with an additional provision for those nets that are not 75 meshes long.

Why is the period 1980-1989 used as the basis for the commercial quota allocation between the States? The Council's position has been that the longer time period is more fair than a shorter time period because the effects of short-term fluctuations are reduced. However, the Council and ASMFC considered a 1985-1989 time period during the discussions following the hearings and decided to stay with the 1980-1989 period.

Why not exempt the fly net fishery? Why not exempt the winter fishery off New York and New England? The final version of the Amendment provides three exemptions: for fly nets, for a particular type of pelagic (squid) nets, and the winter offshore fishery in the northeast.

Conclusions. The changes made by the Council in the final version of Amendment 2 should satisfy most of the commentors. The requirement for the entire net to meet the minimum mesh size beginning with the second year of implementation has been dropped from this Amendment. Exemptions have been included for the seasonal northeast offshore fishery, the fly net fishery, and the pelagic net fishery. The northeast offshore exemption is to be implemented through a readily enforceable permit election system. Most significantly, the Amendment was unanimously adopted by the Atlantic States Marine Fisheries Commission at their 1991 annual meeting (prior to final adoption by the Council). The South Atlantic Council voted to support the final version.

APPENDIX 5. SUPPLEMENTAL HEARING SUMMARIES

30 September 1991, Morehead City, NC

South Atlantic Council member Gerry Schill opened the hearing at approximately 7:10 pm. South Atlantic Council member Dennis Spitsbergen was also present. Also present were Dr. William Hogarth, Rick Monaghan, Mike Street, Linda Mercer, and Harold Johnson (NC Division of Marine Fisheries), Colleen Coogan (NMFS NERO) Jeff Radowski (NMFS NEFC), Jim Baker (NC Sea Grant), and Dave Keifer (Mid-Atlantic Council staff). There were 24 members of the public present.

Dave Keifer reviewed the issues concerning summer flounder and sea turtles.

Dr Hogarth indicated he felt the original conference call solved the summer flounder/turtle problem. He is concerned about emergency action under the Endangered Species Act. He indicated there were certain problems with the data in paragraph 4 of the "Supplemental Measures" paper and submitted revised data (Attachment 1). He said that NMFS Southeast Regional Director Andy Kemmerer had assured him on 30 September that NMFS would take no action regarding TEDs in North Carolina State waters. He stated he was happy with the compromise position, but did not like the new paragraph at the end of the "Supplemental Measures" paper because he does not know what it means. He said that in 1990 North Carolina tried to resolve the problem. The 6" TEDs worked. The fishermen cooperated. He read into the record a letter of 30 September 1990 to Andy Kemmerer setting forth North Carolina's plan for 1991 (Attachment 2). He said the process must be open, that North Carolina will implement and monitor a program, and the fishermen will cooperate.

Melvin Sheppard, South East North Carolina Watermen's Assn., indicated that the National Research Council report to the Secretary of Commerce indicated that fishermen must cooperate for TEDs to work; that more research is needed on TEDs; and that more research is needed on why turtles die.

Rick Monaghan reported that, from the work he had observed, the Jones TED caught no turtles and a 4" TED will lose most flounder.

Gerry Smith, T. B. Smith Seafood, stated that the issue is being raised, not because of turtles, but to reduce the flounder catch. The proposed actions will put fisheries out of business.

Hubert Potter indicated that in the past he was a member of the NMFS Advisory Panel. He operates shrimp boats. He indicated he is in trouble over TED rules in the shrimp fishery. He indicated that 10 years ago when he fished out of Key West there were 600 boats in the fishery, now there are 35.

Jimmy Gilligan, Gilligan Seafood, asked whether turtles die from other than commercial fishing. He stated rules will kill the fishery. He states that TEDs will not work in a summer flounder net.

Montie O'Neil, a commercial fisherman for 32 years, stated you cannot make a living because of the turtles. TEDs will not work.

Ted Smith said that the high number of turtle strandings in 1990 were caused because all of the boats were fishing between Hatteras and Ocracoke; 150 boats rather than the normal 5.

Billy Smith felt that science does not agree with practical experience. There is no proof that turtles are killed by trawlers.

Ted Smith, trawler captain, asked if any experiments had been run in 1991.

The hearing was closed at approximately 8:15 pm.

1 October 1991, Manteo, NC.

South Atlantic Council member Gerry Schill opened the hearing at approximately 7:10 pm. Also present were Dr. William Hogarth, Jeff Ross and Beth Burns (NC Division of Marine Fisheries), Colleen Coogan (NMFS NERO) and Dave Keifer (Mid-Atlantic Council staff). There were 15 members of the public present.

Dave Keifer reviewed the issues concerning summer flounder and sea turtles.

Dr. Hogarth stated he would make the same comments as he made at the 30 September hearing. He stated there had been five changes to the summer flounder/turtle proposal since the issue originally surfaced. He said North Carolina has instituted a successful program in 1990 with 6" bar TEDs, reducing turtle mortality. He cited the differences between NMFS and North Carolina data (Attachment 1). He stated monitoring was possible through aerial surveys and checking water temperatures. The stated that North Carolina could handle the situation. He referred to the State's plan (Attachment 2) , including the use of the State's research vessel and observers. He indicated that a 4" bar TED excluded not only turtles, but flounder, but that a 6" bar TED is fine. He needs to know what is going on. We must use the compromise position and not an Endangered Species Act emergency at this time.

Gerry Schill asked Dr. Hogarth what he thought of the NMFS Draft Biological Opinion. Dr. Hogarth replied that he had not seen it yet.

James Fletcher, United National Fishermen, requested that NMFS and the Councils send him all information on sea turtles, including the Mexican and Japanese studies. He stated that the problem began in 1910. He said that NMFS is responsible for the strandings because NMFS requires that the turtles be returned immediately to the sea. Fishermen should be allowed to maintain the turtles on board until they leave the area; the turtles would have a chance to revive and would not be caught twice. Mexico is responsible for the problem. NMFS must learn at what temperatures turtles swim at and at what depths turtles live. Lights facing turtles when they come to the beach to lay eggs are a problem and should be extinguished during the nesting season from Carolina to Mexico. Pressure should be put on turtle importing nations. TEDs designed for the shrimp fishery will not work in the flounder fishery and will cost lives and increase insurance costs. TEDs can cause problems for stern trawlers. Dogfish will not go through 6" bars and will break the TED on haul back. This is why the commercial fishing industry is going out of business. The government should give tax breaks to make up for the losses caused by TEDs.

Billy Carl Tillet was concerned about the water temperatures versus the presence of turtles. He indicated that temperatures off the Chesapeake on 1 January were 42-46? F.

Moon Tillet asked how fishermen could make a living with the spread of TEDs.

Art Smith, referring to the Figures, asked why the majority of strandings occurred in the summer when there was no trawling. He stated that trawlers are getting blamed for something that might not be true.

Billy Carl Tillet stated there is no evidence that turtle strandings actually occurred in the flounder fishery. If the water is warm enough for turtles, it is too warm for flounder. By early January the turtles are south of Virginia.

The hearing was closed at 8:15 pm.

2 October 1991, Norfolk, VA

Mid-Atlantic Council member Jack Travelstead opened the hearing at approximately 7:00 pm. Also present were Bill Wells (Mid- Atlantic Council), Colleen Coogan (NMFS NERO) and Dave Keifer (Mid-Atlantic Council staff). There were 5 members of the public present.

Dave Keifer reviewed the issues concerning summer flounder and sea turtles.

David Boyd stated that 1990 and 1991 were the best summer flounder year classes in a long time and emergency action on the minimum net mesh regulation was needed to assure they were not destroyed.

Mike Barden suggested the turtle issue was not significant since there were no commercial fishermen present.

Eric Burnley asked about the impact of the turtle issue on the implementation of Amendment 2.

Bill Wells questioned whether the fly net fishery had a turtle problem and questioned the turtle stranding distribution in Figure 3 of the hearing document (Attachment 3).

The hearing was adjourned at 7:23 pm.

N.C. Division Marine
9-30-91

COMMENT ON PARAGRAPH 4 OF "SUPPLEMENTAL MEASURES FOR AMENDMENT 2 TO THE SUMMER FLOUNDER FMP"

This item concerns the strandings of sea turtles in the Cape Hatteras Bight area during late November-December 1990.

The referenced paragraph states that 54 sea turtles were stranded in the area "between 26 November and 7 December 1990" and that "[t]wenty-one additional sea turtles stranded before the end of December. The total mortality included 56 loggerheads, 9 Kemp's ridleys, 6 green turtles, and 4 unidentified sea turtles..." for a total of 75 turtles.

According to data provided to the North Carolina Division of Marine Fisheries (DMF) by the National Marine Fisheries Service (NMFS) on 10 September 1991, the above figures are false. A printout of each individual sea turtle stranding on North Carolina's ocean beaches between 35° and 35°20' N latitude (from slightly south of Ocracoke Inlet to about 5.75 nautical miles north of Cape Hatteras Lighthouse) shows the following information:

	Species				
Time period	Loggerhead	Green	Kemp's	Unknown	Total
11/15-12/7	35	2	7	3	47
12/8-12/31	8	2	1	1	12
Total	43	4	8	4	59

A copy of the printout is attached. Thus, the total number of turtles stranded is wrong, the numbers stranded before and after the DMF closure action are also wrong, and the numbers of each species, except "unknown," are wrong.

The DMF was informed of the strandings by the North Carolina Wildlife Resources Commission, (Mr. Tom Henson) on 5 December 1990 at about 2 p.m. Mr. Henson had been informed of the strandings by the U.S. National Park Service, Cape Hatteras, on that date. Following investigation of the situation during 5-6 December, the DMF issued its proclamation at 11 a.m., 7 December 1990 closing to trawling the area from Cape Hatteras Lighthouse to Ocracoke Inlet, effective at 5 p.m. that date. Elapsed time from notification of the problem to issuance of the closure proclamation was less than 48 hr.

N.C. OFFSHORE STRANDINGS NOV. 15-DEC. 31 1990 9:52 Tuesday, September 19, 199.
BETWEEN 35 DEG. 00 MIN. N AND 35 DEG. 20 MIN. N

OBS	YEAR	MONTH	DAY	LAT	LONG	COUNTY	ZONE	SPECIES	CLOC	CLSL	CWOC	CWSL	SEX	COND	DISP	REL	OBSERVER
1	90	11	28	35136	75321	2	35	CC	.	.	.	.	U	1	2	3	SIR
2	90	11	29	35125	75318	2	35	CC	75.6	.	67.9	.	U	1	2	3	MXL
3	90	11	29	35090	75541	3	35	CC	54.6	.	53.3	.	U	2	1	3	SLR
4	90	11	29	35108	75472	3	35	CC	83.8	.	86.4	.	U	2	1	3	SLR
5	90	11	30	35107	75473	3	35	CC	104.1	.	86.3	.	U	2	.	3	SLR
6	90	11	30	35106	75476	3	35	CC	81.3	.	76.2	.	U	2	1	3	SLR
7	90	11	30	35097	75502	3	35	CC	61.0	.	61.0	.	U	2	1	3	SLR
8	90	11	30	35097	75502	3	35	CC	66.0	.	63.5	.	U	2	1	3	SLR
9	90	11	30	35091	75516	3	35	CC	83.8	.	78.7	.	U	2	1	3	SLR
10	90	11	30	35091	75518	3	35	CC	68.6	.	66.0	.	U	2	1	3	SLR
11	90	11	30	35091	75518	3	35	CC	50.8	.	48.3	.	U	2	1	3	SLR
12	90	12	01	35118	75436	2	35	CC	68.6	.	58.4	.	U	2	1	3	MXR
13	90	12	01	35136	75379	2	35	CC	55.9	.	43.2	.	U	1	1	3	MXR
14	90	12	01	35136	75372	2	35	CC	91.4	.	71.1	.	U	3	2	1	MXR
15	90	12	02	35137	75323	2	35	CC	61.0	.	50.8	.	U	1	1	3	CEW
16	90	12	05	35090	75519	3	35	CC	36.5	.	55.9	.	U	4	2	2	KCB
17	90	12	05	35095	75507	3	35	CC	61.0	.	53.3	.	U	1	2	2	KCB
18	90	12	05	35097	75502	3	35	CC	73.7	.	73.7	.	U	4	2	2	KCB
19	90	12	05	35141	75320	2	35	CC	73.7	.	61.0	.	U	1	1	3	SIR
20	90	12	05	35142	75342	2	35	CC	63.5	.	63.5	.	U	1	1	3	SIR
21	90	12	05	35130	75402	2	35	CC	76.2	.	73.7	.	U	1	1	3	SIR
22	90	12	05	35122	75422	2	35	CC	61.0	.	55.9	.	U	1	1	3	SIR
23	90	12	05	35120	75430	2	35	CC	45.7	.	43.2	.	U	1	1	3	SIR
24	90	12	05	35119	75430	2	35	CC	76.2	.	71.1	.	U	1	1	3	SIR
25	90	12	05	35122	75426	2	35	CC	63.5	.	58.4	.	U	2	1	3	SIR
26	90	12	05	35119	75431	2	35	CC	68.6	.	63.5	.	U	1	1	3	SIR
27	90	12	05	35119	75432	2	35	CC	66.0	.	66.0	.	U	2	1	3	SIR
28	90	12	06	35194	75305	2	35	CC	64.8	.	58.4	.	U	2	1	3	CEW
29	90	12	06	35044	75559	3	35	CC	43.2	.	45.7	.	U	2	2	2	KCB
30	90	12	06	35049	75499	3	35	CC	50.8	.	45.7	.	U	3	2	2	KCB
31	90	12	06	35100	75493	3	35	CC	53.3	.	53.3	.	U	3	2	2	KCB
32	90	12	06	35102	75486	3	35	CC	50.8	.	50.8	.	U	3	2	2	KCB
33	90	12	06	35106	75477	3	35	CC	53.3	.	55.9	.	U	3	2	2	KCB
34	90	12	07	35143	75330	2	35	CC	.	.	.	.	U	1	2	2	CEW
35	90	12	07	35138	75321	2	35	CC	68.6	.	63.5	.	U	3	1	3	CEW
36	90	12	12	35125	75419	2	35	CC	61.0	.	58.4	.	U	2	2	3	SIR
37	90	12	12	35086	75528	3	35	CC	104.1	.	91.4	.	U	2	1	3	WFC
38	90	12	12	35072	75559	3	35	CC	61.0	.	62.2	.	U	2	1	3	WFC
39	90	12	14	35083	75536	3	35	CC	53.3	.	50.8	.	U	2	1	3	KCB
40	90	12	16	35086	75533	3	35	CC	30.5	.	25.4	.	U	2	1	3	KCB
41	90	12	16	35140	75342	2	35	CC	73.7	.	73.7	.	U	2	1	3	MXR
42	90	12	16	35143	75346	2	35	CC	.	.	.	.	U	2	1	3	MXR
43	90	12	19	35120	75430	2	35	CC	40.6	.	35.6	.	U	2	2	3	SIR
44	90	12	01	35122	75427	2	35	CM	27.9	.	22.9	.	U	1	2	3	MXR
45	90	12	05	35122	75424	2	35	CM	66.0	.	61.0	.	U	1	1	3	SIR
46	90	12	15	35052	75591	3	35	CM	48.3	.	43.2	.	U	2	1	2	KCB
47	90	12	15	35087	75528	3	35	CM	61.0	.	53.3	.	U	2	1	2	KCB
48	90	12	01	35135	75319	2	35	LK	27.9	.	25.4	.	U	1	3	2	MXR
49	90	12	01	35134	75391	2	35	LK	33.0	.	27.9	.	U	1	2	3	MXR
50	90	12	02	35137	75322	2	35	LK	36.8	.	35.6	.	U	1	2	3	MXR
51	90	12	05	35184	75306	2	35	LK	30.5	.	27.9	.	U	1	1	3	SIR
52	90	12	05	35138	75322	2	35	LK	50.8	.	50.8	.	U	1	1	3	SIR
53	90	12	05	35138	75375	2	35	LK	33.0	.	33.0	.	U	1	1	3	SIR
54	90	12	05	35128	75407	2	35	LK	71.1	.	68.6	.	U	1	1	3	SIR
55	90	12	06	35138	75372	2	35	LK	33.0	.	33.0	.	U	3	2	2	CEW

N.C. OFFSHORE STRANDINGS NOV. 15-DEC. 31 1990 9:52 Tuesday, September 10, 1991
BETWEEN 35 DEG. 00 MIN. N AND 35 DEG. 20 MIN. N

DBS	YEAR	MONTH	DAY	LAT	LONG	COUNTY	ZONE	SPECIES	CLDC	CLSL	CWDC	CWSL	SEX	COND	DIEP	REL	OBSERVER
56	90	12	05	35143	75348	2	35	UN	81.3	.	81.3	.	U	1	1	3	SIR
57	90	12	05	35142	75350	2	35	UN	58.4	.	53.3	.	U	1	1	3	SIR
58	90	12	05	35143	75342	2	35	UN	50.8	.	48.3	.	U	1	1	3	SIR
59	90	12	16	35093	75492	3	35	UN	30.5	.	35.6	.	U	2	1	3	KCS

Attachment 2

State of North Carolina
Department of Environment, Health, and Natural Resources
Division of Marine Fisheries
P.O. Box 769 • Morehead City, North Carolina 28557-0769

James G. Martin, Governor
William W. Cobey, Jr., Secretary

William T. Hogarth, Di
(919) 72

September 30, 1991

Dr. Andrew J. Kemmerer
Regional Director, NMFS
9450 Koger Blvd.
St. Petersburg, Florida 33702

Dear Dr. ~~Kemmerer~~ Andy:

Attached is a revised version of the North Carolina Cooperative Se Turtle Monitoring and Action Plan to address the turtles that may be preser in the area utilized by summer flounder trawl fishermen. The changes in th Plan were made in accordance with recommendations in your letter of Septembe 24, 1991. You will note that all reference to strandings has been eliminate and an increase in aerial surveillance during the critical period has bee incorporated.

We have serious concerns with the lack of support from the Nationa Marine Fisheries Service (NMFS) for TED's with a 6 inch bar. This gear wa tested in the flounder fishery on the recommendation of NMFS staff from th Pascagoula, Mississippi Laboratory and many North Carolina flounder fisherme have purchased this gear for use in this fishery. We also feel that th certified TED's with the 4-inch bar will exclude flounder along with turtles.

A second concern we have is that North Carolina has been singled out a the only area in which turtle protection rules are being considered. By way this letter we are requesting copies of the Biological Opinion required b Section 7 of the Endangered Species Act (ESA) for both the August 1988 and th most recent Section 7 Consultations which should have addressed turtles trawling and flounder all along the Atlantic Coast.

We are aware the NMFS has certain responsibilities under the ESA fo protecting endangered species, however we feel that North Carolina has shown high degree of responsibility in the past and will continue to do so in th future. Before rules are implemented which will eliminate the North Carolin flounder fishery, considerable communication, cooperation and planning shoul

be undertaken. North Carolina will not implement any restrictions on the summer flounder winter trawl fishery until a satisfactory resolution is reached.

We will be happy to meet with you or any member of NMFS in order to resolve this extremely important issue in an expeditious manner.

Sincerely,

Bill

William T. Hogarth, Ph.D

WTH/bsm

NORTH CAROLINA DIVISION OF MARINE FISHERIES/NATIONAL MARINE FISHERIES SERVICE COOPERATIVE SEA TURTLE MONITORING AND ACTION PLAN

To protect threatened and endangered species of sea turtles in the Atlantic Ocean off North Carolina, the North Carolina Division of Marine Fisheries, (DMF) and National Oceanic and Atmospheric Administration (NOAA) - National Marine Fisheries Service (NMFS) will monitor the activities of the winter trawl fishery for summer flounder. Monitoring activities and fishery management actions will intensify when there is a potential for sea turtles to be present in areas where trawling is occurring. Annually, sea turtles from the mid-Atlantic states and North Carolina inshore areas migrate southward to wintering grounds offshore or south of Cape Lookout. The shelf and nearshore migratory corridor area for sea turtles also supports an active trawl fishery for summer flounder during the fall and winter between Cape Henry, Virginia and Cape Lookout. The goal of this action plan is to provide a framework and operational process to protect sea turtles during their migration southward while concurrently allowing continuation of the traditional flounder fishery in the coastal waters of North Carolina.

An advisory committee composed of representatives from state and federal agencies and fishing interests will be appointed to implement the sea turtle monitoring and action plan. This committee will collect and review data on sea water temperatures, turtle distribution and movements, and fishery activity. Further, they will advise DMF and NMFS Southeast Regional Office (SERO) on recommended actions to protect sea turtles and optimize traditional fishery opportunities. The committee will communicate at least bi-weekly during the critical period.

Monitoring will occur from October 15 through January 15, which is the time that sea turtles migrate southward and the North Carolina trawler fleet fishes for summer flounder in nearshore waters from Oregon Inlet to Ocracoke in depths up to ten fathoms and in deep water from Virginia to Oregon Inlet in depths up to 100 fathoms.

Data on sea surface temperature (SST) derived from thermal infrared satellite imagery is available through the NMFS Southeast Fisheries Science Center Laboratory in Beaufort. Weekly summary plots beginning in mid-September will be used in reviews. Monitoring of daily images will occur for the presence of warm water eddies moving westward from the Gulf Stream into coastal waters. Early identification of conditions which may delay the usual southward or seaward migration of turtles during the fall will prompt monitoring and action measures to protect the turtles. The water temperatures in the area between Oregon Inlet and Cape Lookout will receive particular attention. The data indicate that when water temperatures are above 12°C during this time frame aerial monitoring should be conducted daily, and turtle protection measures should be instituted. (See Attached Table)

Aerial surveys by DMF will be conducted at least twice weekly from 15 October on to monitor the location and number of trawlers working in the area and the presence of sea turtles. The Virginia Institute of Marine Science (VIMS) conducts aerial surveys of the lower Chesapeake Bay and Virginia coastal waters for sea turtles. The DMF observers will be trained in sea turtle aerial survey methodology by NOAA or VIMS personnel. Aerial Survey, water temperature and other available information will be used by the committee to track the north-south movement of sea turtles.

NOAA-NMFS-Beaufort Laboratory data from ongoing aerial survey, public sightings, and cooperating pound net fishermen on abundance, location and species composition will be used to indicate timing and extent of emigration from the inshore areas.

ACTIONS

When it is determined that turtles are present in the trawling area by (a) aerial survey, or (b) onboard agency observers, the DMF Director, in consultation with NMFS, will immediately take appropriate action. Monitoring will intensify to include daily aerial surveys of fleet and turtle locations, observers will be placed aboard selected vessels, satellite imagery will continue to be reviewed and the Stranding Network will be alerted. If turtles are observed in close proximity to trawling activity and/or special conditions warrant it, the Director in consultation with NMFS, will require that trawlers limit their tow times to 60 minutes (bottom time) to be enforced and monitored by observers on selected vessels. The Division's 44-foot research vessel will be dispatched and conduct independent trawling and flounder tagging. If observers continue to encounter turtles in the trawls and if tow times are not being adhered to, the DMF Director will require that turtle excluder devices be installed in flounder trawls. Excluders will have six inch spacing between bars as utilized in December, 1990. As a final measure, the Director will close the area to trawling or take other steps to ensure the safety of the turtles as authorized by North Carolina Marine Fisheries Rule 15A NCAC 3I .0007.

Monitoring during an area/fishery closure will include aerial surveys for turtle locations and trawler violations, examination of satellite thermal imagery, and periodic DMF-monitored experimental trawling with and without TEDs to ground-truth the turtle presence in the area.

When temperature, aerial surveys, and test trawling indicate turtles have dispersed or moved out of the area, the committee will recommend that the Director, in consultation with NMFS, reopen the area to less restricted fishing.

The committee will submit a summary report for the fishing season of conditions and actions taken, if any, to NMFS, SERO Director and the Secretary of the North Carolina Department of Environmental Health and Natural Resources.

Advisory Committee:

NCDMF - Bill Hogarth, Fentress Munden, David Taylor, Wayne Maxwell, Harrel Johnson, Mike Street
NMFS - Ford Cross/John Merriner, Joanne Braun, Sherry E. Chester, Pat Tester
NPS - Ries Collier
NCWRC - Tom Henson
INDUSTRY - Jerry Schill

TABLE - Weekly winter water temperatures 1979-80 through 1990-91 and total ocean turtle strandings from Carteret County northward.

Season	Average water temperature	No. strandings
1979-80	10.6°C	4
1980-81	11.2°C	26
1981-82	11.6°C	26
1982-83	14.9°C	163
1983-84	13.2°C	35
1984-85	13.0°C	37
1985-86	14.0°C	109
1986-87	14.0°C	57
1987-88	13.4°C	27
1988-89	13.6°C	62
1989-90	13.6°C	34
1990-91	15.6°C	83*

*does not include strandings data from January and February, 1991

r=0.734
p=0.005

Supplemental Measures for Amendment 2 to the Summer Flounder FMP

The Amendment was prepared by the Mid-Atlantic Fishery Management Council in consultation with the National Marine Fisheries Service, New England Fishery Management Council, South Atlantic Fishery Management Council, and the Atlantic States Marine Fisheries Commission, under the authority of and pursuant to Title III, section 303 of the Magnuson Fishery Conservation and Management Act of 1976.

Section 7 of the Endangered Species Act requires that every federal agency consult with the National Marine Fisheries Service (NMFS) regarding any action that may affect endangered or threatened marine species. Consultation regarding activities permitted under the Summer Flounder Fishery Management Plan (FMP) was recently reinitiated and the resulting Draft Biological Opinion concluded that the continued unrestricted operation of the summer flounder fishery in waters off North Carolina and southern Virginia would jeopardize the continued existence of the endangered Kemp's ridley sea turtle population. Reasonable and prudent alternatives were given to allow activities conducted under the Summer Flounder FMP to continue in a manner consistent with the Endangered Species Act. Alternatives included observer requirements and mandatory limited tow times or use of Turtle Excluder Devices (TEDs) in waters off North Carolina and southern Virginia from 1 October through 15 January of each year.

In 1988, a Section 7 consultation regarding the implementation of the Summer Flounder FMP was conducted. The resultant Biological Opinion, issued on 2 August 1988, concluded that threatened and endangered sea turtles were taken in the summer flounder trawl fishery off North Carolina and southern Virginia in some years, but that the continued existence of turtle populations was not jeopardized by fishing activities.

Between 26 November and 7 December 1990, 54 sea turtles, including at least 8 endangered Kemp's ridleys, stranded on North Carolina beaches. The North Carolina Division of Marine Fisheries closed State waters to summer flounder bottom trawling from Cape Hatteras Light to Ocracoke Inlet on 7 December 1990. Twenty one additional sea turtles stranded before the end of December. The total mortality included 56 loggerheads, 9 Kemp's ridleys, 6 green turtles, and 4 unidentified sea turtles. During the closure period, in conjunction with the NMFS Pascagoula Laboratory, a Turtle Excluder Device (TED) was developed for use on summer flounder bottom trawlers. Experimental tows conducted during this time indicated that about 0.14 sea turtles were taken per hour for each net towed off Ocracoke in December, 1990 (Table 1). On 26 December 1990, waters were opened to trawlers pulling TEDs until early January, at which time turtles were no longer encountered in North Carolina waters and fishing without TEDs was allowed.

Because of the above information, consultation under Section 7 of the Endangered Species Act was reinitiated. Evaluation of the sea turtle and fishery distribution data (Figures 1 and 2), trawl data collected off North Carolina in November and December, 1990, (Table 1) and stranding data (Figure 3), indicated that the conflict between sea turtles and the fishery occurs annually in the winter summer flounder fishery in North Carolina. The Draft Biological Opinion resulting from the reinitiated consultation concluded that continued unrestricted operation of this fishery would jeopardize the endangered Kemp's ridley sea turtle population. Implementation of the reasonable and prudent alternatives discussed above is necessary to allow activities conducted under the Summer Flounder FMP to continue in compliance with the Endangered Species Act.

The Council was advised of this situation on 22 August 1991, after the first set of hearings on Amendment 2 had been completed. The Council authorized additional hearings in Virginia and North Carolina so fishermen that could be impacted by the additional measures would have an opportunity to comment. The specific measure included in the notice for these hearings was developed by the Council staff following a conference call involving National Marine Fisheries Service Headquarters, Northeast Region, and Southeast Region staffs, the North Carolina Division of Marine Fisheries, and the Council staff, and was considered a workable solution to the problem by the NMFS, North Carolina, and Council personnel. That measure reads as follows:

> The Regional Director, Northeast Region, NMFS (Regional Director) is authorized to monitor sea turtles in the Exclusive Economic Zone from the mouth of the Chesapeake Bay to the southern border of North Carolina, through aerial surveys and sea sampling, in concert with similar efforts by the State of North Carolina, and to institute measures in this area within 10 miles (16.1 kilometers) of the shore to minimize

the take of sea turtles in the summer flounder fishery between 15 October and 15 January, compatible with such measures instituted by North Carolina. If measures are considered necessary and North Carolina has not acted appropriately, the Regional Director may limit tow times to 60 minutes or close the area to trawlers that do not use nets equipped with turtle excluder devices with bars spaced no greater than 6" (15.2 centimeters) apart, or other devices that may be authorized by the Regional Director.

On 20 September the Council was notified by NMFS personnel that regulations would be issued under the Endangered Species Act to protect sea turtles during the winter trawl summer flounder fishery off North Carolina and southern Virginia. The above wording, and resulting Magnuson Act regulations, would not be necessary. The following language is to be included in Amendment 2 instead:

> To be consistent with the Biological Opinion issued for this FMP, fishermen conducting activities regulated under this management plan must comply with any regulations published by NMFS implementing sea turtle conservation measures including mandatory limited tow times, observer coverage, and the use of Turtle Excluder Devices in bottom trawls participating in the winter fishery for summer flounder in waters from Cape Charles, Virginia, to the southern border of North Carolina.

The Council is seeking comments on the above. It is also seeking comments on possible methods of implementing the maximum tow time provision without the use of observers and on other methods of complying with the Endangered Species Act relative to the summer flounder fishery.

Written comments will be accepted until 10 October 1991. For further information contact: John C. Bryson, Executive Director, Mid-Atlantic Fishery Management Council, Room 2115 Federal Building, 300 South New Street, Dover, Delaware 19901 (302-674-2331).

Table 1. Results of Experimental Trawls Conducted off North Carolina

Date	Number of Nets	Type of Net (ft)	No. of Tows	Tow Times (min)	Total Time for Day (hours)	Turtles /Day
12/11/90	2	70' standard	6	90	18	2 Lk
12/17/90	1	72' standard	3	30		None
	1	72' standard	3	60		1 Cc
	1	72' standard	6	90	13.5	1 Cc, 1 Lk
	1	72' w/Jones TED	3	30		None
	1	72' w/Jones TED	3	60		None
	1	72' w/TED w/funnel	6	90	13.5	None
12/19/90	1	72' standard	3	60		None
	1	72' standard	1	45		None
	1	72' standard	3	90	8.25	1 Cc
12/19/90	1	72' w/super shooter	3	60		None
	1	72' w/super shooter	1	45		None
	1	72' w/super shooter	3	90	8.25	1 Lk
12/29/90	1	50' standard	3	70	3.5	1 Cc
01/10/91	1	78' standard	4	90	6	None

Note: Lk = *Lepidochelys kempi* (Kemp's ridley turtle), Cc = *Caretta caretta* (logggerhead turtle).

Source: North Carolina Division of Marine Fisheries, unpublished data.

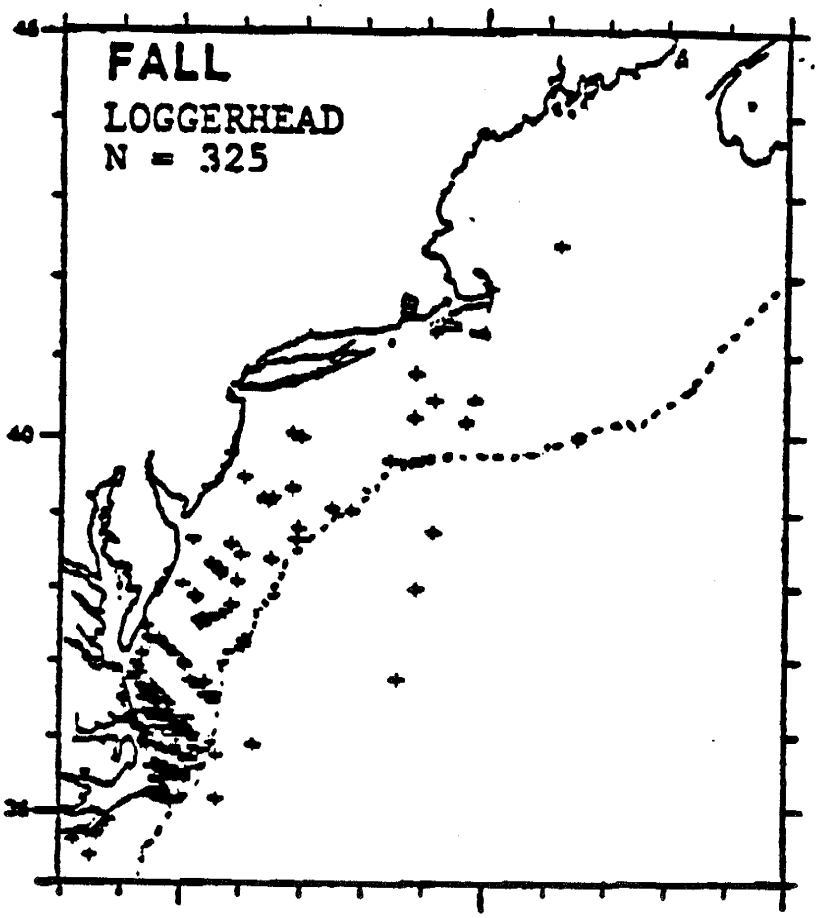
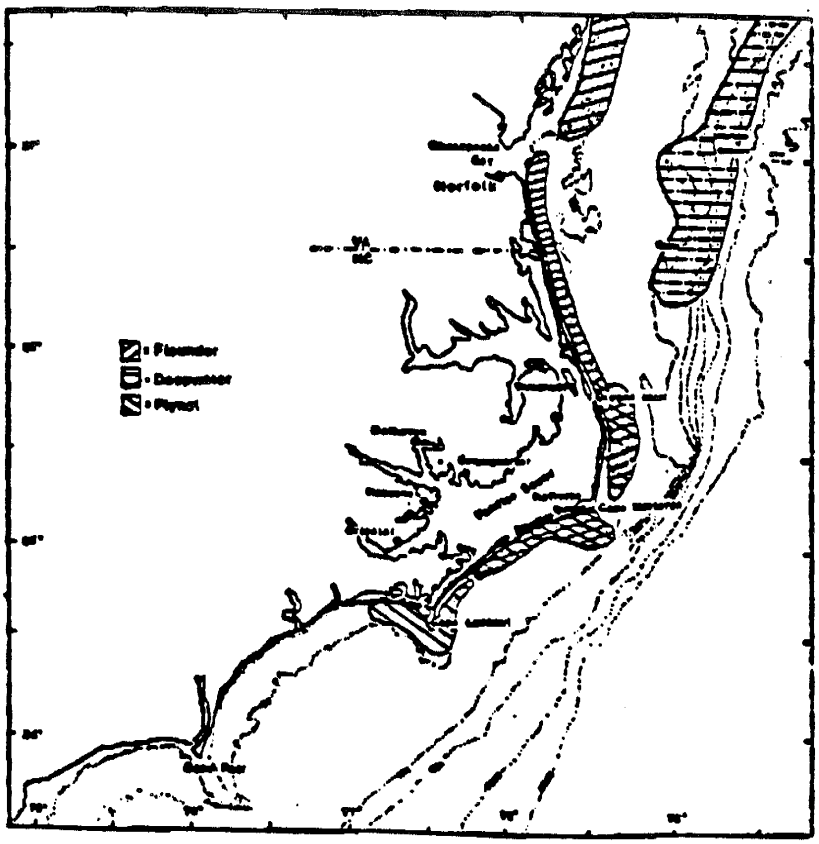
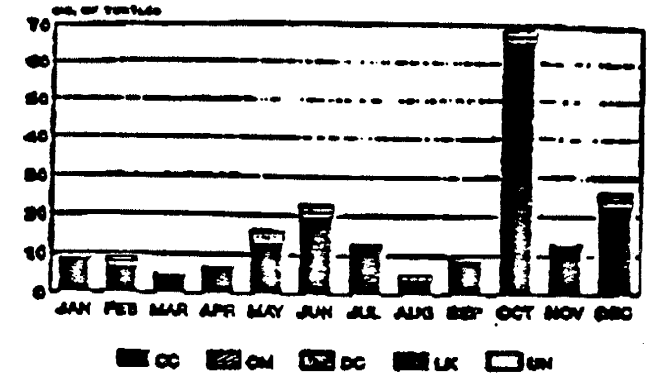


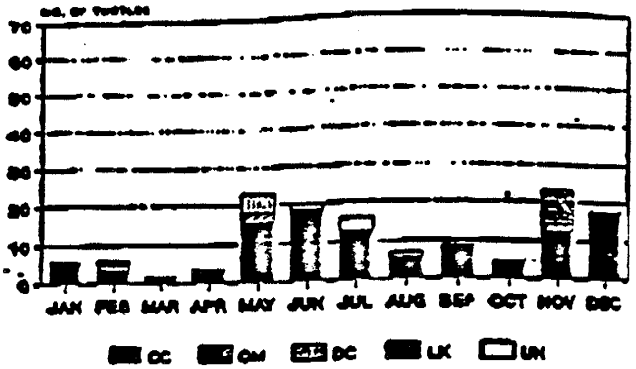
FIGURE 1: Fall (Sept.22-Dec.21) distribution of loggerhead sea turtles. From CeTAP, 1982.

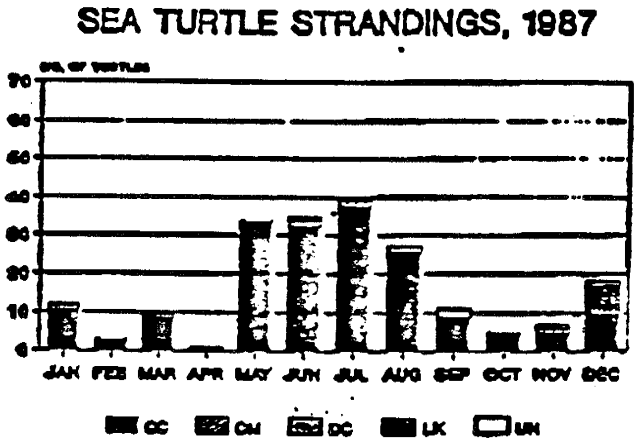
FIGURE 2: Fishing grounds of North Carolina winter (Oct.-Jan.) trawl fishery. From Ross, 1981.

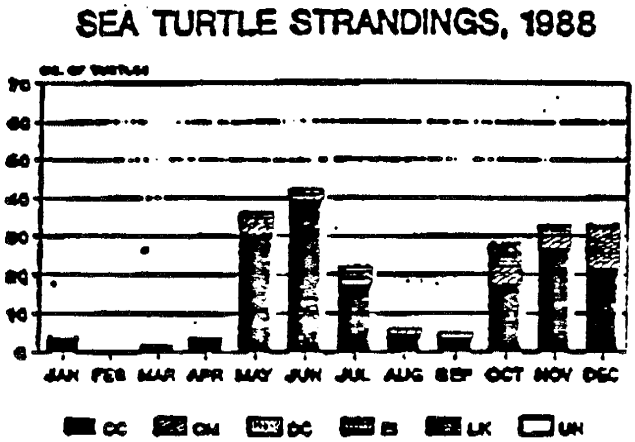


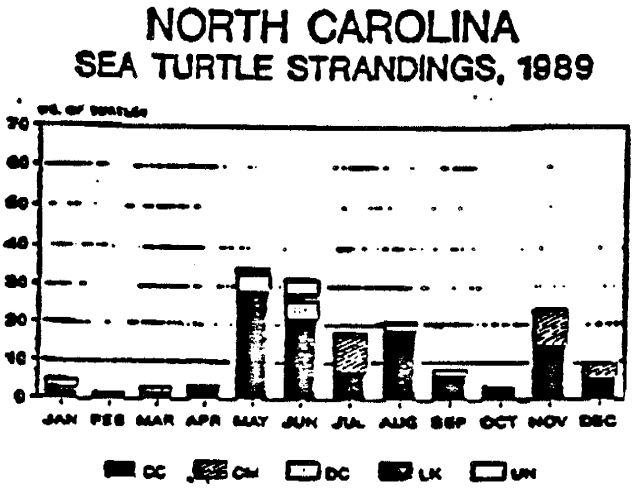
URE 3: From NMFS, SEFC. STSSN Database

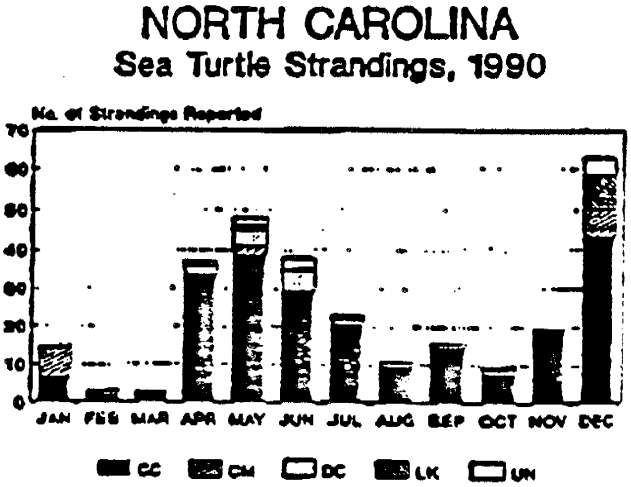












CC=Caretta caretta CM=Chelonia mydas DC=Dermochelys coriacea EI=Eretmochelys imbricata LK=Lepidochelys kempi UN=Unidentified

APPENDIX 6. RESPONSES TO COMMENTS ON AMENDMENT 2 TO SUMMER FLOUNDER FMP SEA TURTLE SUPPLEMENTARY REVIEW

Questionnaires were distributed at the three hearings soliciting comments on the proposed measures and the alternative. Persons were encouraged to fill them out and hand them in or take them home and mail them in. None were handed in or mailed in.

Two comment letters were received by the Council.

The Center for Marine Conservation agreed with the need to implement measures to reduce sea turtle mortality in the summer flounder fishery, suggested 60 minute tow times with observers, and stated a preference for TEDs, which, they stated, would eliminate the need for observers, reduce stress on turtles, and may reduce other bycatch in the fishery.

Mr. Billy Carl Tillett (Wanchese, NC) wrote that I believes the high turtle mortality rate in the fall and winter of 1990 near Hatteras was caused by high water temperatures, which caused the turtles to be mixed with southern flounder. He believes that the water temperatures were too high for summer flounder. He is also concerned that TEDs might get filled with dogfish, damaging the TED and net.

APPENDIX 7. REGULATIONS

Subpart A - General Provisions

§625.1 Purpose and scope.
§625.2 Definitions.
§625.3 Relation to other laws.
§625.4 Vessel permits.
§625.5 Dealer permit.
§625.6 Recordkeeping and reporting requirements.
§625.7 Vessel identification.
§625.8 Prohibitions.
§625.9 Facilitation of enforcement.
§625.10 Penalties.

Subpart B - Management Measures

§625.20 Catch quotas and other restrictions.
§625.21 Closure.
§625.22 Time restrictions.
§625.23 Minimum size.
§625.24 Gear restrictions.
§625.25 Possession limit.
§625.26 Sea sampler program.
§625.27 Sea turtle conservation.

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

Subpart A - General Provisions

§625.1 Purpose and scope.

The regulations in this part implement the Fishery Management Plan for the Summer Flounder Fishery (FMP), which was prepared and adopted by the Mid-Atlantic Fishery Management Council in cooperation with the Atlantic States Marine Fisheries Commission and the New England and South Atlantic Fishery Management Councils. These regulations govern the conservation and management of summer flounder.

§625.2 Definitions. In addition to the definitions in the Magnuson Act and in §620.2 of this chapter, the terms used in this part have the following meanings:

Being rerigged means physical alteration of the vessel or its gear had begun to transform the vessel into one capable of fishing commercially for summer flounder.

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

Commission means the Atlantic States Marine Fisheries Commission.

Council means the Mid-Atlantic Fishery Management Council.

Dealer means any person who receives summer flounder for a commercial purpose from the owner or operator of a vessel issued a moratorium permit under §625.4 other than solely for

transport on land.

Fishery Management Plan (FMP) means the Fishery Management Plan for the Summer Flounder Fishery and any amendments thereto.

Fishing commercially means retaining summer flounder in excess of the possession limit specified in section 625.25.

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.

Regional Director means the Director, Northeast Region, NMFS, 1 Blackburn Drive, Gloucester, MA 01930, telephone 508- 281-9243, or a designee.

Reporting week means a period of time beginning at 0001 local time on Sunday and ending at 2400 hours local time the following Saturday.

Substantially similar harvesting capacity means the same or less Gross Registered Tonnage (GRT) and vessel registered length.

Summer flounder means the species *Paralichthys dentatus.*

Summer Flounder Monitoring Committee means a committee made up of staff representatives of the Mid-Atlantic, New England, and South Atlantic Fishery Management Councils, the Northeast Regional Office of NMFS, the Northeast Fisheries Science Center, the Southeast Fisheries Science Center, and Commission representatives. The Council Executive Director or his designee chairs the Committee.

Total length (TL) means the distance from the tip of the snout to the tip of the tail (caudal fin) while the fish is lying on its side normally extended.

Under construction means that the keel has been laid.

Vessel registered length means that registered length specified on U.S. Coast Guard documentation or State registration if the State registered length is verified by a NMFS authorized official.

§625.3 Relation to other laws.

(a) The relation of this part to other laws is set forth in §620.3 of this chapter and paragraph (b) of this section.

(b) Additional regulations governing fishing for summer flounder by foreign vessels in the EEZ are set forth in 50 CFR Part 611, Subparts A and C.

§625.4 Vessel permits.

(a) *General*

(1) *Requirement.* Subject to the eligibility requirements specified in paragraphs (b) and (c) of this section, the owner of a vessel of the United States, including a party or charter vessel,

must obtain a permit issued under this part to fish for and retain summer flounder in the EEZ.

(2) *Exemption.* Any vessel other than a party or charter, boat that observes the possession limit in §625.25 is exempt from the permit requirement.

(3) *Condition.* Vessel owners who apply for a fishing vessel permit under this section must agree as a condition of the permit that the vessel's fishing, catch and pertinent gear (without regard to whether such fishing occurs in the EEZ or landward of the EEZ, and without regard to where such fish or gear are possessed, taken or landed) will be subject to all requirements of this part. All such fishing, catch and gear will remain subject to all applicable State requirements. If a requirement of this part and a management measure required by state law differ, any vessel owner permitted to fish in the EEZ must comply with the more restrictive requirement. Owners and operators of vessels fishing under the terms of a moratorium permit issued pursuant to paragraph (b) of this section must also agree, as a condition of the permit, not to land summer flounder in any State that the Regional director has determined no longer has commercial quota available.

(b) *Moratorium permit.* (effective through 1997)

A vessel is eligible to receive a permit to fish for and retain summer flounder in excess of the possession limit in section 625.25 in the EEZ if it meets the conditions for paragraphs (e) and (f) of this section and any of the following criteria:

(i) The vessel landed and sold summer flounder between January 26, 1985, and January 26, 1990; or

(ii) The vessel was under construction for, or was being rerigged for, use in the directed fishery for summer flounder on January 26, 1990, provided the vessel landed summer flounder for sale prior to November 30, 1992; or

(iii) The vessel is replacing a vessel of substantially similar harvesting capacity which involuntarily left the summer flounder fishery during the moratorium, and both the entering and replaced vessels are owned by the same person. Vessel permits issued to vessels that involuntarily leave the fishery may not be combined to create larger replacement vessels.

(iv) Vessels that are judged unseaworthy by the Coast Guard for reasons other than lack of maintenance may be replaced by a vessel of substantially similar harvesting capacity.

(v) If there is no further amendment of this section, the above restrictions on eligibility to apply for and receive a moratorium permit expire after 1997.

(2) *Restriction.* No one may apply for the permit specified in paragraph (b)(1) of this section more than 12 months after November 30, 1992, or the events specified under paragraphs (h)(1) and (2) of this section. This section does not affect annual permit renewals.

(c) *Party and charter boat permit.* Any party or charter boat is eligible for a permit to fish, other than a moratorium permit, if it is carrying passengers for hire, and is then subject to the possession limits specified in §625.25.

(d) *Permit application.*

(1) An application for a permit under this section must be submitted and signed by the owner of the vessel on an appropriate form obtained from the Regional Director at least 30 days prior to the date on which the applicant desires to have the permit made effective. The Regional Director will notify the applicant of any deficiency in the application pursuant to paragraphs (d)(2), (e) and (f)(2) of this section. Applicants for moratorium permits shall provide information with the application sufficient for the Regional Director to determine if the vessel meets the eligibility requirements. Dealer weighout forms signed by the dealer and notarized statements from marine architects or surveyors or shipyard officials will be considered acceptable forms of proof.

(2) *Permit information*. An Applicant must provide all the following information:

(i) The name, mailing address including ZIP code, and telephone number of the owner of the vessel (if owner is a corporation a copy of the certificate of incorporation must be attached to the application);

(ii) The name of the vessel;

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

(iv) Home port (city and State), and registered length of the vessel;

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

(vi) Type of construction and type of propulsion;

(vii) Permit number of any current or, if expired, previous Federal fishery permit issued to the vessel;

(viii) Approximate fish hold capacity of the vessel (to the nearest 100 lbs or 45.4 kg);

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

(x) Average number of crew members, including the captain, which may be stated in terms of a normal range;

(xi) Permit category;

(xii) Copy of charter/party boat license and number of passengers the vessel is licensed to carry (charter and party boats); and

(xiii) Any other information required by the Regional director to manage the summer flounder fishery.

(xiv) Certificate of incorporation, if applicable.

(3) *Change in permit information*. Any change in the information specified in paragraph (d)(2) of this section must be submitted by the applicant in writing to the Regional Director within 15 days of the change.

(e) *Fees*. The Regional Director may charge a fee to recover administrative expenses of

issuing a permit required under paragraphs (b) and (c) of this section. The amount of the fee is calculated in accordance with the procedures of the NOAA Finance Handbook for determining administrative costs of each special product or service. The fee may not exceed such costs and is specified with each application form. The appropriate fee must accompany each application; if it does not, the application will be considered incomplete for purposes of paragraph (f) of this section.

(f) *Issuance.*

(1) The Regional director will issue a permit under this section at any time during the fishing year to an applicant if:

(i) The application is complete as described in paragraph (d)(2) of this section; and

(ii) The applicant has complied with all applicable reporting requirements of section 625.6 during the 12 months immediately preceding the application.

(2) Upon receipt of an incomplete application, or an application from a person who has not complied with all applicable reporting requirements of §625.6 during the 12 months immediately preceding the application, the Regional Director will notify the applicant of the deficiency. If the applicant fails to correct the deficiency within 30 days of the Regional Director's notification, the application will be considered abandoned.

(g) *Appeal of denial of permit.*

(1) Any applicant denied a moratorium permit may appeal to the Regional Director within 30 days of the notice of denial. Any such appeal shall be in writing. The only ground for appeal is that the Regional Director erred in concluding that the vessel did not meet the criteria in paragraph (b)(1) of this section. The appeal shall set forth the basis for the applicant's belief that the Regional Director erred in his decision.

(2) The appeal may be presented, at the option of the applicant, at a hearing before an officer appointed by the Regional Director.

(3) The decision on the appeal by the Regional Director is the final decision of the Department of Commerce.

(h) *Expiration.* Except as provided in paragraph (b)(1)(iii) of this section, a permit expires:

(1) When the owner retires the vessel from the fishery;

(2) When the vessel fails to land any summer flounder at least once within any 52 consecutive week period; or

(3) On December 31 of each year; or

(4) When the ownership of the vessel changes; however, the Regional Director may authorize the continuation of a moratorium permit for the summer flounder fishery if the new owner requests. Applications for continuation of a permit must be addressed to the Regional Director.

(i) *Duration.* A permit will continue in effect until December 31 of each year unless it is revoked, suspended, or modified under 15 CFR Part 904, or otherwise expires or the applicant has failed to report any change in the information on the permit application to the Regional Director.

(j) *Alteration.* No person may alter, erase, or mutilate any permit. Any permit which has been altered, erased, mutilated is invalid.

(k) *Replacement.* Replacement permits may be issued by the Regional Director when requested in writing by the owner, stating the need for replacement, the name of the vessel, and the fishing permit number assigned. An application for a replacement permit will not be considered a new application. The fee for a replacement permit shall be the same as for an initial permit.

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

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

(n) *Suspension and revocation.* Subpart D of 15 CFR Part 904 (Civil Procedures) governs the imposition of enforcement-related sanctions against a permit issued under this part.

(o) *Exemption permits.* Owners of vessels seeking an exemption from the minimum mesh requirement under the provisions of §625.24(a)(1)(i) must apply to the Regional Director under paragraph (d) of this section at least seven days prior to the date they wish the permit to become effective. The applicant shall mark "Exemption Permit Request" on the permit application at the top. A permit issued under this paragraph does not meet the requirements of paragraph (a) of this section but is subject to the other provisions of this section. Persons issued an exemption permit must surrender it to the Regional Director at least one day prior to the date they wish to fish not subject to the exemption. The Regional Director may impose temporary additional procedural requirements by publication of a notice in the FEDERAL REGISTER.

§625.5 Dealer permit.

(a) *General.* Any dealer must have a permit issued under this section.

(b) *Permit application.*

(1) An application must apply for a dealer permit on a form provided by the Regional Director. The application must be signed by the applicant and submitted to the Regional Director at least 30 days before the date upon which the applicant desires to have the permit made effective. Applications must contain the name, principal place of business, mailing address and telephone number of the applicant. The Regional Director will notify the applicant of any deficiency in the application pursuant to paragraph (b)(3)(ii) of this section.

(2) *Change in permit information.* Any change in the information specified in paragraph (b)(1) of this section must be submitted by the applicant in writing to the Regional Director within 15 days of the change.

(3) *Issuance.*

(i) The Regional Director will issue a permit at any time during the fishing year to an applicant if:

(A) The application is complete; and

(B) The applicant has complied with all applicable reporting requirements of this section and §625.6(a) during the 12 months immediately preceding the application.

(ii) Upon receipt of an incomplete application, or an application from a person who has not complied with all applicable reporting requirements of paragraph (b)(1) this section and §625.6(a) during the 12 months immediately preceding the application, the Regional Director will notify the applicant of the deficiency. If the applicant fails to correct the deficiency within 30 days of the Regional Director's notification, the application will be considered abandoned.

(4) *Expiration*. A permit expires on December 31 of each year or if the ownership or the business changes.

(5) *Duration*. Any permit issued under this section remains valid until it is revoked, suspended or modified under 15 CFR part 904, or otherwise expires, or ownership changes, or the applicant has failed to report any change in the information on the permit application to the Regional Director.

(6) *Alteration*. Any permit which is altered, erased, or mutilated is invalid.

(7) *Replacement*. The Regional Director may issue replacement permits for lost permits. Any application for a replacement permit shall not be considered a new permit.

(8) *Transfer*. A permit is not transferable or assignable. It is valid only for the person to whom it is issued.

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

(10) *Suspension and revocation*. The Administrator may suspend, revoke, or modify, any permit issued or sought under this section. Procedures governing permit enforcement-related sanctions or denials are found at Subpart D of 15 CFR Part 904.

(11) *Fees*. The Regional Director may charge a fee to recover administrative expenses of issuing a permit required under paragraph (b) of this section. The amount of the fee is calculated in accordance with the procedures of the NOAA Finance Handbook for determining administrative costs of each special product or service. The fee may not exceed such costs and is specified with each application form. The appropriate fee must accompany each application; if it does not, the application will be considered incomplete for purposes of paragraph (b)(3) of this section.

§625.6 Recordkeeping and reporting requirements.

(a) *Dealers*.

(1) *Weekly report*. Dealers shall provide at least the following information to the Regional Director, or official designee, on a weekly basis on forms supplied by or approved by the Regional Director. Reports must be postmarked within 3 days after the end of each reporting week. Each

dealer will be sent forms and instructions, including the address to which to submit reports, shortly after receipt of a dealer permit. The following information is required:

(i) Name and mailing address of dealer;

(ii) Name and permit number of the vessels from which summer flounder are landed or received;

(iii) Dates of purchases;

(iv) Pounds of summer flounder purchased;

(v) Price per pound;

(vi) Pounds purchased of all other species landed by the vessel landing summer flounder;

(vii) Port landed; and

(viii) Any additional information the Regional Director determines is necessary for the orderly management of the summer flounder resource.

(2) *Annual report*. All persons required to submit reports under paragraph (a)(1) are required to complete the "Employment Data" section of the Annual Processed Products Reports; the other information on the form is voluntary. Reports shall be submitted to: NMFS Statistics, 166 Water St., Woods Hole, MA 02543, and must be postmarked by February 10 of the following year.

(e) *Inspection*. The dealer shall make the log reports available immediately upon request for inspection by an authorized officer, or by an employee of the NMFS designated by the Regional Director to make such inspections.

(4) *Record retention*. For one year after the date of the last entry in the log, the dealer shall retain each logbook at the owner's principal place of business.

(5) *At-sea activities*. All persons purchasing, receiving, or processing any summer flounder at sea for landing at any port of the United States must submit information identical to that required by paragraphs (a)(1) and (2) of this section and provide those reports to the Regional Director or designee on the same frequency basis.

(b) *Vessel owners issued a moratorium permit* .

(1) *Fishing log*. The owners of a vessel issued a moratorium permit that is not fishing as a vessel for hire, shall maintain, on board the vessel, an accurate fishing log for each fishing trip, on forms supplied by, or approved by, the Regional Director, showing at least:

(i) Vessel name;

(ii) Vessel permit number;

(iii) Dated sailed;

(iv) Date landed;

(v) Port landed;

(vi) Gear fished;

(vii) Size/quantity of gear;

(viii) Mesh size (codend);

(ix) Area fished;

(x) Depth range fished;

(xi) Number of tows or sets;

(xii) Days fished;

(xiii) Average tow/time set;

(xiv) Loran coordinates;

(xv) Pounds kept by species;

(xvi) Pounds discarded by species;

(xvii) Number of crew

(xviii) Date sold;

(xix) Dealer name;

(xx) Dealer permit number;

(xxi) Any other information required by the Regional Director.

(2) *When to fill in the fishing log.* Vessel owners shall ensure that such logbooks are filled in, except for information such as required by paragraphs (b)(1)(xviii), (xix), (xx) that is not yet known, before offloading has begun at the end of a fishing trip. All logbook information required in paragraph (b)(1) of this section must be filled in for each fishing trip before starting the next fishing trip.

(3) *Inspection.* The owner or operator shall, immediately upon request, make the logbook currently in use available for inspection by an authorized officer, or by an employee of NMFS designated by the Regional Director to make such inspections, at any time during or after a trip.

(4) *Record retention.* For one year after the date of the last entry in the completed log, the owner shall retain a copy of each logbook and make them available upon request by an authorized officer.

(5) *Fishing log reports.* The owner shall submit fishing log reports to the Regional Director

or an official designee, on forms supplied by, or approved by, the Regional Director postmarked within 15 days of the last calendar day of the month during which the trip is landed. Each owner will be sent forms and instructions, including the address to which to submit reports, shortly after receipt of a fishing permit. If no fishing trip is made or summer flounder were landed during a month, a fishing log report so stating must be submitted and postmarked by the 15th of the following month.

(c) *Owners of party and charter boats.*

(1) *Fishing log.* The owner of any party or charter boat issued a permit under §625.4 and carrying passengers for hire shall maintain, on board the vessel, an accurate fishing log for each charter of party fishing trip, on forms supplied by or approved by the Regional Director, showing at least:

(i) Vessel name;

(ii) Vessel permit number;

(iii) Date sailed;

(iv) Date landed;

(v) Port landed;

(vi) Gear fished;

(vii) Size/quantity of gear;

(viii) Area fished;

(ix) Depth range fished;

(x) Daysfished;

(xi) Number and pounds kept by speices;

(xii) Numberand pounds discarded by species;

(xiii) Number of crew;

(xiv) Number of anglers;

(xv) Any other information required by the regional director.

(2) *When to fill in the fishing log.* Vessel owners shall ensure that all logbook information required in paragraph (c)(1) of this section is filled in for each fishing trip by the end of each fishing trip.

(3) *Inspection.* The owner or operator shall, immediately upon request, make the logbook currently in use available for inspection by an authorized officer, or by an employee of NMFS designated by the Regional Director to make such inspections, at any time during or after a trip.

(4) *Record retention.* For one year after the date of the last entry in the completed log, the owner shall retain a copy of each logbook and make them available upon request by an authrrorized officer.

(5) *Fishing log reports.* The owner shall submit fishing log reports to the Regional Director or an official designee on forms supplied, or approved by, the Regional Director postmarked within 15 days of the last calendar day of the month during which the trip is landed. Each owner will be sent forms and instructions, including the address to which to submit reports, shortly after receipt of a fishing permit. If no fishing trip were made or summer flounder were landed during a month, a fishing log report so stating must be submitted and postmarked by the 15th of the following month.

§625.7 Vessel identification.

(a) *Vessel name.* Each fishing vessel subject to this Part and over 25 feet (7.6 m) in registered length must affix permanently its name on the port and starboard sides of the bow and, as possible, on its stern.

(b) *Official number.* Each fishing vessel subject to this Part and over 25 feet (7.6 m) in registered length shall display its official number on the port and starboard sides of the deckhouse or hull, and on an appropriate weather deck so as to be clearly visible from enforcement vessels and aircraft.

(c) *Numerals.* Except as provided in paragraph (e) of this section, the official number must be displayed in block arabic numerals in contrasting color at least 18 inches (45.7 cm) in height for fishing vessels over 65 feet (19.8 m) in registered length, and at least 10 inches (25.4 cm) in height for all other vessels over 25 feet (7.6 m) in registered length. The registered length of a vessel, for purposes of this section, is that registered length set forth in US Coast Guard or State records.

(d) *Duties of owner.* The vessel owner shall insure that each vessel subject to this part will:

(1) Keep the vessel's name and official number clearly legible and in good repair, and

(2) Ensure that no part of the vessel, its rigging, its fishing gear, or any other object obstructs the view of the official number from any enforcement vessel or aircraft.

(e) *Nonpermanent marking.* Vessels carrying recreational fishing parties on a per capita basis or by charter must use markings that meet the above requirements, except for the requirement that they be affixed permanently to the vessel. The nonpermanent markings must be displayed in conformity with the above requirements when the vessel is fishing for summer flounder.

§625.8 Prohibitions.

(a) In addition to the general prohibitions specified in §620.7 of this chapter, it is unlawful for any person owning or operating a vessel issued a permit (including a moratorium permit) under §625.4 to do any of the following:

(1) Land or possess at sea any summer flounder, or parts thereof, that fail to meet the

minimum fish size specified in §625.23;

(2) Fail to affix and maintain markings as required by §625.6;

(3) Possess 100 or more pounds (45.4 kg) of summer flounder between 1 May and 31 October or 200 lbs (90.7 kg) or more of summer flounder between 1 November and 30 April of summer flounder, unless the vessel meets the minimum mesh requirement specified in §625.24,(a) or is fishing in the exempted area with an exemption permit as specified in §625.24(b)(1), or holds an exemption permit and is in transit from the exemption area with the nets properly stowed as specified in §625.24(b)(1)(ii), or is fishing with exempted gear specified in §625.24(b)(2);

(4) Possess summer flounder in other than a box specified in §625.25(d) if fishing with nets; having mesh that does not meet the minimum mesh-size requirement specified in §625.24(a), unless the vessel is fishing pursuant to the exemptions specified in §625.24(b).

(5) Land summer flounder for sale, in a State after the effective date published in the FEDERAL REGISTER notifying permit holders that commercial quota is no longer available in that State.

(6) Possess nets or netting on board with mesh that does not meet the requirements of §625.24, or nets that are modified or otherwise obstructed, if subject to the minimum mesh-size requirement specified in §625.24, except pieces of netting no larger that 3 square feet (0.9 m square) that may be necessary to repair smaller mesh sections of the net forward of the terminal portion of the net to which the minimum mesh-size requirement applies may be carried on board;

(7) Possess nets or netting on board with mesh that does not meet the requirements of §625.24(a), or nets that are modified or obstructed if fishing with an exempted net described in §625.24(b), except pieces of netting may be carried on board if they are no larger than 3 feet square (0.9 m square);

(8) Fish west or south, as appropriate, of the line specified in §625.24 (b)(1) if exempted from the minimum mesh requirement specified in §625.24 by an exemption permit issued under §625.4;

(9) Sell or transfer to another person for a commercial purpose, other than transport, any summer flounder, unless the transferee has a dealer permit issued under §625.5;

(10) Carry passengers for hire, or carry more than three crew members for a charter boat or five crew members for a party boat, while fishing commercially pursuant to a moratorium permit issued pursuant to §625.4; or

(11) Refuse to embark a sea sampler if requested by the Regional Director.

(b) It is unlawful for the owner or operator of a party or charter boat issued a permit (including a moratorium permit) pursuant to §625.4, when the boat is carrying passengers for hire or carrying more than three crew members if a charter boat or more than five members if a party boat, to:

(1) Possess summer flounder in excess of the possession limit established pursuant to §625.25;

(2) Possess summer flounder smaller than the minimum size limit for recreational fishermen established pursuant to §625.23(b);

(3) Fish for summer flounder other than during a season specified pursuant to §625.22;

(4) Refuse to embark a sea sampler if requested by the Regional Director; or

(5) Sell summer flounder or transfer summer flounder to another person for a commercial purpose.

(c) It is unlawful for any person to do any of the following:

(1) Possess in or harvest from the EEZ summer flounder either in excess of the possession limit specified in §625.25 or before or after the time period specified in §625.22, unless the person is operating a vessel issued a moratorium permit under §625.4 and the moratorium permit is on board the vessel and has not been surrendered, revoked, or suspended;

(2) Possess in or harvest from the EEZ summer flounder that do not meet the minimum size specified in §625.23(b);

(3) Possess nets of netting with mesh not meeting the minimum mesh requirement of §625.24 if the person possesses summer flounder harvested in or from the EEZ in excess of the threshold limit of §625.24(a).

(4) Offload, cause to be offloaded, sell or buy any summer flounder, whether on land or at sea, as an owner, operator, dealer, buyer or receiver in the summer flounder fishery without accurately preparing and submitting in a timely fashion the documents required by §625.6;

(5) Purchase or otherwise receive, except for transport, summer flounder from the owner or operator of a vessel issued a moratorium permit under §625.4 unless in possession of a valid permit issued under §625.5;

(6) Purchase or otherwise receive for commercial purposes summer flounder caught by other than a vessel with a moratorium permit not subject to the possession limit in §625.5 unless the vessel has not been issued a permit under this part and is fishing exclusively within the waters under the jurisdiction of any state.

(7) Purchase or otherwise receive for a commercial purpose summer flounder landed in a State after the effective date published in the FEDERAL REGISTER notifying permit holders that commercial quota is no longer available in that State;

(8) Make any false statement, oral or written, to an authorized officer, concerning the catching, taking, harvesting, landing, purchase, sale, possession, or transfer of any summer flounder;

(9) Fail to report to the Regional Director within 15 days any change in the information contained in the permit application;

(10) Fail to comply with any sea turtle conservation measure specified in §625.27, including any sea turtle conservation measure implemented by notice in the FEDERAL REGISTER in accordance with paragraph §625.27(d);

(11) Forcibly assault, resist, oppose, impede, intimidate, threaten, or interfere with any authorized sea sampler or observer while performing their duties as described under sections 625.26 and 625.27, respectively; or

(12) Violate any other provision of this part, the Magnuson Act, or any regulation or permit issued under the Magnuson Act.

(d) All summer flounder possessed aboard a party or charter boat issued a permit under §625.4(c) are deemed to have been harvested from the EEZ.

§625.9 Facilitation of enforcement

See §620.8 of this chapter.

§625.10 Penalties.

See §620.9 of this chapter.

Subpart B - Management Measures

§625.20 Catch quotas and other restrictions.

(a) *Annual review*. The Summer Flounder Monitoring Committee will review the following data on or before August 15th of each year to determine the allowable levels of fishing and other restrictions necessary to result in a fishing mortality of 0.53 in 1993 through 1995, and a fishing mortality rate of 0.23 in 1996 and thereafter:

(1) Commercial and recreational catch data;

(2) Current estimates of fishing mortality;

(3) Stock status;

(4) Recent estimates of recruitment;

(5) Virtual population analysis results;

(6) Levels of noncompliance by fishermen or individual States;

(7) Impact of size/mesh regulations;

(8) Sea sampling and winter trawl survey data, or, if sea sampling data are unavailable, length frequency information from the winter trawl survey and mesh selectivity analyses;

(9) Impact of gear other than otter trawls on the mortality of summer flounder; and

(10) Any other relevant information.

(b) *Recommended measures*. Based on this review, the Summer Flounder Monitoring Committee will recommend to the Demersal Species Committee of the Council and the ASMFC the following measures to assure that the fishing mortality rate specified in paragraph (a) of this section is not

exceeded:

(1) The commercial quota will be set from a range of 0 to the maximum allowed to achieve the fishing mortality specified in paragraph (a) of this section.

(2) Commercial minimum fish size;

(3) Minimum mesh size;

(4) The recreational possession limit will be set from a range of 0 to 15 summer flounder to achieve the fishing mortality rate specified in paragraph (a) of this section;

(5) Recreational minimum fish size;

(6) Recreational season; and

(7) Restrictions on gear other than otter trawls.

(8) Adjustments to the exempted area boundary and season specified in §625.24(b)(1) by 30-minute intervals of latitude and longitude and 2-week intervals, respectively, based on data specified in paragraphs (a)(8) and (10) of this section to prevent discarding of sublegal sized summer flounder in excess of 10 percent by weight.

(c) *Annual fishing measures*. The Demersal Species Committee shall review the recommendations of the Summer Flounder Monitoring Committee. Based on these recommendations and any public comment, the Demersal Species Committee shall make its recommendations to the Council with respect to the measures necessary to assure that the applicable fishing mortality rate specified in paragraph (a) of this section is not exceeded. The Council shall review these recommendations. Based on these recommendations, and any public comment, the Council shall make recommendations to the Regional Director with respect to the measures necessary to assure that the fishing mortality rates specified in paragraph (a) of this section are not exceeded. Included in the recommendation will be supporting documents as appropriate, concerning the environmental and economic impacts of the proposed action. The Regional Director will review these recommendations and any recommendations of the Commission. After such review, the Regional Director will publish in the FEDERAL REGISTER a proposed rule on or before September 15th to implement these measures, if he determines that these measures are necessary to assure that the fishing mortality rate specified in paragraph (a) of this section are not exceeded. After considering public comment on this proposed rule, the Regional Director will publish a final rule in the FEDERAL REGISTER to implement the measures necessary to assure that the fishing mortality rates specified in paragraph (a) of this section are not exceeded.

(d) *Distribution of annual quota*. The annual commercial quota will be distributed to the States based upon the following percentages:

State	Share (%)
Maine	0.0476
New Hampshire	0.0005
Massachusetts	6.8205
Rhode Island	15.6830
Connecticut	2.2571
New York	7.6470

New Jersey	16.7250
Delaware	0.0178
Maryland	2.0391
Virginia	21.3168
North Carolina	27.4458

All summer flounder sold in a State shall be applied against that State's annual commercial quota regardless of where the summer flounder were harvested. Any overages of the commercial quota landed in any State will be deducted from that State's annual quota for the following year.

(e) *Review of State plans.* (Reserved)

§625.21 Closure.

(a) *Noncompliance.* (Reserved)

(b) *EEZ Closure.* The Regional Director shall close the EEZ to fishing for summer flounder by commercial vessels for the remainder of the calendar year by publishing a notice in the FEDERAL REGISTER if he determines that the inaction of one or more States will cause the fishing mortality rate in §625.20 to be exceeded, or if the commercial fisheries in all States have been closed. The Regional Director may reopen the EEZ if earlier inaction by a State has been remedied by that State, or if commercial fisheries in one or more States have been reopened without causing the fishing mortality rate in section §625.20 to be exceeded.

(c) *State quotas.* The Regional Director will monitor State commercial quotas based on dealer reports and other available information and shall determine the date when a State commercial quota will be harvested. The Regional director shall publish notice in the FEDERAL REGISTER advising a State that ,effective upon a specific date, its commercial quota has been harvested and notifying vessel and dealer permit holders that no commercial quota is available in that State.

§625.22 Time restrictions.

Vessels that are not eligible for a moratorium permit under §625.4 and-fishermen subject to the possession limit may fish for summer flounder only during the period May 15th to September 30th. This time period may be adjusted pursuant to the procedures in §625.20.

§625.23 Minimum sizes.

(a) The minimum sizefor summer flounder is 13 inches (33 cm) total length for all vessels issued a moratorium permit under §625.4, except on board party and charter boats carrying passengers for hire or carrying more than three crew members if a charter boat or more than five crew members if a party boat.

(b) The minimum size for summer flounder is 14 inches (35.6 cm) total length for all vessels that do not qualify for a moratorium permit, or party and charter boats holding moratorium permits but fishing with passengers for hire or carrying more than three crew members if a charter boat or more than five crew members if a party boat.

(c) The minimum size applies to whole fish or any part of a fish found in possession, e.g., fillets. These minimum sizes may be adjusted pursuant to the procedures in §625.20.

§625.24 Gear restrictions.

(a) *General.* Otter trawlers whose owners are issued a permit (including moratorium permit) under §625.4 and that land or possess 100 or more pounds (45.4 kg) of summer flounder between 1 May and 31 October or 200 lbs (90.8 kg) or more of summer flounder between 1 November and 30 April, per trip, must fish with nets that have a minimum mesh size of 5 1/2 inches (14.0 cm) diamond mesh or 6 inches (15.2 cm) square mesh applied throughout the codend for at least 75 continuous meshes forward of the terminus of the net, or, for codends with less than 75 meshes, the minimum-mesh-size codend must be a minimum of one-third of the net, measured from the terminus of the codend to the head rope, excluding any turtle excluder device extension.

(b) *Exemptions to the minimum mesh-size restriction.* The minimum mesh-size requirement does not apply to:

(1) Vessels issued a permit under paragraph §625.4(b) and fishing from 1 November through 30 April in the "exemption area" which is east of a line that follows 72° 30.0′ W. until it intersects the outer boundary of the EEZ. Vessels fishing with an exemption permit cannot fish west of the foregoing line.

(i) The Regional Director may terminate this exemption if he or she determines, after a review of sea sampling data, that vessels fishing under the exemption are discarding more than 10 percent by weight of their entire catch of summer flounder per trip. If he/she makes such a determination, the Regional Director shall publish a notice in the FEDERAL REGISTER terminating the exemption for the remainder of the exemption season.

(ii) Vessels issued a permit under paragraph §625.4(o) may transit the area west or south of the line described in paragraph (b)(1) of this section if the vessel's fishing gear is stowed in a manner prescribed under 50 CFR 651.20(f) so that it is not readily "available for immediate use" outside the exempted area.

(2) *Fly nets.* Vessels fishing with a two seam otter trawl fly net with the following configuration, provided that no other nets or netting with mesh smaller than 5 1/2 inches (14.0 cm) are on board:

(i) The net has large mesh in the wings that measure 8 inches (20.3 cm) to 64 inches (162.6 cm);

(ii) The first body section (belly) of the net has 35 or more meshes that are at least 8 inches (20.3 cm); and

(iii) The mesh decreases in size throughout the body of the net to as small as 2 inches (5 cm) or smaller towards the terminus of the net.

(iv) The Regional Director may terminate this exemption if he determines, after a review of sea sampling data, that vessels fishing under the exemption, on average, are discarding more than 1% of their entire catch of summer flounder per trip. If he makes such a determination, the Regional Director shall publish a notice in the FEDERAL REGISTER terminating the exemption for the remainder of the calendar year.

(c) *Restriction.* Vessels subject to the minimum mesh-size requirement may not have nets

or pieces of netting on board the vessel that do not meet the minimum mesh-size requirement except pieces of netting no larger that 3 feet square (0.9 m square) that may be necessary to repair smaller mesh sections of the net forward of the terminal portion of the net to which the minimum mesh-size requirement applies may be carried on board.

(d) *Mesh-size measurement*. Mesh sizes are measured by a wedge-shaped gauge having a taper of two centimeters in eight centimeters and a thickness of 2.3 millimeters inserted into the meshes under a pressure or pull of five kilograms. The mesh size will be the average of the measurement of any series of 20 consecutive meshes for nets having 75 or more meshes, and 10 consecutive meshes for nets having fewer than 75 meshes. The mesh in the regulated portion of the net will be measured at least five meshes away from the lacings, running parallel to the long axis of the net.

(e) *Net modification*. No vessel subject to this part shall use any device, gear, or material, including, but not limited to nets, net strengtheners, ropes, lines, or chaffing gear, on the top of the regulated portion of a trawl net; except that, one splitting strap and one bull rope (if present), consisting of line or rope no more than 3 inches (7.2 cm) in diameter, may be used if such splitting strap and/or bull rope does not constrict in any manner the top of the regulated portion of the net, and one rope no greater that 0.75 inches (1.9 cm) in diameter extending the length of the net from the belly to the terminus of the cod end along each of the following: The top, bottom, and each side of the net. "Top of the regulated portion of the net" means the 50 percent of the entire regulated portion of the net that (in a hypothetical situation) will not be in contact with the ocean bottom during a tow if the regulated portion of the net were laid flat on the ocean floor. For the purpose of this paragraph, head ropes shall not be considered part of the top of the regulated portion of a trawl net. A vessel shall not use any means or mesh configuration on the top of the regulated portion of the net, as defined in §625.24(e), if it obstructs the meshes of the net or otherwise causes the size of the meshes of the net while in use to diminish to a size smaller than the minimum specified in §625.24(a).

§625.25 Possession limit.

(a) No person shall possess more than six summer flounder in or harvested from the EEZ unless that person is the owner or operator of a fishing vessel issued a moratorium permit under §625.4. Persons on board a commercial vessel that is not eligible for a moratorium permit under §625.4 are subject to this possession limit. The owner and operator and crew of a charter or party boat issued a moratorium permit under section 625.4(b) are not subject to the possession limit when not carrying passengers for hire and when the crew size does not exceed five for a party boat and three for a charter boat.

(b) If whole summer flounder are processed into fillets, an authorized officer will convert the number of fillets to whole summer flounder at the place of landing by dividing fillet number by 2. If summer flounder are filleted into a single (butterfly) fillet, such fillet shall be deemed to be from one whole summer flounder.

(c) Summer flounder harvested by vessels subject to the possession limit with more than one person on board may be pooled in one or more containers. Compliance with the daily possession limit will be determined by dividing the number of summer flounder on board by the number of persons on board other than the captain and crew. If there is a violation of the possession limit on board a vessel carrying more than one person, the violation shall be deemed to have been committed by the owner and operator.

(d) Neither owners nor operators of otter trawlers issued a permit (including a moratorium permit) under §625.4, and fishing with, or possessing on board, nets or pieces of net that do not meet the minimum mesh requirements, except pieces of netting no larger than 3 feet square (0.9 m square) that may be necessary to repair smaller mesh sections of the net forward of the terminal portion of the net to which the minimum mesh-size requirement applies, may possess more than 100 pounds (45.4 kg) of summer flounder. Summer flounder on board these vessels shall be stored on board the vessel in a separate box that measures 36 inches (91.4 cm) long, 15 inches (38.1 cm) wide, and 12 inches (30.4 cm) high for a volume of 3.75 cubic feet (0.1 cubic meters) and which is readily available for inspection.

§625.26 Sea sampler program.

(a) *Request to take sea sampler.* The Regional Director may request a fishing vessel issued a permit under §625.4 to take on board an observer or sea sampler to accompany the vessel on all fishing trips conducted during the period specified in the request. If requested by the Regional Director to take an observer or sea sampler, a vessel may not engage in any fishing operations for summer flounder unless an observer or sea sampler is on board or unless the requirement is waived.

(b) *Responsibility for sea sampler placement.* If requested by the Regional Director to take a sea sampler, it is the responsibility of the vessel owner to arrange for and facilitate sea sampler placement. Upon notice, the Regional Director will provide information concerning sea sampler availability and placement.

(c) *Waiver.* The Regional Director may waive the sea sampler requirement based on a finding that the facilities for housing the sea sampler or for carrying out sea sampler functions are so inadequate or unsafe that the health or safety of the sea sampler or the safe operation of the vessel would be jeopardized.

(d) *Sea sampler functions.* If requested by the Regional Director to take a sea sampler, the vessel owner, vessel operator, and crew must cooperate with the sea sampler in the performance of the sea sampler's duties, including:

(1) Notifying the sea sampler in a timely fashion of when fishing operations are to begin and end;

(2) Allowing for the embarking and debarking of the sea sampler, as specified by the Regional Director, ensuring that transfers of sea samplers at sea are accomplished in a safe manner, via small boat or raft, during daylight hours as weather and sea conditions allow, and with the agreement of the sea sampler involved;

(3) Providing adequate accommodations and food;

(4) Allowing the sea sampler access to all areas of the vessel necessary to conduct sea sampler duties;

(5) Allowing the sea sampler access to communications and navigation equipment and personnel as necessary to perform sea sampler duties;

(6) Providing true vessel locations, by latitude and longitude or loran coordinates, as requested by the sea sampler;

(7) Notifying the sea sampler of any sea turtles, marine mammals, summer flounder, or other specimens taken by the vessel, as requested by the sea sampler;

(8) Providing the sea sampler with sea turtles, marine mammals, summer flounder, or other specimens taken by the vessel, as requested by the sea sampler; and

(9) Providing storage for biological specimens, including cold storage if available, as requested by the sea sampler. These specimens must be retained on board the vessel, as instructed by the sea sampler or until retrieved by authorized personnel of the National Marine Fisheries Service.

§625.27 Sea turtle conservation.

This section will be suspended during the effectiveness of any temporary regulations issued to regulate incidental take of sea turtles in the summer flounder fishery under authority of the Endangered Species Act under 50 CFR parts 217, 222, and 227. Such suspensions and temporary regulations will be issued by publication in the FEDERAL REGISTER and will be effective for a specified period of time, not to exceed 1 year.

(a) *Sea turtle handling and resuscitation*. The sea turtle handling and resuscitation requirements specified in 50 CFR 227.72(e)(1)(i) and (ii) apply with respect to sea turtles incidentally taken by a vessel fishing for summer flounder.

(b) *Sea turtle monitoring and assessment program*. (1) The Regional Director will establish a monitoring and assessment program, in cooperation with the Council and the State of North Carolina, to measure the incidental take of sea turtles in the summer flounder fishery, monitor compliance with required conservation measures by trawlers, and predict interactions between the fishery and sea turtles to prevent turtle mortalities.

(2) A scientifically designed, observer-based monitoring program, as specified in paragraph (h) of this section, may be used to gather scientific data measuring the incidental take of turtles by trawlers in the summer flounder fishery and to report turtle distribution and abundance.

(3) A cooperative sea turtle monitoring and assessment program utilizing a variety of information, including aerial and vessel surveys; on-board observers; individually tagged turtles; physical parameters, such as sea surface temperatures, and reports from the sea turtle stranding network; and other relevant and reliable information, will assess and predict turtle distribution, abundance, movement patterns and timing to provide information to NMFS to prevent turtle mortality caused by the summer flounder fishery.

(c) The Regional Director will require the use of a NMFS certified turtle excluder device (TED) by any vessels engaged in summer flounder fishing operations and utilizing trawl gear on or after October 15, as necessary to protect endangered sea turtles. The Regional Director will publish notice in the FEDERAL REGISTER with the specific time period. Descriptions of currently certified TEDs can be found in 50 CFR §227.72(e)(4). This requirement applies to vessels within the EEZ bounded on the north by a line along 37° 05′ N. latitude, bounded on the south by a line along 33° 35′ N. latitude, and bounded on the east by a line 7 nautical miles from the shoreward boundary of the EEZ.

(d) *Closure of the fishery*. The Regional Director may close the summer flounder fishery in Federal waters, or any part thereof, after consultation with the Council, the Director of the State

of North Carolina Division of Marine Fisheries, and the marine fisheries agency of any other affected State, by publishing a notice in the FEDERAL REGISTER. The Regional Director shall take such action if he determines a closure is necessary to avoid jeopardizing the continued existence of any species listed under ESA. The determination of the impact on sea turtles must be based on turtle mortalities and projections of turtle mortality by the NMFS monitoring and assessment program. A closure will be applicable to those areas specified in the notice and for the period specified in the notice. The Regional Director will provide as much advance notice as possible consistent with the requirements of the ESA and will have the closure announced on channel 16 of the marine VHF radio. A closure may prohibit all fishing operations, may prohibit the use of certain gear, may require that gear be stowed, or may impose similar types of restrictions on fishing activities. The prohibitions, restrictions, and duration will be specified in the notice.

(e) *Reopening of the fishery*. (1) The Regional Director may reopen the summer flounder fishery in Federal waters, or any part thereof, after consultation with the Council, the Director of the State of North Carolina Division of Marine Fisheries, and the marine fisheries agency of any other affected State, by publishing a notice in the FEDERAL REGISTER. The Regional Director may reopen the summer flounder fishery in Federal waters, or any part thereof, if additional sea turtle conservation measures are implemented and if projections of NMFS's sea turtle monitoring program indicate that such measures will ensure that continued operation of the summer flounder fishery is not likely to jeopardize the continued existence of any species listed under the ESA.

(2) The Regional Director may reopen the summer flounder fishery in Federal waters, or any part thereof, if the sea turtle monitoring program indicates changed conditions and if projections of the sea turtle monitoring program indicates that NMFS can ensure that continued operation of the summer flounder fishery is not likely to jeopardize the continued existence of any species listed under the ESA.

(f) *Additional sea turtle conservation measures*. (1) The Regional Director may impose additional sea turtle conservation measures, including tow-time requirements, in Federal waters, after consultation with, the Council, the Director of the State of North Carolina Division of Marine Fisheries, and the marine fisheries agency of any other affected State, by publishing a notice in the FEDERAL REGISTER. The Regional Director shall take such action if he determines further measures are necessary to avoid jeopardizing the continued existence of any species listed under the ESA or if such action would allow reopening of the summer flounder fishery in Federal waters. The determination of the impact on sea turtles must be based on turtle mortalities and projections of turtle mortality by the NMFS's monitoring and assessment program.

(2) Consistent with the procedures specified in paragraph (h) of this section, the Regional Director may require observers on all or a certain portion of the vessels engaged in fishing for summer flounder as described in paragraph (h) of this section to gather data on incidental capture of sea turtles and to monitor compliance with required conservation measures. This requirement may apply to certain types of vessels, certain areas, or during certain times of the year.

(g) *Experimental projects*. Notwithstanding paragraphs (a) through (f) of this section, the Regional Director may authorize summer flounder fishing, as a part of experimental projects to measure turtle capture rates, to monitor turtle abundance, to test alternative gear or equipment, or for other research purposes. Research must be approved by the Regional Director, and it must not be likely to jeopardize the continued existence of any species listed under the ESA. The Regional Director will impose such conditions as he determines necessary to ensure adequate turtle protection during experimental projects. Individual authorizations may be issued in writing. Authorizations applying to multiple vessels will be published in a notice in the FEDERAL REGIS-

TER.

(h) *Observer program.* (1) *Request to take observer.* The Regional Director may request a fishing vessel issued a moratorium permit under §625.4 to take on board an observer to accompany the vessel on all fishing trips conducted during the period specified in the request. If requested by the Regional Director to take an observer, a vessel may not engage in any fishing operations for summer flounder unless an observer is on board or unless the observer requirement is waived.

(2) *Responsibility for observer placement.* If requested by the Regional Director to take an observer, it is the responsibility of the vessel owner to arrange for and facilitate observer placement. Upon receipt of notice, the Regional Director will provide information concerning observer availability and placement.

(3) *Waiver.* The Regional Director may waive the observer requirement based on a finding that the facilities for housing the observer or for carrying out observer functions are so inadequate or unsafe that the health or safety of the observer or the safe operation of the vessel would be jeopardized.

(4) *Observer functions.* If requested by the Regional Director to take an observer, the vessel owner, vessel operator, and crew must cooperate with the observer in the performance of the observer's duties, including:

(i) Notifying the observer in a timely fashion of when commercial fishing operations are to begin and end;

(ii) Allowing for the embarking and debarking of the observer, as specified by the Regional Director, ensuring that transfers of observers at sea are accomplished in a safe manner, via small boat or raft, during daylight hours as weather and sea conditions allow, and with the agreement of the observer involved;

(iii) Providing adequate accommodations and food;

(iv) Allowing the observer access to all areas of the vessel necessary to conduct observer duties;

(v) Allowing the observer access to communications and navigation equipment and personnel as necessary to perform observer duties;

(vi) Providing true vessel locations, by latitude and longitude or loran coordinates, as requested by the observer;

(vii) Notifying the observer of any sea turtles, marine mammals, summer flounder, or other specimens taken by the vessel, as requested by the observer;

(viii) Providing the observer with sea turtles, marine mammals, summer flounder, or other specimens taken by the vessel, as requested by the observer; and

(ix) Providing storage for biological specimens, including cold storage if available, as requested by the observer. These specimens must be retained on board the vessel, as instructed by the observer or until retrieved by authorized personnel of the National Marine Fisheries Service.

APPENDIX 8. ABBREVIATIONS AND DEFINITIONS OF TERMS

Act (MFCMA) - the Magnuson Fishery Conservation and Management Act of 1976, as amended, 16 USC 1801 et seq.

adjusted dollars - dollars standardized to a base year based on the Consumer Price Index.

ASMFC (Commission) - Atlantic States Marine Fisheries Commission.

CFR - Code of Federal Regulations.

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

Committee - the Summer Flounder FMP Review and Monitoring Committee. The Committee is made up of staff representatives of the Mid-Atlantic, New England, and South Atlantic Fishery Management Councils, the Commission, the Northeast Regional Office of NMFS, the Northeast Fisheries Center, and the Southeast Fisheries Center. The MAFMC Executive Director or his designee chairs the Committee.

Council (MAFMC) - the Mid-Atlantic Fishery Management Council.

CPI - Consumer Price Index; a comparative ratio of a certain group of goods across time.

CPUE - catch per unit of effort.

Domestic Annual Harvest (DAH) - the capacity of US fishermen, both commercial and recreational, to harvest and their intent to use that capacity.

Domestic Annual Processing (DAP) - the capacity of US processors to process, including freezing, and their intent to use that capacity.

Exclusive Economic Zone (EEZ) - the zone contiguous to the territorial sea of the US, the inner boundary of which is a line coterminous with the seaward boundary of each of the coastal States and the outer boundary of which is a line drawn in such a manner that each point on it is 200 nautical miles from the baseline from which the territorial sea is measured.

Fishing for summer flounder - any activity, other than scientific research vessel activity, which involves: (a) the catching, taking, or harvesting of 100 pounds of summer flounder or more per trip; (b) any other activity which can reasonably be expected to result in the catching, taking, or harvesting of 100 pounds of summer flounder or more per trip; or (c) any operations at sea in support of, or in preparation for, any activity described in paragraphs (a) or (b) of this definition.

Fishing mortality rate - the part of the total mortality rate (which also includes natural mortality) applying to a fish population that is caused by man's harvesting. Fishing mortality is usually expressed as an instantaneous rate (F), and can range from 0 for no fishing to very high values such as 1.5 or 2.0. The corresponding annual fishing mortality rate (A) is easily computed but not frequently used. Values of A that would correspond to the F values of 1.5 and 2.0 would be 78% and 86%, meaning that there would be only 22% and 14% of the fish alive (without any natural mortality) at the end of the year that were alive at the beginning of the year. Fishing mortality rates are estimated using a variety of techniques, depending on the available data for a species or stock.

Fishing mortality rate reduction strategy - reducing fishing mortality on summer flounder to 0.53 in the first year of FMP implementation and maintaining it at that level through year 3. In year 4 and subsequent years, the target fishing mortality rate will be F_{max} (0.23).

$F_{0.1}$ - the rate of fishing mortality for a given method of fishing at which the increase in yield per recruit for

a small increase in fishing mortality results in only 10% increase in yield per recruit for the same increase in fishing mortality from a virgin fishery.

F_{max} - a calculated instantaneous fishing mortality rate that is defined as "the rate of fishing mortality for a given method of fishing that maximizes the harvest in weight taken from a single year class of fish over its entire life span".

F_{rep} is the fishing mortality rate that results in a year class replacing the spawning biomass of its parents on average.

FMP - fishery management plan.

FR - *Federal Register.*

GRT - gross registered ton.

ICES gauge - International Council for the Exploration of the Seas (ICES) longitudinal mesh gauge set a 4 kg pressure; as used in mesh selectivity studies.

internal waters - marine waters landward of the territorial sea.

L_{50} - length at which 50% of the fish are mature.

M (natural mortality) - instantaneous rate of death attributable to all causes except fishing.

MSY - maximum sustainable yield. The largest average catch of yield that can continuously be taken from a stock under existing environmental conditions, while maintaining the stock size.

MRFSS - Marine Recreational Fishery Statistics Surveys, 1979 - 1988.

NEFC - the Northeast Fisheries Center of the NMFS.

NMFS - the National Marine Fisheries Service of NOAA.

NOAA - the National Oceanic and Atmospheric Administration of the US Dept. of Commerce.

OY - Optimum Yield.

Regional Director (RD) - the Regional Director, Northeast Region, NMFS.

recruitment - the addition of fish to the fishable population due to migration or to growth. Recruits are usually fish from one year class that have just grown large enough to be retained by the fishing gear.

Secretary - the Secretary of Commerce, or his designee.

serial spawners - species which have egg batches that are continuously matured and shed during a protracted spawning season.

Spawning stock biomass per recruit (SSB/R) - measures the average or expected contribution of any one young fish to the spawning stock biomass over it lifetime. A useful reference point is the level of SSB/R that would be obtained if there were no fishing. This is a maximum value for SSB/R which can be compared to levels of SSB/R calculated for different fishing levels.

state waters - internal waters and the Territorial Sea.

stock assessment - the biological assessment of the status of the resources. This analysis provides the

official estimates of stock size, spawning stock size, fishing mortalities, recruitment, and other parameters used in this Plan. The data from these assessments shall constitute the "best scientific information currently available" as required by the Act.

summer flounder - the species *Paralichthys dentatus.*

Territorial Sea - marine waters from the shoreline to 3 miles seaward.

take means to catch and retain on board either in the hold lose or in boxes. It does not include fish from the most recent tow on deck and not yet sorted.

TL - total length.

Total Allowable Level of Foreign Fishing (TALFF) - that portion of the Optimum Yield made available for foreign fishing.

USDC - US Department of Commerce.

year-class - the fish spawned or hatched in a given year.

Yield per recruit - the theoretical yield that would be obtained from a group of fish of one age if they were harvested according to a certain exploitation pattern over the life span of the fish. From this type of analysis, certain critical fishing mortality rates are estimated that are used as biological reference points for management, such as F_{max} and $F_{0.1}$.

Z - instantaneous rate of total mortality; the ratio of numbers of deaths per unit of time to population abundance during that time.

Appendix 9. 50 CFR 620.7 General prohibitions.

It is unlawful for any person to do any of the following:

(a) Possess, have custody or control of, ship, transport, offer for sale, sell, purchase, land, import, or export, any fish or parts thereof taken or retained in violation of the Magnuson Act or any regulation or permit issued under the Magnuson Act.

(b) Transfer or attempt to transfer, directly or indirectly, any U.S.-harvested fish to any foreign fishing vessel, while such vessel is in the EEZ, unless the foreign fishing vessel has been issued a permit under section 204 of the Magnuson Act which authorizes the receipt by such vessel of U.S.-harvested fish.

(c) Fail to comply immediately with enforcement and boarding procedures specified in ?620.8 of this part.

(d) Refuse to allow an authorized officer to board a fishing vessel or to enter areas of custody for purposes of conducting any search, inspection, or seizure in connection with the enforcement of the Magnuson Act.

(e) Dispose of fish or parts thereof or other matter in any manner, after any communication or signal from an authorized officer, or after the approach by an authorized officer or an enforcement vessel.

(f) Forcibly assault, resist, oppose, impede, intimidate, threaten, or interfere with any authorized officer in the conduct of any search, inspection, or seizure in connection with enforcement of the Magnuson Act.

(g) Interfere with, delay, or prevent any means, the apprehension of another person, knowing that such person has committed any act prohibited by the Magnuson Act.

(h) Resist a lawful arrest for any act prohibited under the Magnuson Act.

(i) Fish for or land any mollusks from the Georges Bank Area, defined at 50 CFR 652.23(a)(4)(i), except that the adductor muscle of Atlantic sea scallops may be landed.

AMENDMENT 2 TO THE

FISHERY MANAGEMENT PLAN FOR THE

SUMMER FLOUNDER FISHERY

Volume 2

FINAL ENVIRONMENTAL IMPACT STATEMENT

May 1991

Mid-Atlantic Fishery Management Council

in cooperation with the

Atlantic States Marine Fisheries Commission,

the

National Marine Fisheries Service,

the

New England Fishery Management Council,

and the

South Atlantic Fishery Management Council

Draft adopted by MAFMC: 29 May 1991
Final adopted by MAFMC: 17 October 1991
Final approved by NOAA: 22 April 1993

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, Maryland 20910

MAY 22 1992

To All Interested Government Agencies and Public Groups:

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

TITLE: Final Environmental Impact Statement for Proposed Management Measures for Amendment 2 to the Fishery Management Plan for the Summer Flounder Fishery

LOCATION: Off the U.S. Atlantic Coast in the Exclusive Economic Zone

SUMMARY: The final environmental impact statement discusses the proposed measures included in the subject amendment designed to achieve the reduction in fishing mortality rate needed to rebuild the stock of summer flounder and then safeguard against future overfishing. Management measures in the preferred alternative include those that will closely regulate the commercial and recreational fisheries and protect the endangered and threatened species of sea turtles that interact with the summer flounder fishery.

RESPONSIBLE: William W. Fox, Jr.
OFFICIAL: Assistant Administrator
for Fisheries
National Marine Fisheries Service
1335 East-West Highway
Silver Spring, Maryland 20910
Phone: 301-713-2239

Sincerely,

Donna Wieting

(for) David Cottingham
Director, Office of Ecology
and Environmental Conservation

Enclosure

FINAL ENVIRONMENTAL IMPACT STATEMENT (FEIS)

Responsible Agency
Mid-Atlantic Fishery Management Council

Cooperating Agencies
Atlantic States Marine Fisheries Commission
New England Fishery Management Council
South Atlantic Fishery Management Council
National Marine Fisheries Service/National Oceanic and Atmospheric Administration

Title of Action
Amendment 2 to the Fishery Management Plan for the Summer Flounder Fishery

Contact Person
John C. Bryson, Executive Director
Mid-Atlantic Fishery Management Council
Room 2115 Federal Building
300 South New Street
Dover, Delaware 19901-6790
302-674-2331

Designation of the Statement
Final Environmental Impact Statement

Abstract
The proposed action, authorized under the Magnuson Fishery Conservation and Management Act of 1976, as amended (Magnuson Act), will modify management of the summer flounder fishery in the US Exclusive Economic Zone (EEZ). The action will, among other things, prevent overfishing and allow the resource to rebuild. It will provide a data collection and reporting system and a procedure for adjusting management measures annually. Specific measures are included to minimize conflicts between the fishery and both threatened and endangered species of sea turtles. There the proposed action will have no adverse impact on the physical environment and will strengthen efforts to work with other agencies to conserve summer flounder habitat. However, there may be temporary losses to the human environment because of the requisite reduced harvest levels. However, the proposed restrictions will produce long term benefits, allowing the fishery to rebuild and to continue indefinitely in a controlled manner.

Comment Due Date
Comments on the statement are required by 10 April 1992.

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NOTE: all references to Tables, Figures, and overall References are from Amendment 2 to the FMP. Tables and Figures used in this EIS are copied from Amendment 2 and have the same numbers as in Amendment 2. Much of the material in this EIS is taken from Amendment 2 and its appendices; cross reference notations will be provided throughout the text.

C. SUMMARY

C. 1. BACKGROUND (taken largely from Amendment 2 section 4.1)

The FMP was based on a management plan drafted by the State/Federal Summer Flounder Management Program pursuant to a contract between the New Jersey Division of Fish, Game, and Wildlife and NMFS. The State/Federal draft was adopted by the Atlantic States Marine Fisheries Commission (ASMFC) at its annual meeting in October 1982. The Council adopted the FMP on 16 April 1988 and NMFS approved it 19 September 1988. Amendment 1 (1990) was intended to impose a minimum net mesh regulation and define overfishing. NMFS approved the overfishing definition but disapproved the minimum net mesh provision. Amendment 2 is intended to address the problems identified in section 4.2 of the Amendment (section D.1 of this EIS).

The Council first considered the development of a fishery management plan for summer flounder in late 1977. During the early discussions, the fact that a significant portion of the catch was taken from State waters was considered. As a result, on 17 March 1978 a questionnaire was sent by the Council to east coast State fishery administrators seeking comment on whether the plan should be prepared by the Council or by the States acting through the Atlantic States Marine Fisheries Commission (ASMFC).

It was decided that the initial plan would be prepared by ASMFC. The Council arranged for NMFS to make some of the Council's programmatic grant funds available to finance preparation of the ASMFC plan. New Jersey was designated as the State with lead responsibility for the plan. The State/Federal draft was adopted by the Atlantic States Marine Fisheries Commission at its annual meeting in October 1982. The original Council FMP (MAFMC 1988) was based on the ASMFC management plan.

The Council adopted the original FMP for public hearings on 29 October 1987. The public hearings were held in January 1988 in Fairhaven, MA; Galilee, RI; Riverhead and Rockville Center, NY; Wall and Cape May Court House, NJ; Lewes, DE; Annapolis, MD; Norfolk, VA; and Morehead City and Manteo, NC.

Following public hearings, the original FMP was adopted by the Mid-Atlantic Council on 16 April 1988. The South Atlantic Fishery Management Council endorsed the FMP on 28 April 1988 (Joseph pers. comm.). The New England Council, also in April 1988, adopted a motion supporting a 13" minimum fish size and no mesh size initially, with an automatic minimum size limit increase to 14" at the end of three years, rather than the framework measure adopted by the Mid-Atlantic and South Atlantic Councils (Marshall pers. comm.). (A framework measure is one than can be changed within limits after additional information and analyses are received, in this case, if fishing mortality increased, the size limit would be increased by the NMFS Regional Director from 13" to 14" without an additional plan amendment.)

NMFS approved the original FMP on 19 September 1988.

Amendment 1 to the FMP was developed in the summer of 1990 solely to protect the

1989 and 1990 year classes by imposing a minimum net mesh size comparable to the 13" minimum fish size included in the original FMP. Amendment 1 was adopted for hearings on 29 September 1990. Hearings were held in October 1990 in Fairhaven, MA; Galilee, RI; Riverhead and Rockville Center, NY; Wall and Cape May Court House, NJ; Dover, DE; Salisbury, MD; Hampton, VA; and Manteo and Morehead City, NC. It was revised based on comments received and the final was adopted by the Council 31 October 1990. The Council also requested that NMFS implement the minimum mesh size by emergency regulations to regulate the 1990-1991 winter fishery. This request was also made by the New England and South Atlantic Councils and by the Atlantic States Marine Fisheries Commission.

On 15 February 1991 the Council was notified that NMFS had approved the overfishing definition for summer flounder contained in Amendment 1, but had disapproved the minimum net mesh provision. On 28 February NMFS notified the Council it was not going to implement emergency regulations.

The Council adopted the hearing draft of Amendment 2 on 29 May 1991. The Amendment was also adopted for hearings at the May meeting of the ASMFC Interstate Fishery Management Program Policy Board. Hearings were held in Fairhaven, MA; Galilee, RI; East Lyme, CT; Riverhead and Brooklyn, NY; Wall and Cape May Court House, NJ; Salisbury, MD; Norfolk, VA; and Manteo and Morehead City, NC. Following close of the comment period the Council's Demersal Species Committee met (22 August) to review the summaries of the hearings and written comments received by the Council. At that meeting the Committee was notified by NMFS that Amendment 2 would need to address the capture of endangered sea turtles in the summer flounder fishery in the fall-winter off southern Virginia and North Carolina. The Council reviewed the basic provisions of Amendment 2 and the results of the hearings at its regular 4-5 September 1991 meeting. The Council made a number of changes as a result of the hearing and comment process as recommended by the Demersal Species Committee and submitted the revised management measures to the ASMFC for consideration at the Commission's annual meeting 7-11 October 1991.

At its September meeting the Council also authorized supplemental hearings to deal with the flounder/turtle interaction issue. A proposal was drafted by personnel from the State of North Carolina, NMFS Headquarters, NMFS Northeast Regional Office, NMFS Southeast Regional Office, and the Council. This proposal, and one subsequently advanced by NMFS, were taken to a set of supplemental public hearings in Morehead City, NC (30 September), Manteo, NC (1 October), and Norfolk, VA (2 October).

The Council's action on the basic Amendment was submitted to a meeting of the ASMFC Summer Flounder Board on 23-24 September. The summary of the supplementary hearings, along with the Summer Flounder Board's recommendations were submitted to the ASMFC Interstate Fishery Management Program Board at the annual meeting on 8 October. The full membership of ASMFC unanimously adopted the Amendment on 10 October.

The outcome of the ASMFC deliberations were presented to a meeting of the Council's Demersal Species Committee on 16 October (a meeting at which all Council members

were designated members of the Committee so they could be aware of the provisions of the Amendment and participate in the decision making). Following adoption by the Committee at that meeting, the Council officially adopted the Amendment by unanimous roll call vote (the Regional Director abstaining) on 17 October 1991.

In order to appreciate the scope of the evaluation of the condition of the resource and fishery, the proposed action, and the alternatives to the proposed action, the organizational arrangements for the development of Amendment 2 must be understood. The Mid-Atlantic Council's Demersal Species Committee was given oversight responsibility. That Committee's membership was augmented with voting members from both the New England and South Atlantic Councils. Virtually all meetings of the Committee were held jointly with the ASMFC Summer Flounder Management Board. Staff members from the Mid-Atlantic, New England, and South Atlantic Councils, the Northeast and Southeast Fisheries Science Centers, and the Northeast Regional Office were added as voting members to the ASMFC Summer Flounder Scientific and Statistical Committee (SSC). Most of the members of the SSC became members of the Northeast Fisheries Science Center's Summer Flounder Working Group, which worked within the context of that Center's Stock Assessment Workshop to produce the summer flounder stock assessments used in Amendments 1 and 2. The Mid-Atlantic Council also created a Plan Team made up of NMFS Headquarters, Northeast Regional Office, General Counsel Northeast, and Northeast Fisheries Science Center personnel, as well as Council staff. The effect was that the Plan Coordinators from Silver Spring and Gloucester, the chief summer flounder biologist from Woods Hole, and General Counsel Northeast were at all of the significant Committee meetings. Finally, the Council created an Industry Advisory Committee, with representatives from the fisheries in New England and the South Atlantic, as well as from the Mid-Atlantic.

This lengthy amendment process provided ample opportunity for public input and debate. Each document and hearing cycle invited comment on the issues and range of alternatives. Collectively, the process satisfied NEPA requirements for scoping and public comment.

The management unit is summer flounder in US waters (State and Federal) in the western Atlantic Ocean from the southern border of North Carolina northward to the US - Canadian border. The objectives of the FMP are:

1. Reduce fishing mortality in the summer flounder fishery to assure that overfishing does not occur.

2. Reduce fishing mortality on immature summer flounder to increase spawning stock biomass.

3. Improve the yield from the fishery.

4. Promote compatible management regulations between State and Federal jurisdictions.

5. Promote uniform and effective enforcement of regulations.

6. Minimize regulations to achieve the management objectives stated above.

C.2. MAJOR CONCLUSIONS (~~taken from Amendment 2 section 9.2.2.7~~)

Clearly, there will be impacts from the Amendment. However, if overfishing is to be eliminated, fishing mortality must be reduced and if stocks are to reach optimal levels, habitat degradation must be controlled. The real test of impacts is whether the fishing mortality reduction period adopted by the Council represents the best compromise between the probability that the stock will recover relative to minimizing costs to the fishing industry. Achieving the fishing mortality reduction target in the first year would probably require closure of the fishery, thus maximizing costs to the fishermen. Based on the strategy adopted by the Council and ASMFC Summer Flounder Management Board, the probability of reaching a 20% Maximum Spawning Potential (MSP) in 5 years (Figure 16) and 10 years (Figure 17) would be approximately 30% and 100%, respectively.

The greatest impact to fishermen would come with no action. With the only existing management measure being the minimum fish size limit (as it is with the original Summer Flounder FMP), it is quite likely that the resource would continue to decline and any attempt at recovery in the future would both have a greater impact on the fishermen and would be less likely to succeed than would the strategy proposed at this time. It must also be noted that the no action strategy is not approvable since it does not reduce overfishing and, therefore, does not satisfy Magnuson Act national standard 1.

The adopted management measures are considered the most reasonable program to achieve the fishing mortality rate reduction target at this time (see EIS section E.2.b.1 for the associated risk assessment). The moratorium is included to increase probability of compliance with the management program in the near term, as well as providing a mechanism for participants to share in the recovery of the resource rather than having the dividend of recovery dissipated over additional vessels that could enter the fishery as soon as the resource recovered. This technique was used to great success with the surf clam fishery.

It must be recognized that a standard cost/benefit analysis was not developed on the Amendment because the requisite data were not available. It is anticipated that improved data collection, including the reporting requirement of the Amendmdent, will allow such a study to be conducted in future amendments. It must also be recognized that all alternatives (including most particularly, the no action alternative) will have negative economic impacts in the short run. However, it is believed that the adopted alternative will have the least negative impacts in the short term and the greatest benefits (in the form of the rebuilt resource) in the long term in a reasonable time frame (10 years).

The importance of summer flounder to the recreational fishery, most particularly the party and charter boat industry, is presented in section 8.2.4. The survey reported in that section was carried out by the Council to characterize this important part of the fishery.

C.3. AREAS OF CONTROVERSY

There were a number of controversial issues associated with Amendment 2 during its

development and the public review process. Among the more significant were the proposal to establish a moratorium on the entry of additional party and charter boats into the fishery (in addition to the moratorium on commercial vessels); the extension of the minimum net mesh throughout the entire net after the first year of implementation; the differential size limits in the commercial and recreational fisheries; and the time period used to calculate the distribution of the commercial quota. These issues were resolved through changes made by the Council and ASMFC following the hearings. The proposed action as adopted is set forth in section E.1 of this DEIS.

The basic hearings on Amendment 2 are summarized in Amendment 2 Appendix 4, the written comments are reviewed in Amendment 2 Appendix 5, and the hearings on the summer flounder/turtle conflict issue are summarized in Amendment 2 Appendix 6. It is important that 28 responses to the Council's hearing questionnaire (Appendix 5) supported the preferred alternative while only 7 favored the no action alternative.

C.4. ISSUES TO BE RESOLVED

Given the condition of the resource, the Council knew when it began work on Amendment 2 that stringent management measures would be required to address overfishing. The alternatives were developed after extensive public discussion and debate, and all parties acknowledged that the adoption of these management measures would have significant impacts on the fishery and associated human environment. Several proposed management measures were revised in response to severe impacts identified during the course of the public discussion of the proposed management measures (see C.3 above). If the proposed management scheme is adopted and reveals unforeseen negative impacts, these will be evaluated and responded to in future management measures.

C.5. MITIGATION

The only issue involving mitigation at this time is the summer flounder/sea turtle conflict.

During the 1990-1991 fall and winter summer flounder fishery the State of North Carolina acted on its own to minimize the capture of sea turtles.

NMFS reinitiated the Endangered Species Act Section 7 consultation process in the spring of 1991 and a Draft Biological Opinion was developed with a jeopardy conclusion. NMFS was unsure whether the matter should be resolved through Amendment 2 using the Magnuson Act or directly by NMFS using the Endangered Species Act. This issue was placed before the Council after the public comment period closed in late August 1991.

The result was that the Council, working with representatives of the State of North Carolina and NMFS, drafted additional language for Amendment 2 giving the Regional Director authority to minimize conflicts by reducing tow times, placing NMFS and North Carolina observers, and closing the fishery off Virginia and North Carolina. NMFS also presented a proposal to manage the problem under the Endangered Species Act. Both proposals were taken to public hearing in the affected area (Appendix 6). The proposed FMP language was included in the final version of Amendment 2 (description of the

proposed action follows).

The summer flounder/turtle mitigating measures were included in emergency regulations implemented by NMFS on 2 December 1991, so they were in place during most of the 1991-1992 fall and winter fishery.

D. PURPOSE AND NEED (taken from Amendment 2 section 4.2)

D.1. SUMMER FLOUNDER ARE OVEREXPLOITED

Summer flounder are overexploited. The best currently published indicators, on which the Amendment is based, show that instantaneous fishing mortality (F) is at least 1.4, while the rate which maximizes the harvest (F_{max}) is 0.23. Thus, fishing mortality is at least six times the rate which would produce the maximum yield per recruit. The instantaneous fishing mortality rate is easily translated into an annual survival estimate. With a fishing mortality rate of 1.4, only about 20% of all summer flounder that are alive now will be alive one year later. The level that corresponds to the F_{max} rate is 65%. Obviously, gains in long term yield from the fishery and increases in stock size could be realized by significantly reducing fishing mortality from current levels. Significant and timely reductions in fishing mortality are also needed to avoid stock collapse. Overfishing is defined in this FMP as fishing in excess of the F_{max} level (approved by NMFS in Amendment 1).

Long term trends in abundance and recruitment of summer flounder were derived from several local and coastwide surveys at the October 1990 Summer Flounder Working Group workshop (USDC 1990b). In general, these indices indicated that summer flounder were approximately 5 times more abundant in the mid to late 1970's than in the late 1980's. These surveys also indicated that the 1988 year class was poor and the 1989 and 1990 year classes "no better than average". In addition, the coastwide NEFC survey did not collect any summer flounder older than age 3 in the 1990 survey, although a decade ago summer flounder as old as 10 years were collected.

Spawning biomass per recruit declines markedly with increasing fishing mortality on females (Figure 9). An F_{max} level (0.23) of fishing corresponds to a spawning stock biomass per recruit level of 20%. Current levels of F (greater than 1.4) would be equivalent to a spawning stock biomass per recruit level of about 2 - 3% of the maximum level. At the current level of fishing mortality, the summer flounder stock will not recover.

At present, as a direct result of high rates of fishing mortality, both commercial and recreational catches of summer flounder are comprised primarily of 0 to 2 year old fish. Individuals of this species have previously been known to live longer than 10 years, yet older and larger fish are now infrequent in the landings. This indicates a severely compressed age composition of the summer flounder stock. Such age class compression poses a great risk to recruitment because the older, more fecund spawning adults are being too rapidly removed from the population and nearly all of the new fish are being spawned by individuals that only get to spawn once or at most twice before they are caught and killed by fishermen.

D.2. MIXED SPECIES FISHERIES

The Mid-Atlantic mixed species trawl fishery, which relies principally on summer flounder, scup, and black sea bass, also harvests significant quantities of *Loligo* squid, winter flounder, witch flounder, yellowtail flounder, and other species either as bycatch or in directed fisheries. Many of these species are also principal components of the southern New England trawl fisheries since stock migrations occur between the Mid-Atlantic Bight and this area.

Generally, fishing activity follows this species as it makes annual migrations from south to north, and back to the south, and from offshore to inshore waters, and back offshore. Fishing effort is concentrated northerly and inshore in summer when a wide range of vessels have access to the stocks. In winter, effort is concentrated southerly and offshore, primarily with larger vessels. Although the majority of landings (96%) are taken by fish otter trawls (Table 19), summer flounder are landed by other types of fishing gear, including: pound nets, crab otter trawls, shrimp otter trawls, gill nets, and scallop dredges. At any particular time, fishermen may target a single species with certain gear, but significant bycatch of other species usually occurs in conjunction with the targeted species, depending on the fishing technique. As a result discarded bycatch in the commercial fisheries is probably underestimated as a component of total mortality for summer flounder. For a full discussion of the species mixtures and co-occurrences, refer to EIS section G.1.a.

The occurrence of summer flounder and other species, in commercial catches of the Mid-Atlantic and southern New England regions complicates the identification of appropriate and effective management strategies. Close coordination of regulatory measures is therefore necessary to properly manage this species assemblage. That necessity extends to ecosystem changes that may result from bycatch of mixed species and life stages.

D.3. INCREASED FISHING PRESSURE

Nearly all the major groundfish fisheries in New England (haddock, yellowtail flounder, redfish, cod, etc.) have had their stocks severely depleted or have current catch levels which exceed long term potential catch (USDC 1990a). There have also been declines in South Atlantic and Gulf of Mexico fishery resources. Consequently, it is probable that more effort will be directed towards the southern New England/Mid-Atlantic species of summer flounder, exacerbating current problems of high exploitation rates. Because of the potential for an increased number of entrants into the fisheries, increases in effort by present participants, as well as technological advances that have increased the efficiency of gear, there is a need to limit and reduce effort in the summer flounder fisheries. Without such controls, species assemblage changes could occur, as have been documented elsewhere (for example, emergence of skates and rays as traditional groundfish have plummeted in New England).

D.4. LACK OF UNIFORM MANAGEMENT

The highly migratory nature of summer flounder complicates the development of

management strategies since fishing activities in the EEZ or waters of a few States could adversely impact the stocks. For example, nearly all the Atlantic coastal States have different regulations pertaining to the harvest of summer flounder.

Federal regulations could guide implementation of complimentary regulations in State waters. Compliance with National Standard 3 (" ... an individual stock of fish shall be managed as a unit throughout its range ... ") is improved with consistent regulations for these species.

Special, directed efforts to influence decisions by State and Federal agencies that could affect summer flounder habitat would also improve management and the prospects of success.

D.5. INCONSISTENT AND INADEQUATE ENFORCEMENT

There is a lack of uniform enforcement affecting the summer flounder fisheries which is partly due to the inconsistent regulations among States and between States and Federal jurisdictions. FMP advisors report a lack of consistency in enforcement between States, the EEZ, and/or parts thereof, due to various interpretations of the rules by enforcement officers, which leads to confusion and has resulted in fishermen seeking ways to avoid the rules. Adequate funding at the State and Federal level for enforcement personnel, training, and equipment is problematic. In addition, sanctions resulting from noncompliance with regulations may be insufficient to encourage conformity to State and Federal laws.

Effective enforcement requires that fishery participants perceive both the likelihood of enforcement contact and the application of standards to be uniform throughout the management unit. The perception of fairness is essential in the promotion of voluntary compliance. Proper training of fishery enforcement officers is important in this regard.

D.6. EDUCATION

In general, the lack of information and education programs on the status and management of this species has contributed to habitat abuse, overharvest and economic waste. The promotion of conservation education pursuant to the implementation of this FMP will enable resource users to better understand the severity of the problem and the long term benefits of conservation and management programs. A proper conservation ethic will assure wise resource use and avoid the excessive costs associated with unwanted mortalities or declining stock health.

D.7. LACK OF DATA

National Standard 2 states: "Conservation and management measures shall be based upon the best scientific information available". Although recreational and commercial catch data for summer flounder are adequate to formulate and implement management measures, data collection should be improved. An improved data base will allow the Council to more finely tune the management system to the needs of the fishery. These data are necessary to assess the impact and effectiveness of management measures, as

well as monitor reductions in fishing mortality and increases in stock size to determine if additional amendments to the FMP will be necessary. For example, the absence of a permit to sell requirement in some States, which allows direct sale of catch to retail establishments by fishermen, may result in under reporting of commercial landings that complicates the development, implementation, and enforcement of fishery management In order to be effective, the annual quota process requires adequate data. Other data collections should address perceived connections between habitat and stock health, relations of the fishery to sea turtles, and possible implications of bycatch, gear impacts, and other aspects of the fishing activity.

Additionally, it must be recognized that a standard cost/benefit analysis was not developed on the Amendment because the requisite data were not available. It is anticipated that improved data collection, including the reporting requirement of the Amendmdent, will allow such a study to be conducted in future amendments.

E. ALTERNATIVES INCLUDING THE PROPOSED ACTION

The management measures for the proposed action are presented in Sections 3 and 9.1 of Amendment 2 and in EIS section E.1. The alternatives considered but not adopted are presented in Appendix 1 to Amendment 2 and in EIS section E.3.

The original Summer Flounder FMP (1988) imposed a 13" minimum fish size on the commercial and recreational fisheries with the provision that the minimum fish size could be increased to 14" by a regulation change (a "framework measure") after THREE years if the resource continued to decline. The original FMP also included a requirement that commercial vessels and party and charter boats obtain annual permits from NMFS. Amendment 1 added a definition of overfishing (as required by 50 CFR 602) to the management system, but did not change the regulatory measures (because NMFS disapproved the 5.5" minimum net mesh proposed by the Council). Amendment 2 (the proposed action) would maintain the 13" minimum fish size in the commercial fishery and add an annual quota, minimum net mesh size, logbook reports, and a moratorium on entry of additional vessels. For the recreational fishery Amendment 2 would provide a 14" minimum fish size, a possession limit, and a closed season. All of the management measures are "frameworked", which means that they may be adjusted annually following a procedure set forth in the Amendment (and below) based on the condition of the resource and fishery; for example, the commercial quota may be increased or decreased, the recreational possession limit increased or decreased, or the commercial mesh size may be changed. All of the measures in Amendment 2 are described in EIS section E.1 and evaluated in EIS section E.2.

E.1. DESCRIPTION OF THE PROPOSED ACTION (taken from Amendment 2 sections 3 and 9.1)

E.1.a. Moratorium

The Amendment establishes a moratorium in the commercial fishery for up to 5 years following implementation. (The public hearing version of Amendment 2 also included a

moratorium on entry of additional party and charter boats. That moratorium was dropped in the final version of Amendment 2 because party and charter boat owners and operators thought that the potential benefits of a party and charter boat moratorium would be exceeded by the costs associated with the increased structure and control that the moratorium would bring to that segment of the fishery.)

E.1.b. Permits

Any owner of a vessel desiring to fish for summer flounder within the US EEZ for sale, or transport or deliver for sale, any summer flounder taken within the EEZ, must obtain a moratorium permit from NMFS for that purpose. A vessel is eligible for a moratorium permit if it meets any one of the following criteria:

1. The owner or operator of the vessel landed and sold summer flounder from the management unit for summer flounder, between 26 January 1985 and 26 January 1990; or

2. The vessel was under construction for, or was being rerigged for, use in the directed fishery for summer flounder on 26 January 1990 and provided the vessel has landed summer flounder for sale prior to implementation of this Amendment. For the purpose of this paragraph, "under construction" means that the keel has been laid, and "being rerigged" means physical alteration of the vessel or its gear had begun to transform the vessel into one capable of fishing commercially for summer flounder; or

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

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

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

Any owner or operator of a party and charter boats (vessels for hire) desiring to fish for summer flounder within the US EEZ must obtain a permit from NMFS for that purpose. A party or charter boat may have both a commercial moratorium permit to catch and sell and a party or charter boat permit if the vessel qualifies as a commercial vessel under the moratorium. However, such a vessel may not fish under the commercial rules if it is carrying passengers for a fee. When a party or charter boat is operating as a commercial vessel, the crew size must not be more than 5 when it is operating as a party boat and not more than 3 when it is operating as a charter boat.

A recreational vessel, other than a party or charter boat (vessel for hire), is exempt from the permitting requirement if it catches no more than the recreational possession limit,

multiplied by the number of persons on board, of summer flounder per trip.

Any dealer of summer flounder must have a permit. A dealer of summer flounder is defined as a person or firm that receives summer flounder from the owner or operator or a vessel issued a moratorium permit pursuant to this FMP.

E.1.c. Reports

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

Commercial fishery logbooks must be submitted on a monthly basis by Federal moratorium permit holders in order to monitor the fishery.

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

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

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

Dealers. In order to monitor the fishery and enable the Regional Director and the States to forecast when a closure will be needed, dealers with permits issued pursuant to this Amendment must submit weekly reports showing at least the quantity of summer flounder purchased (in pounds), and the name and permit number of the vessels from whom the summer flounder was purchased.

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

with commercial moratorium permits).

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

E.1.d. Summer Flounder FMP Monitoring Committee

The Summer Flounder Monitoring Committee will be made up of staff representatives of the Mid-Atlantic, New England, and South Atlantic Fishery Management Councils, the Northeast Regional Office, the Northeast Fisheries Center, and the Southeast Fisheries Center, and ASMFC representatives. The MAFMC Executive Director or his designee will chair the Committee.

The Summer Flounder Monitoring Committee will annually review the best available data including, but not limited to, commercial and recreational catch/landing statistics, current estimates of fishing mortality, stock status, the most recent estimates of recruitment, Virtual Population Analysis (VPA) results, target mortality levels, beneficial impacts of size/mesh regulations, bycatch, incidental take, and habitat trends, as well as the level of noncompliance by fishermen or States and recommend to the Council Committee and ASMFC Interstate Fishery Management Program (ISFMP) Policy Board commercial (annual quota, minimum fish size, and minimum mesh size) and recreational (possession and size limits and seasonal closures) measures designed to assure that the target mortality level on summer flounder is not exceeded [0.53 in the first year of FMP implementation and maintaining it at that level through year three; in year four and subsequent years, the target fishing mortality rate will be F_{max} (0.23)]. The Committee will also review State regulatory programs for consistency with the FMP. The Committee will also review the gear used to catch summer flounder to determine whether gear other than otter trawls needs to be regulated to help assure attainment of the fishing mortality rate target and propose such regulations as appropriate.

The steps from the Monitoring Committee to action by the Regional Director are:

1. The Monitoring Committee reviews the data and makes its recommendations to the Demersal Species Committee and ASMFC ISFMP Policy Board.

2. The Demersal Species Committee and ASMFC ISFMP Policy Board consider the recommendations of the Monitoring Committee and makes their recommendations to the Council and ASMFC.

3. The Council and ASMFC consider the recommendations of the Demersal Species Committee and ASMFC ISFMP Policy Board and make their recommendations to the Regional Director.

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

E.1.e. Commercial Management Measures

E.1.e.1. Commercial quota

The annual commercial quota will be set at a range of between 0 and the maximum allowed by the adopted fishing mortality rate reduction strategy. The commercial quota includes all landings for sale by *any* gear.

Quotas will be distributed to the States based on their share of commercial landings for the period 1980-1989 (Table 72) minus any landings in that State in excess of the previous year's quota.

All landings by any vessel that has a commercial moratorium permit (required in order to sell) count against the quota, whether the summer flounder are caught with an otter trawl, a scallop dredge, hook and line, or any other gear. If the vessel does not have a commercial moratorium permit, the fish may not be sold and the recreational rules on size, possession, and season apply.

The quota applies throughout the management unit, that is, in both State and Federal waters. All commercial landings in a State count toward that State's quota. When a State's quota has been caught, fishing for and/or landing summer flounder will be prohibited in that State.

NMFS will monitor the fishery and inform each of the States of the State's landings relative to that State's quota.

It is the responsibility of each State to assure that its quota is not exceeded. Each State shall close their State's waters to commercial fishing for summer flounder when their quota is reached and prohibit landing by commercial vessels. Each State must submit to the Council and Regional Director a plan setting forth the means by which the State will manage the quota, size limit, and mesh regulation. Each State's plan will be reviewed by the Monitoring Committee.

Until the Regional Director determines that a State is in compliance with the FMP, vessels from that State may be prohibited from fishing in the EEZ. The Regional Director shall publish a notice in the *Federal Register* specifying which States are in compliance, which States are not in compliance, and which States are closed. A vessel is deemed to be from the State listed on the permit as the principal landing State as shown on the vessel's permit application. The State from which the vessel is deemed to be from may not be changed except through a notification to the Regional Director of a change to the permit application. Such notification shall include evidence sufficient for the Regional Director to conclude that the legal residence of the owner or operator has been changed. Such evidence may include a copy of a drivers license or a voter registration card.

The Regional Director shall close the EEZ to fishing for summer flounder by commercial vessels if he determines that the inaction of one or more States will cause the target fishing mortality levels to be exceeded.

The Regional Director shall close the EEZ to fishing for summer flounder by commercial vessels if the commercial fisheries in all States have been closed.

The Regional Director shall close the EEZ to fishing for summer flounder by commercial vessels from a particular State by publishing a notice in the *Federal Register* if he determines that the State's quota has been exceeded and the State has taken no action or inappropriate action to close its fishery.

E.1.e.2. Commercial fish size limitations

It is illegal for owners or operators of vessels issued moratorium permits (with the exception of party and charter boats carrying passengers for hire who must have fish of at least the minimum size for the recreational fishery) to possess summer flounder less than 13" total length (TL). It is also illegal to possess parts of summer flounder less than 13" to the point of landing.

Vessels with commercial moratorium permits issued pursuant to this FMP are required to fish and land pursuant to the provisions of this FMP unless the vessels land in States with larger minimum fish sizes than those provided in the FMP, in which case the minimum fish size would be required to meet the State limits.

The minimum fish size is a framework measure and, thus, may be changed annually, if appropriate through regulatory action by the Regional Director.

E.1.e.3. Minimum mesh requirement

(The hearing draft of Amendment 2 included a provision that during the second and subsequent years following implementation, the minimum net mesh size would apply throughout the entire net. This provision was replaced with the following language after the hearing and comment process because testimony of the fishermen preceded the Council that the benefits associated with the minimum mesh throughout the net were less than the cost of constructing and using such nets. Additionally, information submitted by fishermen and by the New England Council and the State of North Carolina persuaded the Council to add the three exempted fisheries described below, because there is an indication that the three exempted fisheries would not contribute significantly to summer flounder mortality. However, the proposed action does require that the Regional Director monitor the exempted fisheries and modify or withdraw the exemptions if mortality of small summer flounder is excessive.)

Vessels using otter trawls that land or possess more than 100 lbs of summer flounder may only fish with 5.5" minimum diamond mesh or 6" minimum square mesh, inside measure, applied throughout the cod end for at least 75 continuous meshes forward of the terminus of the net, or, if the net is not long enough for such a measurement, the terminal 1/3 of the net, measured from the terminus of the cod end to the head rope. If the fish are landed in a State that has a larger minimum net mesh size, the State limit would prevail.

Any combination of mesh or liners that effectively decreases the mesh below the

minimum size is prohibited.

The owner or operator of a fishing vessel shall not use any device, gear, or material, including, but not limited to, nets, net strengtheners, ropes, lines, or chaffing gear, on the top of the regulated portion of a trawl net; except that, one splitting strap and one bull rope (if present), consisting of line or rope no more than 2" in diameter, may be used if such splitting strap and/or bull rope does not constrict in any manner the top of the regulated portion of the net; and one rope no greater than 0.75 inches in diameter extending the length of the net from the belly to the terminus of the cod end along each of the following: the top, bottom, and each side of the net. "Top of the regulated portion of the net" means the 50% of the entire regulated portion of the net which (in a hypothetical situation) would not be in contact with the ocean bottom during a tow if the regulated portion of the net were laid flat on the ocean floor. For the purpose of this paragraph, head ropes shall not be considered part of the top of the regulated portion of a trawl net.

There are three exceptions to the minimum mesh rule:

1. **Fly Net Exemption** - Vessels fishing in the fly net fishery are exempt from the minimum mesh size requirement. A fly net is a two seam otter trawl with the following configuration:

   a. The net has large mesh webbing in the wings with a stretch mesh measure of 8" to 64".

   b. The first body (belly) section of the net consists of 35 meshes or more of 8" (stretch mesh) webbing or larger.

   c. In the body section of the net the stretch mesh decreases in size relative to the wings and continues to decrease throughout the extensions to the cod end, which generally has a webbing of 2" (stretch mesh).

2. **Pelagic Net Exemption** - Vessels fishing in the pelagic net fishery are exempt from the minimum mesh size requirement. A pelagic net is a four seam otter trawl with the following configuration:

   a. The net has large mesh webbing in the wings with a stretch mesh measure of 32" or larger.

   b. The first body (belly) section of the net consists of 50' (40 meshes) of 15" (stretch mesh) webbing or larger.

   c. In the body section of the net the stretch mesh decreases in size relative to the wings and continues to decrease throughout the extensions to the cod end, which has a webbing of 1.5" or less.

3. **Exempted Fishery Area** - Vessels fishing for summer flounder in the EEZ (taking and retaining more than 100 lbs of summer flounder) seaward of the line described

below from 1 November through 30 April and not using a 5.5" minimum mesh (diamond) net, are required to obtain a special permit from NMFS. Application for this permit must be made 7 days prior to entering this exempted fishery and NMFS must be notified 7 days before the vessel exits the exempted fishery. The commercial minimum size limit (13") applies in the exempted area. Vessels with this special permit are exempted from the minimum net mesh regulations, but are prohibited from fishing west (landward) of the line. NMFS is authorized to establish procedural rules necessary to process applications for and cancellation of these special permits in order to facilitate enforcement.

The line follows 71°30′ west longitude south to 40°53.1′ N, 71°30′ W; thence northeasterly 41° 00.0′ N, 70°49.5′ W, thence easterly to 41°00.0′ N, 70°30.0′ W, thence southerly to 40°50.0′ N., 70°30.0′ W., thence easterly to 40°50.0′ N., 69°40.0′ W., thence southerly to 40°33.5′ N., 69°40.0′ W., thence southwesterly to 40°26.5′ N., 70°40.0′ W., thence northerly to 40°40.5′ N., 70°40.0′ W., then southwesterly to 40°30.0′ N., 72°00.0′ W., thence southerly to 40°17.8′ N., 72°00.0′ W., thence southwesterly to 40°15.5′ N., 72° 20.0′ W., thence southerly along 72°20.0′ W. until it intersects the outer boundary of the EEZ.

Vessels fishing with an exempted fishery permit may transit the area south and west of the exempted fishery area to leave and return to port so long as all fishing gear is stowed in a manner that it cannot be used outside the exempted fishery area.

E.1.f. Recreational Fishery Measures

The recreational fishery throughout the management unit will be managed through an annual evaluation of a framework system of possession limits, size limits, and seasonal closures. Recreational landings will be compared to annual target harvest levels established through the FMP Monitoring Committee process to determine if modifications to the recreational possession limit and size limit are required for the following year or if the fishery needs to be closed for certain periods.

The annual recreational possession limit, size limit, and season will be set at a range of between 0 and the maximum allowed by the adopted fishing mortality rate reduction strategy. It will be illegal to possess parts of summer flounder less than the minimum size to the point of landing.

During the first year of FMP operation there will be a 14" TL minimum fish size, 6 fish possession limit, and a fishing season from 15 May through 30 September.

On vessels with several passengers, where catches are pooled in one or more containers, the number of summer flounder contained on the vessel may not exceed the possession limit multiplied by the number of people aboard the vessel.

It is the responsibility of each State to assure that it implements measures at least equivalent with the Federal FMP. The Regional Director may prohibit landing summer flounder from the EEZ by recreational vessels (party, charter, and private boats) of any

State not in compliance with this FMP (possession limit, size limit, and season). If the inaction of one or more States leads the Regional Director to conclude that the FMP will be adversely affected, he may close the entire EEZ to summer flounder fishing. To be equivalent with the FMP, the States' measures must have the same length and possession limits as the FMP, but may incorporate a different equivalent open season provided such open season remains within the same Marine Recreational fishery Statistics Survey (MRFSS) waves (bimonthly sampling periods) used in the coastwide season.

E.1.g. Sale-Purchase

Only persons with a dealer permit may buy summer flounder at the point of first sale landed by a vessel that has a commercial moratorium permit issued pursuant to this FMP.

Owners or operators of vessels with moratorium permits may sell summer flounder at the point of first sale only to a dealer that has a dealer permit issued pursuant to this FMP.

E.1.h. Other Measures

The amount of summer flounder on board a vessel using small mesh trawl gear other than exempted gear may not exceed 100 pounds.

All summer flounder on vessels fishing with a mesh smaller than the legal minimum size must have any summer flounder on board boxed in a manner that will facilitate enforcement personnel knowing whether the vessel has more than 100 pounds of summer flounder on board to meet the minimum mesh size criterion. Any unboxed summer flounder on board a vessel fishing with a net smaller that the legal minimum is considered a violation of this FMP. A box holds 100 pounds of summer flounder and is approximately 36" long, 15" wide, and 12" high (approximately 3.75 cubic feet).

The Regional Director may place sea samplers aboard vessels if he determines a voluntary sea sampling system is not giving a representative sample from the summer flounder fishery.

The Regional Director, Northeast Region, NMFS is authorized to monitor sea turtles in the Exclusive Economic Zone from the mouth of the Chesapeake Bay to the southern border of North Carolina, through aerial surveys and sea sampling, in concert with similar efforts by the State of North Carolina, and to institute measures in this area within 10 miles (16.1 kilometers) of the shore to minimize the take of sea turtles in the summer flounder fishery between 15 October and 15 January, compatible with such measures instituted by North Carolina. If measures are considered necessary and North Carolina has not acted appropriately, the Regional Director may limit tow times to 60 minutes or close the area to trawlers that do not use nets equipped with turtle excluder devices with bars spaced no greater than 6" (15.2 centimeters) apart, or other devices that may be authorized by the Regional Director.

E.2. EVALUATION OF THE PROPOSED ACTION (taken from Amendment 2 section 9.2)

E.2.a. The Proposed Action (Amendment 2) Relative to the National Standards

The following discussions on each of the seven national standards address biological, ecological, social, economic, and cultural issues related to the proposed action and alternatives.

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

E.2.a.1. Conservation and management measures shall prevent overfishing while achieving, on a continuous basis, the optimum yield from each fishery.

Maximum Sustainable Yield (MSY) has not been specified for summer flounder. Optimum Yield (OY) is all summer flounder harvested pursuant to this FMP.

Overfishing in the Summer Flounder FMP is defined as fishing in excess of the F_{max} level. F_{max} is a biological reference point that corresponds to the level of fishing mortality (F) that produces the maximum yield per recruit. Based on current resource condition, F_{max} is 0.23. That overfishing definition was approved by NMFS in Amendment 1 to the FMP. The Council's schedule to reduce overfishing is presented in EIS section E.2.b.1. Summer flounder stocks are severely overfished. Current fishing mortality rates (F) are at least 1.4 and could be as high as 2.1. Thus, there is at least a six fold difference between the F_{max} and the current F. In order to achieve F_{max}, current exploitation rates would have to be reduced by 73%.

Long term trends in abundance and recruitment of summer flounder, derived from several local and coastwide surveys, indicate that the summer flounder stock has been so reduced that current levels of abundance are less than 20% of the stock size measured in the late 1970's. Based on current levels of exploitation, spawning stock biomass (SSB) levels are 2-3% of the virgin or unfished biomass level. SSB levels should be at least 20% of the unfished level, based on analysis conducted on other species, to allow the stock to sustain itself over an extended period of time. Survey indices also indicate that the 1988 year class was almost a complete failure and the 1989 and 1990 year classes "no better than average." In addition, age composition of the summer flounder stock is severely compressed. In fact, the coastwide NEFC survey did not collect any summer flounder older than age 3 in the 1990 survey although a decade ago summer flounder as old as age 10 were collected. (Most of this discussion was condensed from Amendment 2 sections 5.2 and 5.4.)

State and Federal cooperation increases the chances of reducing overfishing.

The Council believes the proposed action (the measures described in EIS section E.1) will allow the resource to recover from its overfished condition while minimizing impacts on fishermen (see EIS section E.2.b.1 for an evaluation of the fishing mortality reduction

strategy).

E.2.a.2. Conservation and management measures shall be based upon the best scientific information available.

This FMP is based on the best and most recent scientific information available. Future summer flounder research should be devoted toward both data collection and analysis in order to evaluate the effectiveness of this FMP. This species will be periodically reviewed by the NEFC Stock Assessment Workshop process.

E.2.a.3. To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

The FMP's management unit is summer flounder throughout their range on the Atlantic coast from Maine through North Carolina, including the EEZ, territorial sea, and internal waters. This specification is considered to be consistent with National Standard 3.

E.2.a.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 FMP does not discriminate among residents of different States. It does not differentiate among US citizens, nationals, resident aliens, or corporations on the basis of their State of residence. It does not incorporate or rely on a State statute or regulation that discriminates against residents of another State.

Summer flounder migrate inshore in the spring and offshore in the fall (Amendment 2 section 5.1). These seasonal migrations lead to seasonal fisheries. Once the decision was made to use an annual quota as one of the tools to manage the commercial fishery, it became important to adopt measures to insure that fishermen from one State could not take the entire quota (which, at least in the short run, must be much smaller that historical catches in order to stop overfishing) before fishermen from other States had an opportunity to participate in the fishery. Early in the planning process it became apparent that it would be extremely difficult, if not impossible, to prevent overfishing without the use of an overall quota. The States quickly realized that overall or regional quotas could work to the detriment of a particular State and/or region, and, therefore, requested the Council to consider State by State quotas. In developing State quotas, the Council reviewed the history of the fishery and recommended a ten year time frame as the appropriate historical data upon which quotas would be based. This was discussed thoroughly by the States and while efforts were made to shorten the period to as little as three years, it was quickly realized that short term variations in landings did occur and quotas based on a short term series would penalize one segment of the fishery while granting others what was considered an excessive share. The States, through ASMFC, approved the ten year time period and the method of allocating the quota.

However, the solution to allocate the quota by State created the problem of how to prevent overfishing in the FMP if a State did not take appropriate action to insure that its quota was not exceeded. The only action readily available was to close the EEZ to taking summer flounder, which is considered in this EIS and in the Amendment. While the inaction of one State could result in such gross overfishing that a closure of the entire EEZ would be warranted, it was felt that prohibiting retention of summer flounder in the entire EEZ if only one State presented a problem generally would impose a hardship on fishermen from other States. Hence, the provision to prohibit fishermen resident (the State that is shown as the principal landing State in the annual permit application) in the problem State from taking summer flounder anywhere in the EEZ (section 9.1.2.3.1).

Preemption was not considered a serious alternative to this procedure (the Magnuson Act provides that NMFS may manage a fishery in State waters if State action or inaction interferes with the implementation of an FMP, provided the fishery predominantly occurs in the EEZ). There is not a great deal of precedent to determine if preemption could work rapidly enough to prevent overfishing. The existing procedures are complicated. Additionally, there is the question of whether summer flounder landings are primarily from the EEZ or primarily from State waters. If the commercial fishery is the basis, landings from the EEZ have averaged 77% during the period 1980-89 (Table 50). It was 92% in 1989 (Table 2). In the recreational fishery, EEZ catch in pounds was 7% of the total recreational landings for the 1980-89 period and 4% of the total recreational landings in 1989. For the total fishery (both commercial and recreational) during 1980-89, the EEZ share of the total was 49% . The total fishery EEZ share in 1989 was 74%.

In choosing historical catch as a basis of allocation, and by virtue of acceptance by the States of the time frame and the resulting percent of allocations, National Standard 4A, the "fair and equitable to all such fishermen" test, has been met. Since the quota is based on stock size and will be determined annually to assure that the target mortality rate is not exceeded, National Standard 4B "reasonably calculated to promote conservation" is met.

Section 4C requires that the allocation be carried out in such a manner that "no particular individual, corporation, or other entity, acquires an excessive share of such privilege." It was therefore necessary for the Council and ASMFC to develop a method to assure that Section C was met.

In order to assure that 4C is fully met, any State or States not in compliance with the quota, that is, those States which have exceeded the allocated amount, must be prevented from taking additional summer flounder or an excessive share will be realized by the residents of that State, unfairly penalizing the other participants in the fishery. The Council and ASMFC have proposed that this obligation be met by requiring the Regional Director, upon advice from the Monitoring Committee through the Council and ASMFC, and upon his concurrence that the allocation has been exceeded by a particular State, to close the EEZ to fishermen from that State.

Another remedy which was considered to be available to the Regional Director was to close the entire EEZ when quotas are exceeded. While this still may be necessary if enough States exceed the quotas, it is certainly not a remedy to prevent one State from

acquiring an excessive share. The provision proposed by the Council, as stated above, will prevent excessive share gains and comply with the charge of National Standard 4C. It should be noted that this clause would not prohibit continued fishing in State waters as would "preemption", which is included in the Magnuson Act, and may or may not be applicable to the summer flounder fishery.

The Council and ASMFC considered the argument that this measure discriminates among fishermen of different States, and may therefore run afoul of National Standard 4. The Council and the ASMFC have considered this argument and believe that it results in too narrow a construction of the National Standard, particularly in the context of this fishery. The National Standard must be read as a whole, and any interpretation that focuses too narrowly on distinctions based on residence may face problems in providing fair allocations. In this FMP, all fishermen are given an equal opportunity to harvest a fair share of the overall quota. The distinction drawn in the management measures is not for the purpose of harming the fishermen of any State, but rather to ensure that all of the requirements of National Standard 4 are met. This kind of differentiation, which is implemented not to adversely affect anyone, but to ensure attainment of equitable allocations, cannot be considered discriminatory within the meaning of National Standard 4. The allocation system will be administered by the States under this cooperative interjurisdictional management program. The effect of this measure is simply to provide the Secretary with the opportunity to support the collective States' efforts in administering quotas.

The recreational measures are applied coastwide, although the States are allowed to make minor changes to the open season to allow for regional differences caused by the summer flounder migration. In the commercial fishery, the minimum fish size and minimum net mesh size are applied coastwide. The commercial quota is allocated on a State by State basis using the distribution of the commercial catch of summer flounder for the period 1980-1989. These provisions are, therefore, "fair and equitable to all fishermen."

The recreational size limit, possession limit, and season are all specified so they may be adjusted annually following procedures set forth in the FMP to assure that the fishing mortality reduction strategy is followed. The commercial quota, minimum fish size, and minimum net mesh are all specified so they may be adjusted annually following procedures set forth in the FMP to assure that the fishing mortality reduction strategy is followed. These provisions are, therefore, "reasonably calculated to promote conservation."

It is clear that while the best solution to this problem may be a change either in the Magnuson Act, an interjurisdictional fisheries act, or similar legislation, the Council and ASMFC have acted responsibly in the required measures and fully expect these measures to be successful in carrying out a fair and equitable Summer Flounder Amendment.

The Council believes that there is an intrinsic tension within the National Standards with respect to management of interjurisdictional fisheries such as the fishery for summer flounder, which is severely overfished. Strong and effective measures are needed to reverse the overfished nature of this valuable fishery resource. Each State must play a

meaningful part in this cooperative effort to reverse the trend in this fishery. Allowing vessels from any recalcitrant State full reign to fish in the EEZ uncontrolled will have serious negative repercussions for the stock. It is paramount that overfishing be prevented rather than access be preserved for vessels from a State that is not contributing equitably to rebuild the resource. The Council believes that the mandate of National Standard 1 far overshadows the introductory statement to National Standard 4. All of the State members of the ASMFC have voted in favor of an identical ASMFC version of Amendment 2. The States do not believe the measure preventing access to the EEZ to vessels from States not in compliance with the management measures in the Amendment is discriminatory with respect to their residents. The Secretary should adopt a similar interpretation.

The moratorium is fair and equitable. The Council voted to establish 26 January 1990 as a cut off date for limiting entry into the fishery at its February 1990 meeting. The *Federal Register* notice of this date was published 7 June 1990. The moratorium was part of the preferred alternative in the public hearing draft of Amendment 2. Additionally, the long time period for establishing eligibility (26 January 1985 through 26 January 1990) assures that the largest possible number of fishermen can qualify under the moratorium.

E.2.a.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 management regime is intended to allow the fishery to operate at the lowest possible cost (e.g., fishing effort, administration, and enforcement) given the FMP's objectives. The objectives focus on the issue of administrative and enforcement costs by encouraging compatibility between Federal and State regulations since a substantial portion of the fishery occurs in State waters. The FMP places no restrictions on processing, or marketing and no unnecessary restrictions on the use of efficient techniques of harvesting.

The minimum net mesh provision improves efficiency by reducing waste through discards. The Council and NMFS recognize their mandate to reduce ecological impacts associated with this fishery. Reduced bycatch is one goal of minimum mesh measures. The bycatch issue and species co-occurrence is expanded upon in EIS section G.1.a.

E.2.a.6. Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

The management regime was developed to be compatible with and reinforce the management efforts of the States and ASMFC. The FMP allows the States to manage their commercial quotas, the only constraint being a review to assure that the State's management system will not allow the quota to be exceeded. While the recreational size and possession limits apply coastwide, the open season may be adjusted slightly by the States to account for seasonal differences.

E.2.a.7. Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

The management regime was developed to be compatible with and reinforce the management efforts of the States and ASMFC. The minimum size limits, quotas, possession limits, and, to some extent, closed seasons, can be enforced on shore, thus eliminating the need for high cost at sea enforcement. The provisions of this Amendment have already been adopted by the ASMFC.

These provisions will also complement related efforts on land to reduce the impact of human activities that could affect the management unit. These fishery management measures, coupled with land based efforts, offer improved prospects of stock recovery.

E.2.b. Cost/Benefit Analysis.

E.2.b.1. Implications of overfishing definitions and need to reduce fishing mortality rate

The cost/benefit analysis must be considered in light of the guidelines in 50 *CFR* 611, which require that a Council define overfishing for the managed species, determine whether the species is in an overfished condition, and, if it is, develop a strategy for ending the overfished condition. The Council has adopted and NMFS has approved (MAFMC 1990) an overfishing definition (section 9.1.1). The Council has determined that summer flounder are currently greatly overfished and has adopted a strategy to reduce fishing mortality to prescribed levels in order to end the overfished condition (section 9.1.1) while considering the needs of the fishermen. Many fishing mortality rate reduction strategies were considered by the Council's Demersal Species Committee and the ASMFC Summer Flounder Board before the final strategy was adopted. All of these strategies involved balancing the impact on the fishing industry against the probability of successfully ending the overfished condition of the resource.

By the approved definition, the excessive take of summer flounder will cease when fishing mortality is at the F_{max} level, which current analysis indicates is F = 0.23. Current fishing mortality rates are at least 1.4 and could be as high as 2.1. Thus, there is at least a six fold difference between the F_{max} and the current F. In order to achieve F_{max}, current exploitation rates would have to be reduced by 73%.

An immediate reduction to an F_{max} level was seen as having an unnecessarily negative impact on the industry, so the Council and ASMFC Board adopted the following strategy: Fishing mortality on summer flounder should be reduced to 0.53 in the first year of the management program and be maintained at that level through year 3. This requires a reduction in exploitation of approximately 47% in the first year. In year 4 and subsequent years, the target F would be F_{max} (0.23).

The remainder of this section will set forth the analyses that led to this conclusion. What must be remembered when reading the remainder of this section is that the baseline for the impacts is not "No Action" or the *status quo*, but rather, alternative ways of achieving the fishing mortality rate target (F_{max}). That approach differs from most EIS analyses, but is essential for this severely depressed stock.

The Council and Commission were presented with the following analysis so that they could choose an appropriate reduction strategy that would balance effective reductions with the short term economic burdens placed on the participants in the fishery.

GENMOD, an age-structured population model was used to simulate the summer flounder population under the various reduction strategies. The model has been used to determine optimal harvesting strategies for several fish stocks including anchovy, Atlantic menhaden, Pacific ocean perch, bluefish, and winter flounder. A description of the model and its use can be found in Hightower and Grossman (1985 and 1987).

The model uses standard fisheries equations to simulate the dynamics of an exploited fish stock. The model requires input data on weight-at-age, fecundity, mortality, and recruitment. These data were obtained for summer flounder from several sources including the summer flounder FMP, Stock Assessment Workshop (SAW) documents, and NEFC personnel (Table 73).

The model is most affected by changes in the stock-recruitment (S-R) relationship, specifically the value of alpha, the slope at the origin of the S-R curve. Alpha can also be defined as the rate at which the population could grow if there was no inhibition due to parent stock size.

Because of the controversy associated with the use of the S-R relationship developed by Chang and Pacheco (1975) and used in a previous version of this risk assessment, alpha was estimated using alternative techniques based on life history parameters (Table 16). Specifically, these methods estimate alpha or r_m, the innate or intrinsic ability of a population to increase in size under favorable environmental conditions. Values of r_m are then converted to alpha. Based on the five separate methods a mean alpha of 2.53 was calculated and used in the simulation.

The beta term of the S-R relationship was estimated by incrementally adjusting the S-R relationship to derive an MSY value of approximately 45 million pounds. This value is close to the estimate derived by Chang and Pacheco (1975) and Fogarty (1981). Commercial and recreational landings since 1979 have averaged approximately 48.2 million pounds.

The model was first run to determine the spawning stock biomass (SSB) associated with specific fishing mortality rates. This allowed the determination of the SSB equal to 5%, 10%, 15%, 20%, 25%, and 30% of the unfished level (% of maximum spawning potential or MSP). A 20% MSP value has been used for some groundfish (e.g., cod, yellowtail, and winter flounder) and other fish species (red drum and scup) to define the minimum level at which the stock can sustain itself over an extended period of time. The 10% MSP level can be used to define the level below which the probability of recruitment failure is high. The other values were either suggested by MAFMC Demersal Committee members or are presented for illustrative purposes.

Using the 5% to 30% values as targets, the model was then run to determine the probability of reaching these values in 5 and 10 years under the various mortality reduction alternatives. In order to simulate random variability in recruitment (that is, due

to environmental effects), a multiplicative lognormal error term was used. Hightower and Grossman (1985) suggested that this term ranged from 0.25 to 0.75 for most fish stocks. A value of 0.75 for summer flounder was used in these simulations. An identical value was used by Gibson (pers. comm.) to simulate the winter flounder population.

The error term can also be estimated from a series of recruitment data by calculating the mean and standard deviation from a log transformed index and then dividing the standard deviation by the mean to calculate the mean square error (MSE). Because the MSE represents the variability in recruitment due to both environmental factors and spawning stock size, it is an overestimate of the lognormal error term. Using the YOY index obtained from the VIMS trawl survey the calculated MSE would be 0.96. Assuming 75% of the MSE is due to environmental effects (Crecco pers. comm.), an estimate of the lognormal error term would be 0.72.

The results of the VPA, specifically the 1989 numbers at age, the last year in the VPA time series, were used to estimate the current population size (number at age) prior to implementation of theoretical reduction strategies (Table 15). The probabilities associated with the alternatives were then derived using this starting age vector and the appropriate Fs. A frequency distribution of spawning biomass at the end of 5 or 10 years was then obtained by replicating the model 100 times for each 5 or 10 year period. This distribution served as the basis for the estimated probabilities.

Based on the strategy adopted by the Council and ASMFC Summer Flounder Management Board, the probability of reaching a 20% MSP in 5 years (Figure 16) and 10 years (Figure 17) would be approximately 30% and 100%, respectively. The probability that this reduction strategy would result in a 10% MSP in 5 years was close to 80%. The Council and the Commission rejected the other alternatives because they had an associated high risk of recruitment failure (that is, the proposed strategy did not have a high probability of achieving the 10% MSP level in 5 years or the 20% MSP in 10 years) or the economic burden on fishermen was too great.

For example, the alternative with the least amount of reduction in mortality had about an 8% chance of allowing the stock biomass to rebuild to a 10% MSP level in 5 years. In contrast, a total closure strategy in year one with levels of mortality set at F_{max} in subsequent years, would have virtually guaranteed a 20% MSP level in 5 years, that is the associated probability was nearly 90%.

It is important to note that the probabilities associated with each one of the reduction strategies reflect the assumptions associated with the input data. For example, if the mortality on age-1 fish is reduced due to the implementation of mesh regulations or minimum fish size, the associated probabilities would increase. Alternatively, if the variable associated with the effects of environmental factors on recruitment was less than 0.75, the value assumed for the model, the associated probabilities would decline. In addition, if the current (1991) population is more reduced than suggested by the 1989 numbers, than the associated probabilities are overestimates.

The following cost/benefit analysis of management measures recognizes that, due to the interannual variability in fishing effort, stock size and fishing mortality, and the variability

associated with the point estimates for expanded recreational catch and commercial fishery landings, it is unwise to use only the past one or two years of data for assessment of fishery conditions and evaluation of management alternatives. Trends are more discernible at the five or ten year level, though they may be reinforced or contradicted by more recent data. A one year decline from a record high catch is more alarming if it substantiates a consistent downward trend from a ten year average.

Since most fish stocks are comprised of many cohorts, the effects of sustained overfishing are expressed through age class compression and lower CPUE over a period of time. Likewise, management measures aimed at reducing fishing mortality will require an adjustment period before the stocks show signs of increased abundance.

Given the above mentioned characteristics of fish stocks and fisheries, it is prudent to use five to ten year time horizons both for evaluating fishery conditions and for implementing reduction strategies. Such long term horizons are scientifically sound, and therefore approvable under the Magnuson Act, but they do affect economic assessments of the impacts of management measures.

In assessing impacts, analyses were performed relative to conditions which would prevail in the absence of the proposed regulations. For example, if a possession limit were imposed on the recreational fishery, the impacts should be gauged against what anglers would catch in the absence of the limit. Since predictions of angler effort and stock size are uncertain, the best way to estimate catch rates is to extrapolate from past experience. Extrapolations based on one year of data may not as accurately reflect true patterns when compared to extrapolations based on a longer time series.

Since stock recovery cannot be instantaneous, it is appropriate to assess impacts, both costs and benefits, over a time frame sufficient to reduce the uncertainty of estimates resulting from interannual variability. However, short term evidence of stock condition and fishing success must not be ignored when monitoring the effectiveness of management measures. Rather, abrupt changes in fishery conditions should be weighed against long term trends and fishery independent evidence before adjusting and implementing regulations.

Without management to address overfishing, the future of the commercial and recreational industries which depend upon this resource are in serious jeopardy. These industries generally consist of three distinct sectors: harvesting, processing and marketing. Many individuals and firms specialize in a single sector, although some vertically integrated companies span all sectors, and diversified companies are often involved in food related industries besides seafood.

The exvessel value of summer flounder landings has increased from about $16 million in the early 1980's to a peak $41 million in 1988 (Table 46). Exvessel value dropped to $28 million in 1989, due to a nearly 13 million pound decline in landings, but a rise in average price to $1.56 per pound helped to temper the effect on revenues to harvesters. Inflation adjusted prices (1989 dollars) have more than doubled over the 1980-89 time period from $0.64 to $1.56 per pound.

Nationwide, the summer flounder percentage of overall US commercial flounder landings over the past 10 years has varied from 9% to 17% (Table 48). In terms of value, however, the summer flounder percentage has ranged from 16% to 29%, indicating the higher value placed on fresh flounder in US east coast markets.

At $1.56/lb, the average price (all sizes) of summer flounder reached a record high in 1989 in both nominal and inflation adjusted (1989) dollars (Table 46). In 1989, highest prices were received in the northern States with Connecticut the leader at $2.50 per pound (Table 49). Real price per pound for all size categories has fluctuated over the past seven years with noticeable drops in 1983-84 and 1988. The supply - price relationship is also observable on a monthly basis. Months with highest average exvessel prices tend to coincide with months of lowest landings, normally in June and July (Table 50). Prices received for summer flounder originating in the EEZ were generally higher than for State waters and tracked the seasonal supply relationship. The 1989 coastwide average exvessel price per pound for jumbo was $1.93, $1.57 for large, $1.44 for medium, $1.09 for small, and $1.71 for unclassified landings (Table 51).

The Summer Flounder FMP (MAFMC 1988) requires annual permits for commercial fishing vessels taking summer flounder within the US EEZ. Without individual logbooks, however, information on the total number of vessels actually landing summer flounder (or the extent of dependence on summer flounder) is difficult to assemble. NMFS permit files indicate that 2,003 vessels have checked off summer flounder as an intended commercial fishing activity for 1990. Many vessel owners check off the summer flounder category to maintain flexibility of fishing operations pending the availability of species, or to maintain eligibility given concerns about a potential limited entry program. Other vessels anticipate taking summer flounder as bycatch during normal fishing activities for other species. Not all permit holders are participants in a full time directed fishery for summer flounder.

The NMFS weighout system records can be used to estimate the number of vessels landing summer flounder in covered States (CT, DE & NC are not currently included), but even so, the data do not constitute a complete census. Finfish otter trawl vessels comprise the vast majority of the vessels covered by the weighout system. Since 1983, between 599 and 704 otter trawl vessels have landed summer flounder on a year by year basis (Table 52) with a general trend downward. In 1983, 612 vessels landed 100 pounds or more of summer flounder (Table 52). By 1989, this number fell to 510 vessels.

The number of trips landing any summer flounder also decreased during the 1983-1989 period (Table 53), from 11,643 in 1983 to 10,828 in 1989. Trips landing 100 pounds or more of summer flounder fell from 6,509 in 1983 to 5,215 in 1989.

Summer flounder tend to have a higher value per pound than other species caught with them. The average trip catch for 1983-89 for trips when any summer flounder was landed was 24% summer flounder (Table 29), whereas the summer flounder exvessel value for the same trips was 41% of the total (Table 54). The second most important category was "Miscellaneous species" (28%), which is largely yellowtail flounder and other groundfish species.

Average monthly data for the period 1985-1989 (Table 55) indicate that summer

flounder are more important in value, in all months, than any other species, except "Miscellaneous species" in the month of May. Summer flounder accounted for more than 30% of average trip exvessel value in all months but May (26%), with other significant species including winter flounder (April - August), *Loligo* (December - May), and miscellaneous species (all months; Table 56).

If trips landing more than 100 pounds of summer flounder are examined (Tables 57 and 58), the 1985-1989 average exvessel summer flounder value per trip never falls below $1,955 (33%), and is as high as 74% in August.

Vessels which land summer flounder in Connecticut, Delaware, and North Carolina are missed by the weighout system. About 150 vessels participated in the 1985-86 North Carolina winter trawl fishery. Of these, about 80 landed fish north of North Carolina during the year (J. Ross pers. comm.). There are a substantial number of finfish otter trawl vessels which fish for summer flounder up and down the Atlantic coast. This mobile fleet is composed of vessels from North Carolina, Virginia, New Jersey, and other States (Stevenson pers. comm.). Some of these vessels direct on summer flounder in the winter and direct on scallops or other species in the summer. Other finfish otter trawl vessels fish for summer flounder in mixed fisheries with squid or other species, on the basis of local availability, or land them as bycatch in other directed fisheries.

The New England full time otter trawl fleet increased 66% between 1976 and 1985 while per vessel deflated gross revenue decreased 20% (Kurkul and Terrill 1986). This appears to be a result of decreased landings per vessel rather than increased expenses.

Vessels which use otter trawls other than finfish otter trawls are expected to be similar in their characteristics to finfish otter trawl vessels. Scallop dredgers are predominately the same type of vessel (often the same vessels) as those which use finfish or other otter trawls. Therefore, these vessels' fixed costs, with the exception of gear costs, would be the same as finfish otter trawlers while their variable costs will vary somewhat depending on weather, bottom topography and drag, etc. Summer flounder is considered to be a bycatch for these vessels for the purpose of these analyses.

Fishing costs for pound nets, fish traps, and hand line operations are much less than costs for otter trawlers. Fish trap fishermen typically use 70 ft vessels with major expenditures for wages (41%) followed by nets (15%) and taxes (12%) . Rhode Island is the only State which lands summer flounder in fish traps and in 1980 approximately six firms had permits (Norton *et al.* 1984). Hand line fishermen typically use a small boat (17 ft average), have major expenses of wages (35%), fuel (16%), and tackle (16%), and in past years made much of their income from striped bass (Norton *et al.* 1984).

Almost all summer flounder are sold in fresh form. The catch is generally iced at the dock and then shipped to market. Some filleting is done by primary processors, for instance four processors in New Jersey and Virginia reported in 1980 that they filleted 5 to 25% of the summer flounder they received (Scarlett 1981). All Long Island landings are currently boxed at sea and then transported to market (Mason pers. comm).

A study conducted in New England in 1982 (Hu *et al.* 1983) showed that labor costs

would be reduced approximately $0.05 per pound by filleting large flounder instead of small flounder. This is the result of more fillet weight per flounder and the reduced time involved in the fillet process. The species of flounder examined and the size differences were not mentioned.

The cost of processing a pound of New England groundfish was $0.67 in 1982 (Dressel and Hu 1983). The percentage by units of production were: 45% labor, 8% energy, 10% packaging, 4% other variable costs, 3% interest, 12% administration, and 18% other fixed costs. The processing cost increases had risen slightly less than the producer price increases in the 5 years previous to 1982. The net profit was determined to be $0.05 to $0.10 per pound depending on species. Georgianna and Dirlam (1982) determined the pretax profit on flounder processed in New England in 1979 to be between $0.03 and $0.33 per pound. Since summer flounder are sold fresh the processing costs should be less for packaging and for labor when there is no filleting. Summer flounder processing costs in Virginia and North Carolina are expected to be less due to lower wage rates. The overall marginal costs of production in New England were determined to be constant over a wide range of production (Georgianna and Hogan 1986).

Because processing plant data are not specific to summer flounder, the number of plants handling summer flounder is unknown. The number of processing plants handling all flounders from Maine through North Carolina has varied from 123 in 1981 to 138 in 1984 and 1987 (Table 59). The value of the flounder processed by these plants has varied from $70 million in 1980 to over $150 million in 1986 and 1987 (Table 60).

The major central wholesale market for fresh fish in the Mid- Atlantic region is the Fulton fish market. Summer flounder were received at Fulton market in 1984 and 1985 from the States of Massachusetts through North Carolina. The market handles approximately 6 to 8% of total summer flounder landings (Table 61). If only those summer flounder landed north of Maryland are considered then the percentage rises to approximately 11%. Almost none of the summer flounder entering Fulton market is in the fillet form and little filleting is done there (Petrovich pers. comm.).

Summer flounder prices for each size category vary from processor to processor and from day to day for each processor. The prices react to the market supply of summer flounder, other flounders available, imports, and wholesale/retail demand. The size categories of summer flounder are likewise not fixed. In the areas where more summer flounder less than 14" are landed there is a greater tendency to call smaller fish mediums than in areas where fewer summer flounder less than 14" are landed. The exact lengths which comprise a size category are known to vary from processor to processor and day to day. This variation in price leaves the fisherman with a sense of uncertainty in terms of what he will receive for his catch. Such uncertainty is common in the fishing business.

In 1985 there were 20 processors handling flounder in North Carolina (MAFMC 1988). Since summer flounder is the primary flounder landed in that State, it is assumed that all processors handle summer flounder. There are 6 fish processors in Wanchese being supplied by 30 to 40 otter trawlers and 5 or 6 fish processors in Morehead City supplied by at least 10 to 15 full time otter trawlers (North Carolina 1986).

Because processing plant data are not specific to summer flounder, the number of plants handling summer flounder is unknown. The number of processing plants handling all flounders from Maine through North Carolina was 138 in 1984 and 132 in 1985 (MAFMC 1988). The value of the flounder processed by these plants was $137 million in 1984 and $138 million in 1985.

Recent and specific information on the distribution of processed summer flounder products to restaurants, specialty shops, institutional food service, and supermarkets is lacking. However, four surveys were conducted between 1970 and 1981 which determined per capita consumption of various species of fish or species groups. The surveys did not collect usable data on home consumption of fish caught by recreational fishermen so results must be interpreted for seafood obtained through commercial channels only. Findings of the four surveys were collated and summarized by Hu (1985) in order to investigate how socio- demographic and economic factors related to seafood consumption over time.

Regression results of the 1977-78 survey indicated positive income elasticities for both expenditures and quantity consumed (Hu 1985). Overall, a 10% increase in income would result in a 5% increase in expenditures for flounder and a 4% increase in consumption. A demand function for nationwide flounder consumption was derived by Hu *et al.* (1983). The linear regression equation considered annual per capita consumption of flounder as a function of a constant, the average price of flounder per pound, and the annual per capita disposable income in adjusted (real) dollars. The data covered the period 1960 through 1980. The results indicated that a 10% increase in the price of flounder had no significant effect on the consumption of flounder. Also, a 10% increase in income induced an 11.9% increase in the consumption of flounder.

Hu *et al.* (1983) results, if generalized to apply to summer flounder, suggest that demand is normal and is generally inelastic. An increase or decrease in the wholesale price of summer flounder would not affect sales significantly. The implication is that the major factor affecting sales appears to be disposable real income and this will affect sales regardless of the price level.

A study by the National Fisheries Education and Research Foundation estimated sales, employment, and wage impacts for flounder harvesting, processing and distribution in the Mid- Atlantic region for 1986 (NFERF 1989). Since summer flounder comprised 84% of the total flounder landings in this region in 1986, specific estimates for summer flounder can be derived from the estimates for total flounders.

Cumulative direct impacts of the Mid-Atlantic summer flounder fishery (Table 62) amounted to 2,290 person years of employment, $21.6 million in income, and $50.2 million in output (sales). Over 60% of the employment was generated in the food service sector. Harvesting and processing made up most of the remainder, each accounting for just under 15%. Income per person - year was highest in the harvesting and distribution sectors and lowest for processing and food service, probably related to the labor intensive nature of the two latter sectors. Value of output was high for harvesting, processing and food service, indicating the large markup in these sectors. These direct impact estimates are comparable to direct impacts estimated for the summer flounder

recreational fishery (section 8.2.2) and reflect the distribution (60/40) of landings between the commercial and recreational fisheries (Table 39).

Recreational fishing contributes to the general well being of participants by affording them opportunities for relaxation, experiencing nature, and socializing with friends. The potential to catch and ultimately consume fish is an integral part of the recreational experience, though studies have shown that non-catch related aspects of the experience are often as highly regarded by anglers as the number and size of fish caught. Since equipment purchase and travel related expenditures by marine recreational anglers have a profound affect on local economies, the maintenance of healthy fish stocks and development of access sites is as important to fishery managers as the status of commercial fisheries.

Summer flounder anglers are diverse in terms of participation mode, but MRFSS data indicate 78% of summer flounder (by number) were caught from private or rental vessels in 1989 (Table 43). Ownership of a private vessel involves investment and maintenance costs, thus contributing greatly to measures of economic impact. In addition to private and rental boats, 12% of summer flounder were caught from shore and 10% from party and charter boats. The Summer Flounder FMP (MAFMC 1988) requires annual permits for party and charter boats which take anglers to fish for summer flounder within the US EEZ. NMFS permit files indicate that 213 vessels have requested a summer flounder party/charter permit for 1990. It is likely that many more vessels are actually dependent on summer flounder fishing for a significant fraction of passenger revenues. Without individual logbooks, however, the total number of party and charter vessels actually directing trips on summer flounder is difficult to determine.

In 1985, a total of 454 party and 1,626 charter boats operated out of Atlantic coast ports from Maine through North Carolina (Table 63). These vessels generated revenues of $101 million in 1985. Estimates of party and charter boat trips directed at summer flounder are lacking for specific regions along the coast, but a 1987 survey of New Jersey party and charter boat owner/captains (Brown and Ofiara 1989) may be indicative of the Mid-Atlantic region. Survey respondents reported that, in 1987, New Jersey party boats targeted 21.7% of trips towards summer flounder and New Jersey charter boats targeted 10.4% of trips for this species.

The NMFS estimated that 8,900,000 angler trips (all modes) were nominally directed at summer flounder in 1988, out of a total of 23,941,000 trips (Table 40). Over 80% of those directed summer flounder trips were made in the Mid-Atlantic region, further underscoring the importance of summer flounder to coastal counties in the region.

In 1985, Mid-Atlantic region direct sales related to marine recreational fishing for all species amounted to over $1.0 billion (SFI 1988a). These sales and services required 17,000 person-years of labor and generated wages of $213.8 million. Adjusting these expenditures to account for species preferences, angling for summer flounder was estimated to be the second most popular recreational fishing activity for the Mid-Atlantic region in 1985 (SFI 1988b). In the North and South Atlantic regions, summer flounder impacts were not specifically enumerated due to the greater relative popularity and abundance of other species.

The Sport Fishing Institute estimated that 10% to 15% of the $1.05 billion in retail sales directly related to Mid-Atlantic marine recreational fishing in 1985 could be attributed to summer flounder (Table 64), making it second only to bluefish in importance to anglers. The estimates disaggregate the regional economic impacts to summer flounder based on the percent of total trips where summer flounder were reported as the target species. The minimum estimate uses the target percent as given. The maximum estimate assumes that those individuals, who did not identify a target species, have the same distribution of species preferences as those who did express a preference. Estimates of the economic activity associated with recreational fishing for summer flounder on the Atlantic Coast in 1985 are: $110.1 to $152.8 million in retail sales; 1,795 to 2,494 person- years of employment; and $22.4 to $31.1 million in wages and salaries (Table 64). These estimates are comparable to the above estimates for the commercial fishery.

Clearly, the economic impacts associated with Atlantic coast recreational fishing for summer flounder are significant. Estimates of aggregate economic value are not currently available, however. The value of recreational fishing can be divided into actual expenditures and a non-monetary benefit associated with satisfaction (consumer surplus). Combined, these two values divide the area under a demand or willingness-to-pay curve up to the point of the quantity of trips taken at given levels of costs, catch rates, etc. (Figure 15).

The demand for recreational fishing trips is determined by the costs of equipment, travel expenditures, catch rates, accessibility of fishing sites, weather, social experiences, and many other factors affecting angler enjoyment. Holding all other factors constant (expenditures, weather, etc.), a decrease in the catch (or retention rate) of fish should move the demand curve to the left (Figure 15). Likewise, an increase in the catch (or retention rate) of fish should move the demand curve to the right. Each move will have an associated decrease (increase) in angler expenditures and total benefits.

The above estimate of total expenditures made fishing for summer flounder is useful for economic impact analysis, but it is impossible to estimate the total value (willingness to pay) of summer flounder without an estimate of the marginal value per trip. The determination of marginal value requires a demand curve for recreational fishing. In the case of summer flounder, as with many recreationally sought species, an aggregate demand curve is not available.

Several studies have estimated the value of a recreational fishing day for saltwater angling along the Atlantic coast. A University of Delaware study (Rockland 1983) presented value per trip for marine recreational fishing at nine sites in Delaware. This study used the travel cost method with a variety of estimation approaches. The range of average values for the boat fishing sites was $20.58 to $39.90 per day, whereas the range for shore fishing was $37.47 to $62.53 per day. A study of recreational striped bass fishing on the Atlantic Coast presented estimates of $39 to $169 per day (Norton *et al.* 1983). A 1982 study conducted for the State of Florida derived estimates of $18.97 to $57.99 per day for all marine species (Bell *et al.* 1982). Since the above studies are 7 to 8 years old, the dollar values are understated because of inflation.

It is important to note that the average cost of a summer flounder trip or fishing day is

not equivalent to the marginal value of a recreationally caught summer flounder. Attributes of a recreational fishing day other than catching fish are valued by anglers, so all expenditures are not dependent on summer flounder catch. The marginal value of summer flounder catch must be estimated, and as with any normal good, marginal value declines with increasing quantity. Agnello (1989) determined the marginal value of recreationally caught summer flounder by considering fishing success as a shift factor in the demand for summer flounder trips. Using the travel cost method, estimates of marginal value for the first summer flounder caught by the average angler ranged from $4.00 to $17.73 (1987 dollars) depending on the specification of the regression model. Estimates for the average summer flounder, about four fish per angler, ranged from $2.06 to $9.24, indicating a declining marginal value for each successive summer flounder kept.

The charter and party boat industry is important in several States in the management unit of this FMP. On average for the 1985-1989 period, 16% of the summer flounder (in numbers) landed by anglers in New York was caught from party or charter boats (Table 65). For New Jersey the share was 17%, for Delaware 23%, and for North Carolina 13%. Charter and party boats in the other States accounted for less than 10% of the landings in each State. The North Carolina party and charter boat share was 28% in 1985, fell to 1% in 1986, and was less than 1% in every year since, through 1989 (Table 65). To provide additional information on this segment of the industry, the Council conducted a survey of charter and party boat owners in the summer of 1990 with the purpose of acquiring information in support of management efforts for the summer flounder, scup, and black sea bass fisheries. A mailing list was compiled from the NMFS vessel permit files, including all vessels which indicated they were involved in party and charter activities (permit Category 2). The list included 402 vessels. Representatives from New Jersey, New York, and Virginia supplied the Council with lists supplementing the NMFS permit files, and an additional 190 questionnaires were mailed. A total of 592 surveys were sent out to 13 east coast States (Table 66). Massachusetts, New Jersey, New York, and Virginia were most heavily represented, together accounting for 80% of survey mailings.

A total of 202 surveys were returned to the Council, 172 of which were usable. The 30 returns which could not be used were inappropriate mailings that fell into the following general categories: did not charter/fish in 1989; private boat, not for hire; dive boat, primarily after lobsters; returned as undeliverable by Post Office; or sold boat. Usable returns equaled 29% of total mailings, with the percentage ranging from approximately 20% - 50% for individual States.

Some of the analyses conducted on the survey divided the responses into "Party boat" versus "Charter boat" categories. Typically, charter vessels are thought of as hiring out for a day's fishing to a small number of individuals at a cost of over $100 per person. They provide a high level of personal attention to the passengers and will make special efforts to find the particular species for which their client's are interested.

"Party boats" are generally larger vessels which run on a fixed schedule and carry from 10 to 100 passengers, averaging around 20. They offer fewer options and less attention to passengers, yet charge much lower fares than charter boats (in the $20 -

$40 range).

In order to have the ability to differentiate between these two groups, the data were partitioned based on the reported number of passengers each vessel could carry. Examination of the data showed a logical division between those vessels which reported carrying 8 or fewer passengers, and those able to carry more than 8. (The average fee charged per person dropped significantly for those vessels carrying more than 8 passengers.) For purposes of this analysis, then, "charter boats" are defined as those boats carrying 8 or fewer passengers, and "party boats" those which may carry 9 and above. It is recognized that charter boat licenses for generally for six passengers and, in fact, responses to another question indicated that the average charter boat carried 6 passengers (SD = 0.4), while the average party boat carried 53 (SD = 32), so it is quite likely that the respondents that indicated they owned a charter boat that carried eight people were including the captain and mate whereas in the subsequent question they were referring to the six paying passengers.

The first question on the survey attempted to gauge the interest or demand which party and charter boat customers exhibited for common species (or species groups). Given a five point scale, owners were asked to rank each species as being: 1 = Low, 2 = Somewhat Low, 3 = Moderate, 4 = Somewhat High, or 5 = High in interest to their customers. Calculating mean values of responses allows comparison of the different species using a single number for each.

Spot ranked as the most desirable fish for party boats (mean interest = 4.7), illustrating its importance to the well represented boats of Virginia (Table 67). It was followed by bluefish (4.6), then summer flounder (3.6), and striped bass (3.5). These desires only met with partial fulfillment, however, for the top four fish which party boats reported catching were: bluefish (4.0), Atlantic mackerel (3.5), spot (3.4), and black sea bass (2.9).

Perhaps the most important finding of the survey was the fact that, for party boats, summer flounder ranked as the fish anglers were least successful in catching; the absolute bottom of the list in 1989 (mean success = 1.5; Table 67).

An additional perspective can be gained on the situation by creating what might be termed a "frustration index," or simply the difference between fishermen's interest in catching a particular species and their success in doing so. Summer flounder again stands out by having the largest difference between interest and success values for party boat fishermen (2.1), followed by striped bass and weakfish.

Charter boat owners reported a preference ordering similar to that of party boats for their customers, with the exception that large pelagics took the second ranked spot. The top five species were: spot (4.6), large pelagics (3.9), bluefish (3.9), striped bass (3.7), and summer flounder (3.2; Table 67).

Summer flounder placed fourth from the bottom of charter boat success rankings, with a mean of 1.9. On the "frustration index," summer flounder in 1989 reached third from the top (1.4), exceeded only by large pelagics (1.5) and weakfish (1.4).

In 1989, the average party boat customer traveled 67 miles, with a standard deviation (SD) of 43 miles. The farthest party boat customer traveled 695 miles (SD = 1,125 mi.). In 1989, the average charter boat customer traveled 123 miles (SD = 194 mi.). The farthest charter boat customer traveled 727 miles (SD = 914 mi.).

Charter boat respondents indicated that 38% of their customers were more interested in a particular species, 15% were more interested in fishing enjoyment, and 46% were about equally interested in each. For party boats, the responses were 43% for a particular species, 12% for the fishing experience, and 45% equally for each.

For charter boats, 89% of the respondents were both owner and operator (7% just owner, 5% just captain). The party boat responses were 94% owner and captain, 2% just owner, and 4% just captain. Only 14% of the charter boats were used year round (86% seasonally), while 18% of the party boats were used year round (82% seasonally). The average charter boat carried 6 passengers (SD = 0.4), while the average party boat carried 53 (SD = 32).

Thirty six percent of the charter boat respondents indicated that they fished commercially in 1989, with 91% of those fishing commercially from the charter boat and 9% from another boat. For party boats, 26% of the respondents indicated they had fished commercially in 1989, with 69% of those fishing commercially from the party boat and 31% from another boat.

On a scale of 1 (almost none) to 5 (almost all), respondents were asked what part of their personal earnings in 1989 came from party and charter boat fishing, commercial fishing, or other sources. For charter boat respondents the mean answers were: charter or party boat fishing, 2.2; commercial fishing 1.5; and other sources, 4.0. For party boat respondents the mean answers were: charter or party boat fishing, 3.2; commercial fishing 1.3; and other sources, 2.4.

Respondents were also asked what their perception of fishing success was for 1989 and what they thought their customers' perceptions of 1989 fishing success was. Ranking was on a scale of 1 (good) through 3 (bad). For charter boats, the operators reported a mean of 2.1 (SD = 0.7) for their own view and 1.9 (SD = 0.7) for their customers. For party boat operators, their own perception was 2.2 (SD = 0.6), while they thought their customers would rate the season at 2.0 (SD = 0.6).

The survey included a series of questions to determine how the respondents felt business was in 1989 compared to 1985. Both charter and party boats made slightly fewer trips in 1989 compared to 1985 (Table 68). The days per trip and/or trips per day were essentially unchanged. They operated fewer days per week, on average, and carried slightly fewer customers. The average price per trip increased from $121.80 to $149.50 for charter boats and $26.20 to $29.20 for party boats. The average number of fish taken per customer for charter boats fell from 10.9 to 8.3 for charter boats and from 15.2 to 9.9 for party boats between 1985 and 1989. The number of crew members stayed relatively constant. The average cost per trip rose from $96.10 to $131.10 for charter boats and from $113.30 to $146.60 for party boats.

E.2.b.2. Recreational Fishery

E.2.b.2.1. Possession limits, minimum size limits, and seasonal closures

MRFSS intercept data from the years 1986 to 1990 were used to determine the impact of alternative possession/size limits on recreational landings. These data indicate that approximately 6% of the successful angler trips would have been affected by a 6 fish possession limit in these years (Table 74). Based on a comparison of the number of trips landing any size summer flounder and those trips where only 14" TL or larger fish were landed, approximately 25% of the trips would have been impacted in those same years by the 14" minimum size.

The reduction in exploitation associated with a 6 fish possession limit and a 14" minimum size would have been 33.9% for 1986-1990 combined (Table 75). This reflects corrections for bias associated with the number of summer flounder measured in the MRFSS data set. MRFSS Type A fish are fish that are seen and counted by the MRFSS interviewers but not necessarily measured. Frequently, only a portion of the total landings attributed to an individual angler are weighed and measured. The initial analysis of possession and size limits assumed that the measured fish were representative of the sample and that measured lengths could be extrapolated to those fish that are not measured. Based on this assumption, the impact of a 6 fish possession limit and a 14" TL minimum size was 25.8%. However, for summer flounder there is slightly more than a 8% difference between the impact of a 14" minimum size depending on whether the analysis is based on all Type A fish or only those that are measured. Accounting for this bias results in a percent reduction of 33.9% for a 6 fish possession limit.

The proposed reduction strategy calls for a reduction in exploitation of 47%. As indicated above, a 6 fish possession limit combined with a 14" TL minimum size does not achieve the target reduction of 47%. However, coastwide seasons would allow for higher possession limits with a 14" TL minimum size.

Analysis of summer flounder recreational data indicated that 20.1% of the annual landings occurred from 1 October through 14 May for the years 1985 to 1989 combined (Table 76). A closure during this period (i.e., an open season from 15 May through 30 September) would have an associated reduction in exploitation of 13.5%, assuming a combined hooking mortality/effort transference rate of 33% (20.1 - (.33 x 20.1)) (Table 77). The combined effect of the season closure with the possession/size limit restrictions would have an associated reduction of 47.4% (i.e., 33.9 + 13.5).

The recreational fishery management measures would allow for the States to incorporate a different open season provided the season remained within the same MRFSS waves (May through October) used in the coastwide season. MRFSS waves are bimonthly sampling periods, i.e., there are six waves in each year. Because of the method used to calculate the recreational estimates, catches are assumed to be constant for each week within the sampling period or wave. Thus, equivalent seasons within the same bimonthly sampling period would have the same effect on coastwide recreational landings. As an example, this provision would allow for southern states to begin and end the season on earlier dates. For example, the States of Maryland, Virginia, and North Carolina could

have an open season from 1 May through 15 September with northern States having a season from 15 May through 30 September. The combined coastwide effect with the 6 fish possession limit and 14" TL minimum size would be approximately 47%.

The adopted combination of a closed season, minimum fish size, and possession limit (during the first year of FMP operation there will be a 14" TL minimum fish size, 6 fish possession limit, and a fishing season from 15 May through 30 September) is seen as providing the best compromise between a season and a possession limit. The public hearing document included alternative combinations ranging from 3 fish with a season open all year to 10 fish and an open season from 1 July through 31 December. All the options were associated with a 14" minimum fish size.

These alternatives provided much debate in the meetings with the Council's industry advisors, in the hearings, and in the written comments received by the Council. The debate primarily focused on the issue of how small could a possession limit be and still attract fishermen (customers) to the party and charter boat industry. The conclusion was that with a limit less than 6 fish, the party and charter boat industry would be adversely impacted due to public perceptions that the cost of the fare exceeded the anticipated benefits of the trip, that is, the number of fish that could be legally taken.

E.2.b.2.2. Evaluation of framework provisions

Based on a recommendation by the Council and the ASMFC Policy Board, the Regional Director and the States in their respective jurisdictions could modify the possession limit to between 0 and 15 summer flounder per angler, the size limit from 13" TL to 16" TL, and open or close the fishing season for the entire year. Recreational limits would be revised according to specific criteria to account for changes in stock abundance and meet the time frame of the fishing mortality reduction strategy, that is, an F of .53 for years 1 through 3 followed by an F of .23 in subsequent years.

Short term impacts due to restrictive limits would be outweighed by the long term benefit of conserving the summer flounder stock for future generations of recreational anglers.

The possession limit may be raised to a maximum of 15 summer flounder, the size limit decreased to 13" TL, and the season open throughout the year. However, decreases in restrictions would only occur under circumstances of increased summer flounder abundance. Since the prevailing rate of fishing success would reflect increased stock abundance, the number of anglers catching their limit would be high for overly restrictive limits. Decreasing recreational restrictions by raising the possession limit, decreasing the size limit, or increasing the length of the fishing season would decrease the number of affected anglers and have less adverse impact than the limit in force at the time.

If stock levels are allowed to continue to decline or the amount of effort by recreational anglers increases (more trips or more people) disproportionately to increases in stock size, landing rates for anglers would decline regardless of specific limits. Adverse impacts would therefore be measured against the prevailing rate of fishing success and would not be as great as when summer flounder are abundant or angler effort is less. In addition, if stock levels do not increase during the first three years of plan implementation

recreational restrictions will have to increase to meet F_{max} levels in year four and subsequent years. Although it is not possible to estimate exact impacts for hypothetical levels of summer flounder abundance, it is clear that more restrictive limits than those proposed initially would have substantially less impact than a total fishery closure precipitated by stock collapse.

A zero possession limit or a season closed for the entire year would prohibit retention of summer flounder by recreational fishermen and would have significant impacts, depending on the level of fishing success currently operative and the value anglers place on retention of catch. A 16" TL minimum size, the most restrictive minimum size limit proposed for this framework measure, would have had an associated percent reduction in exploitation of nearly 54% for the years 1986-90. In addition, based on a comparison of the number of trips landing any size summer flounder and those trips where only 16" TL or larger fish were landed, approximately 58% of the trips would have been impacted in those same years by the 16" minimum size. These severe restrictions would only be implemented in the event that the stock continues to decline and stock collapse becomes imminent.

Reductions associated with these limits assume 100% compliance by recreational fishermen. To determine the compliance by recreational anglers to the 13" minimum size regulation which was implemented in the fall of 1988, MRFSS data from 1985 through 1990 were examined (Figure 18). These data indicate that the percent of summer flounder less than 13" TL declined from 27.4% in 1985 to a low of 7.6% in 1989, the year after implementation. However, the low value in 1989 probably reflects poor recruitment in 1988 (that is, no age 1 fish in 1989) rather than an increase in compliance. In fact, the amount of fish less than 13" TL increased to 10.4% in 1990 (it may be that the 5.5' minimum net mesh regulation implemented by the State of North Carolina contributed to this by allowing small summer flounder to escape alive). Levels of noncompliance will be considered in annual reviews when assessing the impact of bag/size limits on the recreational fishery and determining if modification to the possession/size/season limits are necessary. A thorough and consistent enforcement program is required for this or any other FMP to succeed.

Recreational harvest limits (minimum size limit, possession limit, and season) would be calculated on an annual basis to reflect the current status of the stock and the most recent information on recruitment. Year end total recreational landings would be compared to the harvest limit to ensure that the landings target was not exceeded. Based on a 14" TL minimum fish size in the recreational fishery and a 13" TL minimum size and a 5.5" minimum diamond mesh or 6.0" minimum square mesh in the commercial fishery, the 1992 harvest limit would be 4.4 million fish (Table 80). This is in excess of the 1989 landings of 1.8 million fish but well below the 1980-89 average of 15 million (Table 81). This system allows the most flexibility to the fishermen within the limits of the Magnuson Act and the implementing guidelines (that is, the size limit may be lowered or the possession limit increased or the season lengthened if the resource condition warrants).

E.2.b.3. Commercial Fishery

E.2.b.3.1. Minimum net mesh size

The proposed management measure of 5.5" minimum cod end mesh (diamond) or 6" minimum square, will impact the costs and revenues of the summer flounder fishery. Landings of other species taken as bycatch in the summer flounder fishery will also be affected, as will landings of small mesh fisheries not targeting summer flounder but which will be subject to the mesh regulation due to summer flounder landings of 100 pounds or greater per trip. These impacts may reduce in time as some of these species should attain a larger size due to reduced fishing mortality.

Weighout data indicate that 5,215 trips landing 100 lbs or more of summer flounder were made in 1989 (Table 53), by approximately 510 vessels (Table 52). It is estimated that approximately 90 North Carolina vessels are in the summer flounder fishery (Hogarth pers. comm.). In order to account for the other vessels not covered by the weighout system (CT and DE), approximately 625 vessels were assumed to be affected by the mesh size restrictions. Compliance costs to these vessels fall into the following categories: reduced catch of summer flounder; reduced bycatch of marketable species; and gear conversion and other costs related to altered fishing practices.

Reduced catch of legal sized summer flounder will likely be minimal. A 5.5" diamond mesh has a length of 50% selection (L_{50}) of 13.5" (Tables 82 and 83) and a 6 " square mesh is considered equivalent (section 3.2). All States currently have a minimum legal size limit for summer flounder at 13" or greater (Table 84) so small amounts of flounder which could be legally retained would in fact be lost due to the mesh restriction.

Bycatch of marketable species may be affected, however, since a monthly average of 26% or more of revenues from weighout trips landing 100 pounds or more of summer flounder were derived from other species during 1985-89 (Table 58). The extent to which marketable bycatch is reduced will depend on fishing practices (season, area, etc.) and the selection characteristics of a 5.5" diamond mesh (6" square mesh) for the particular species. Without specific selectivity information, the magnitude of bycatch losses cannot be determined. The problem may be most acute in the southern New England area where other groundfish are relatively abundant and contribute a greater share of the catch (Miscellaneous species in Table 58). However, the minimum mesh requirement implemented through Amendment 4 to the Multispecies FMP (NEFMC 1990) requires that a vessel use a 5.5" mesh net if a regulated groundfish species is on board, so, while Amendment 4 may have affected the summer flounder fishery in the southern New England area, this FMP will not impact that fishery since the 5.5" minimum mesh rule is already in place. Sea sampling data (Table 34) suggest that the *Loligo* and scup fisheries can be prosecuted with minimal summer flounder bycatch, so it is possible that they will not be significantly impacted given the 100 pound/trip threshold.

Cost increases associated with gear conversion are estimated to be about $1,000 per codend. Full costs cannot be attributable to the mesh size restriction, however, since many fishermen would be replacing codends due to State regulations and the Multispecies FMP or to normal wear and tear from fishing activities (generally every two

years).

Benefits of mesh size restriction in the directed summer flounder fishery would result from reduced fuel consumption and increased catches of larger summer flounder in future years. Studies on fishing net drag and fuel consumption indicate only marginal gains in fuel efficiency with small increases in mesh size, but in times of rising fuel prices savings can be more significant.

Greater gains will accrue to fishermen through protecting small summer flounder until they reach legal size. Discard mortality is extremely high (estimated to be at least 80%) for trawl caught flatfish and the problem is particularly acute when new year classes are abundant. The benefits of the proposed mesh size regulation will be manifested through a more balanced age structure of the summer flounder stock, and, thus, a lower risk of recruitment failure. Further, waste will be reduced due to (1) lower total discards and (2) lower mortality of net encounter.

A threshold of 100 lbs per trip would have affected approximately 85% of the vessels and 59% of the trips landing summer flounder from 1983-89 based on NMFS weighout data (Tables 52 and 53). These trips accounted for over 99% of the total summer flounder landed during these years. In fact, for each year from 1983 to 1989 this percentage was 99%. This period encompassed years in which recruitment was both good (1985) and very poor (1988).

The 100 lb threshold was used to define a regulated trip after NMFS disapproved the 500 lb threshold in Amendment 1. The 100 lb threshold would impact between 48 and 66% of the trips, based on annual NMFS weighout data from 1983 through 1989 (Table 30).

E.2.b.3.2. Square and diamond mesh equivalency

Data are limited on the selectivity of a square mesh for summer flounder on which to base an equivalent to the 5.5" diamond mesh. Unquestionably, mesh selectivity for cod, haddock, and pollock demonstrate that for round fish, diamond mesh of 5.5" has roughly the same selectivity characteristics as a square mesh of 5.0". However, selectivity behavior for flatfishes, like summer flounder, have been evaluated significantly less. The equivalency of a 5.5" diamond mesh selectivity to a 6.0" square mesh for summer flounder is based on three sources. First, Amendment 4 to the Northeast Multispecies FMP (NEFMC 1990) states: "The use of square mesh codends is known to significantly increase the retention of small flounders. Preliminary information indicates that a 5.5" square mesh codend may have roughly the same flatfish selectivity characteristics as a 5" diamond mesh codend." Second, in a selectivity study for nets for winter flounder in Connecticut, Simpson (1989) states: "Diamond mesh was found to have a length at 50% retention about 1 cm longer (L_{50} = 22.6 cm), and a selection range (3.4 cm) about 1 cm narrower, than square mesh in 102 mm codends." (conversion from metric is 1 cm = 0.39") The third source is from Canadian researchers in Nova Scotia (Cooper and Hickey 1989) who, while exploring selectivity behavior mainly for cod and haddock, observed: "For flounder, the diamond mesh codends always have higher 50% retention lengths and selection factors."

E.2.b.3.3. Exemptions to mesh regulation

There are three exemptions to the minimum mesh regulation (EIS section E.1). One exemption is the area of the EEZ east of 71°30'W, the yellowtail closed area, and 72°20'W (a complete description is in EIS section E.1.e.3). The other two exemptions are the fly net and pelagic net fisheries. These three exemptions were made because of the minimal summer flounder impacts relative to the tradeoffs of the socio-economic impacts and impacts to the human environment.

The exempted area was suggested by the New England Fishery Management Council.

Among the adverse impacts of a 5.5" diamond minimum mesh size (6" square) restriction for otter trawl trips would be the loss of marketable bycatch to fishermen who currently use smaller mesh in directed fisheries for other species, yet land 100 pounds or more of summer flounder. Many of these trips occur during the winter months off southern New England when vessels target on squid, butterfish, and other species with small mesh.

An analysis of 39 trips landing at the Pt. Judith Fishermen's Coop between December 1989 and April 1990 indicated that the summer flounder landings totalled between 565 and 3,834 lbs, while accounting for between 1.5 and 21.5% of the fish landed. A mesh of 5.5" would reduce total bycatch of other species to the point where profits for the entire trip would be reduced. On the other hand, discarding summer flounder to reduce landings below the 100 pound threshold would be wasteful since the fish are generally large. "Large" and "Jumbo" categories comprised 75% of the landings of summer flounder in Rhode Island during the first quarter of 1990.

NEFC commercial weighout data were used to determine the length frequencies of summer flounder caught in northeast statistical areas that were entirely offshore 71°30'W, the yellowtail closed area, and 72°20'W. Based on combined 1985 to 1989 data, 99.8% of the summer flounder caught in these areas and landed by commercial fishermen were 13" or greater in length. A total of 84.7% were 15" or larger. These values were higher than the percentages for all other water areas combined, that is, 88.6% of the summer flounder landed from the other water areas were 13" or larger and only 50% were 15" or larger.

Under this alternative, vessels fishing east of the line are exempt from the mesh size requirement if the vessel has a permit from NMFS to fish east of the line (EIS section E.1.e.3). Vessels with this special permit are prohibited from fishing west of the line and inshore in the yellowtail area. This provision also reduces waste by eliminating the need to discard summer flounder in order to avoid the mesh size requirement.

The mesh size requirement is designed to protect smaller summer flounder, which do not occur in these offshore areas in the winter months. The exemption is thus viewed consistent with the conservation goals of the FMP, while reducing discard waste in the summer flounder fishery.

The 1990 NMFS Sea Sampling program collected data on a number of otter trawl vessels fishing in areas distinctly east of the line. A combined total of 4,059 pounds of summer

flounder were caught by these vessels with approximately 8.8% of the summer flounder discarded. Discard rates for otter trawl vessels fishing for summer flounder in other areas exceeded 25%.

The special permit mechanism for implementing this exemption is readily enforceable without boarding the fishing vessel. The effort needed to obtain and cancel these permits should be more than offset by the flexibility the exemption offers the fishermen.

The fly net exemption was suggested by the South Atlantic Council and by the State of North Carolina.

The use of fly nets occurs generally between Cape Henlopen, Delaware, and North Carolina in the fall - winter season. Atlantic croaker, weakfish, and Atlantic mackerel were the dominant species in the fly net catches made during successive fishing seasons from 1985 to 1988 (in 1987-88 several catches of large bluefish increased this species' relative importance). Limited amounts of summer flounder are traditionally harvested by this gear, with estimates of only 266 pounds (0.8% of the catch), 91 pounds (0.3%), and 58 pounds (0.2%) for the 1985-86, 1986-87, and 1987-88 fishing seasons harvested per trip. If one extrapolates the North Carolina sampled fly net catch to the total landings in North Carolina, it appears there are between 300 and 500 fly net trips per year. The exemption should increase flexibility to the fishermen while not negatively impacting the conservation objective of the FMP.

The provision that the Regional Director may withdraw the exemption if the annual average summer flounder catch in the fly net fishery exceeds 1% of the total is another safeguard. The 1% is reasonable in light of the statistics in the preceding paragraph.

The pelagic net exemption was suggested primarily by New Jersey fishermen. These nets are similar to the fly nets, are used in the offshore squid fishery, and are sometimes called millionaire nets. The characteristics of these nets are such that virtually all of the summer flounder captured escape soon after entering the net.

E.2.b.3.4. Commercial quota

The 1992 maximum quota is only slightly less than the amount of summer flounder landed in 1990, but much less than the ten year average of 29.2 million pounds. However, landings of summer flounder represent only a fraction of the fishing mortality experienced by the stock. Undersized summer flounder, those less than 13" TL, experience both discard mortality and deaths due to encounters with commercial gear. The amount of fish dying due to these causes can be high with the current mesh sizes now used in the fishery, that is, an effective mesh size of 4.0" or less. Sea sampling data for 1990 indicated that the ratio of discarded to landed summer flounder can be as high as 1:1 (or 50%) during some months (Figure 19). Discard rates would be even greater in years of good recruitment, that is, years when more small fish were available. Discard rates on other trips may be significantly higher. In the yellowtail flounder fishery, discard rates as high as 9:1 have been observed.

Based on simulations conduced by the NEFC (Gabriel pers. comm.), approximately 22%

of the summer flounder caught by commercial fishermen using 5.5" mesh would be discarded under the preferred alternative (Table 80). A larger minimum size of 14" TL, comparable to the minimum size in the recreational fishery, would have a larger discard rate of 35%. To prevent waste, a smaller minimum size of 13" TL will be implemented for the commercial fishery.

A minimum mesh regulation will reduce discard and escape mortality of undersized flounder. Using historical length frequency information, a 5.5" mesh would have reduced the number of summer flounder killed by commercial fishermen in the years 1985-89 by 14% and 30% in the Northeast and North Carolina, respectively (Tables 85 and 86). However, decreases in mortality would occur only with the smaller fish; reductions in mortality would not occur for summer flounder once they reached the legal size of 13" TL. Essentially the fish that contribute the most to the spawning population, fish 13" TL and larger, would continue to experience high mortality rates; overfishing would not be reduced.

The commercial quota will control mortality on fully recruited, older fish. The ability to close the fishery (except for the 100 lbs/trip bycatch) is a very powerful tool in controlling mortality. This bycatch can be accounted for by closing the directed fishery soon enough to allow for the bycatch and, to the extent the quota is exceeded, by appropriately reducing the next year's quota. This combination seems to be the most reasonable compromise between stopping all fishing that may result in additional summer flounder mortality and allowing fishing to continue and making all adjustments in the subsequent year's quota. Since summer flounder may only be sold by and purchased from a vessel with a moratorium permit, the summer flounder bycatch will be accounted for by the vessel and dealer reporting system.

This management measure will result in a short term reduction in the marketable catch and long term benefits as more fish grow to larger sizes, mature, and increase the size of the spawning stock. In addition, a reduction in the mortality of small summer flounder will allow for increase in yield or harvest as small fish that were previously killed grow larger and add weight to the stock.

Combined, these two measures, the minimum mesh regulation and the commercial quota, will prevent overfishing and reduce waste. As the stock rebuilds, commercial quotas should increase. Assuming current levels of recruitment, and 100% compliance by fishermen and affected States, the quota could more than double in ten years.

E.2.b.3.5. Moratorium on commercial vessels

The MFCMA allows the Council to limit entry into a fishery if the Council considers the factors set forth in section 303(b)(6) of the Act: "establish a system for limiting access to the fishery in order to achieve optimum yield if, in developing such system, the Council and the Secretary take into account (A) present participation in the fishery, (B) historical fishing practices in, and dependence on, the fishery, (C) the economics of the fishery, (D) the capability of fishing vessels used in the fishery to engage in other fisheries, (E) the cultural and social framework relevant to the fishery, and (F) any other relevant considerations;"

Present participation in the summer flounder commercial fishery is estimated to range between 800 and 2,300 vessels.

In addition to summer flounder, these vessels land scup, black sea bass, *Loligo* squid, yellowtail flounder, and other species. Most of the marketable species caught in the mixed trawl fishery are depleted, if not technically overfished. The Mid-Atlantic Council has already determined that scup and black sea bass are overfished, has adopted a control date for limited entry (the same as that used in this Amendment for summer flounder), and intends to develop an amendment to this FMP to initiate Federal management of scup and black sea bass in the near future. The New England Council has adopted a limited entry control date for the Northeast Multispecies FMP (which includes yellowtail flounder in its management unit) and is debating including an entry limitation measure in an amendment to that FMP currently being developed.

Given the likely number of vessels operating in this fishery and the level of probable quotas in the near term, not controlling the number of vessels will lead to a significant waste of capital resources as the ever decreasing probability of profits are dissipated over more operating units.

In terms of other fisheries, only the Atlantic mackerel and *Loligo* and *Illex* squid resources in the northwest Atlantic are marketable and not overexploited (there are species such as rays and dogfish that are underexploited but currently unmarketable. However, they cannot be viewed as replacements for summer flounder. To successfully harvest *Illex* vessels must be equipped with freezers or recirculating sea water tanks. Mackerel fishing requires significantly different gear and fishing techniques.

In summary, there are no true alternatives to summer flounder. If there were, fishermen would be harvesting them already.

The Amendment proposes a moratorium on new entrants to the commercial summer flounder fishery. The main purpose of this provision is simply to cap entry so the States will have knowledge of the vessels operating in the fishery, thus facilitating developing the required quota management plans. The primary beneficiaries of the moratorium are the fishermen, since any future gains in productivity and profitability which may occur in the fishery will not be dissipated by future entrants. In this way, the individuals who make sacrifices today will be able to share in the benefits of future stock recovery, rather than others who experienced none of the hardship.

The initial impacts of this provision are purely administrative. Vessel owners or operators will be asked to provide evidence that they harvested summer flounder between 26 January 1985 and 26 January 1990.

No license is intended or necessary for those individuals who do not sell the fish that they catch.

There are a number of impacts which will occur in the short term. The very fact that entry into the industry has been curtailed will give vessels with moratorium permits a scarcity value that they would not otherwise possess. Experience in the surf clam fishery

has shown that, over time, the value these moratorium permits can accrue is substantial, though the magnitude in the summer flounder fishery will be reduced because thousands will be issued instead of hundreds.

Fishermen will also be impacted by the provision controlling vessel replacement. This is intended as a means to reduce the number of vessels in the fishery by attrition, and will expire in five years unless extended by plan amendment or replaced by an alternative limited entry system.

A final impact is the reduction in flexibility which fishermen with genuinely lost vessels will have in replacing them. The current specification of the preferred alternative requires that replacement vessels not have a larger tonnage or registered length than the original. On balance, this limitation is considered necessary to inhibit a large scale increase in the fishing power of the fleet through such replacements.

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

E.2.b.3.5.A. Present participation in the fishery.

Present participation in the summer flounder commercial fishery is estimated to range between 800 and 2,300 vessels. The proposed program of limited entry seeks to reduce the size of the fleet gradually through natural attrition. No vessel which is now actively fishing would be denied access to the fishery.

E.2.b.3.5.B. Historical fishing practices in, and dependence on, the fishery.

Virtually the entire summer flounder commercial catch is taken in otter trawls (Table 19). Many species are caught in conjunction with summer flounder (annual average data Tables 29 and 31; tow by tow data Table 33). Data for North Carolina (Table 37) shows as significant a bycatch mix as does the Mid-Atlantic and New England data (Tables 29 and 31). Economically, summer flounder is the most important species in the mixed trawl fishery (Tables 54 - 58). (For a more thorough discussion of bycatch, see EISsection G.1.a.)

E.2.b.3.5.C. The economics of the fishery.

As discussed above, summer flounder is economically the most important species in the mixed trawl fishery. The provisions of this Amendment, in order to solve the overfishing problem, will impose restrictions on the industry. Limiting entry is the only tool available under the MFCMA to allow vessel owners and operators to recover, at least in part, losses incurred during the rebuilding program. If entry remains open, profits will be dissipated among new entrants following recovery.

E.2.b.3.5.D. The capability of fishing vessels used in the fishery to engage in other fisheries.

Summer flounder vessels traditionally harvest other species (sections 7.1.5 - 7.1.7 and 8.1.1.2). However, a number of species in the mixed trawl fishery have also been determined to be overfished. The Mid-Atlantic Council has determined that scup and black sea bass are overfished and is preparing another Amendment to this FMP to add scup and black sea bass to the management unit (the Council has already adopted and published in the *Federal Register* a control date for limiting entry into the scup and black sea bass fisheries). The ASMFC has adopted an Amendment to their Weakfish FMP to eliminate an overfished situation and the Mid-Atlantic Council is beginning development of an FMP to extend the ASMFC regime into the EEZ. The Mid-Atlantic Council is also considering an Amendment to the Atlantic Mackerel, Squid, and Butterfish FMP to limit entry into the squid fishery, if not into all of the fisheries covered by that FMP. While summer flounder are caught with these and other species (sections cited above and Tables 29, 31, 33, and 34), because of its high value summer flounder is the most economically important species in the fishery (Tables 54-58).

The proposed limited entry program will not force operators out of the fishery unless they clearly do not meet a minimum standard of involvement and activity in the fishery. The program is designed to continue over a period long enough to allow the number of operators to seek its own equilibrium level through natural attrition and to acquire data for an alternative limited entry program.

E.2.b.3.5.E. The cultural and social framework relevant to the fishery.

Many of the vessels in the fishery are smaller, older, and are owned and operated by independent, individual fishermen who have obtained their position of ownership through individual enterprise. There is a strong tradition of summer flounder fishing within families. Many of the family operated businesses are the most vulnerable to an influx of additional vessels because they are not in a position to survive long periods without revenue, or to operate at significantly lower levels of gross revenue. Those traditional summer flounder fishing families will benefit from the historical participation requirements for determining access.

E.2.b.3.5.F. Any other relevant consideration.

The management program is designed to rebuild the stocks. However, the vessels currently in the fishery will have to sacrifice income opportunity as a part of the rebuilding program. While the net benefits to society from the management program are not in question, the benefits to individual operators who make the sacrifice could quickly be lost or eroded among new entrants. The length of the period of sacrifice is unknown. It would be unfair to dissipate the investment of these operators among a flood of opportunistic new entrants when it begins to appear that the stock is rebuilding. The proposed program of limited entry allows traditional operators to recoup at least a portion of their sacrifice. Such a program will promote resource stability and industry efficiency which is in the best interests of the fishing community and the nation.

E.2.b.3.6. Measures to minimize sea turtle conflicts

A Biological Opinion regarding the implementation of the Summer Flounder Fishery Management Plan (FMP) was issued on 2 August 1988 as required by Section 7 of the Endangered Species Act. The Opinion considered the impacts of the fishery and related management activities on listed species. Takes of endangered and threatened sea turtles in the fishery were determined to occur in some areas and years, but were felt to be below levels that would jeopardize the continued existence of any populations.

The fishery continued without restriction and, between 26 November and 7 December 1990, 54 sea turtles, including at least 8 endangered Kemp's ridleys, stranded on North Carolina beaches. In response, the North Carolina Division of Marine Fisheries closed State waters to summer flounder bottom trawling from Cape Hatteras Light to Ocracoke Inlet on 7 December 1990. Twenty one additional sea turtles stranded before the end of December. The total number of stranded sea turtles included 56 loggerheads, 9 Kemp's ridleys, 6 green turtles, and 4 unidentified sea turtles. Experimental trawl surveys conducted by the North Carolina Division of Marine Fisheries in December 1990 and January 1991 documented turtle takes outside of Ocracoke Inlet at a rate of 0.14 sea turtles per hour. During the State closure period, in conjunction with the NMFS Pascagoula Laboratory, a Turtle Excluder Device was developed for experimental use and tested on summer flounder bottom trawlers. On 26 December 1990, waters were opened to trawlers pulling TEDs until early January, at which time turtles were no longer encountered in experimental trawl surveys in North Carolina waters and restrictions were lifted.

Consultation was reinitiated due to new information collected during the stranding event and subsequent experimental trawls. Evaluation of the sea turtle and fishery distribution data (Figures 20 and 21), trawl data collected off North Carolina in December 1990 and January 1991 (Table 87) and stranding data (Figure 22), indicated that the conflict between sea turtles and the fishery occurs annually in the late fall/winter otter trawl summer flounder fishery in North Carolina. The second Biological Opinion, issued on 13 November 1991, concluded that continued unrestricted operation of the summer flounder fishery in waters off North Carolina and southern Virginia would jeopardize the continued existence of the endangered Kemp's ridley (*Lepidochelys kempi*) population. Reasonable and prudent alternatives were given which included requirements for vessels trawling for summer flounder to limit tow times to 75 minutes or use Turtle Excluder Devices (TEDs) in waters within 10 miles of the North Carolina and southern Virginia coast.

The Council was advised by NMFS of this situation on 22 August 1991, after the first set of hearings on Amendment 2 had been completed. The Council authorized additional hearings in Virginia and North Carolina so fishermen who would be impacted by the additional measures would have an opportunity to comment. The specific measure included in the notice for these hearings was developed by the Council staff following a conference call involving National Marine Fisheries Service Headquarters, Northeast Region, and Southeast Region staffs, the North Carolina Division of Marine Fisheries, and the Council staff, and was considered a workable solution to the problem by the NMFS, North Carolina, and Council personnel. That measure read as follows:

The Regional Director, Northeast Region, NMFS (Regional Director) is authorized to monitor sea turtles in the Exclusive Economic Zone from the mouth of the Chesapeake Bay to the southern border of North Carolina, through aerial surveys and sea sampling, in concert with similar efforts by the State of North Carolina, and to institute measures in this area within 10 miles (16.1 kilometers) of the shore to minimize the take of sea turtles in the summer flounder fishery between 15 October and 15 January, compatible with such measures instituted by North Carolina. If measures are considered necessary and North Carolina has not acted appropriately, the Regional Director may limit tow times to 60 minutes or close the area to trawlers that do not use nets equipped with turtle excluder devices with bars spaced no greater than 6" (15.2 centimeters) apart, or other devices that may be authorized by the Regional Director.

A monitoring program was established and implemented by the North Carolina Division of Marine Fisheries and the National Marine Fisheries Service (Southeast Fisheries Center Beaufort Laboratory) to assess the documented incidental take level on a real time basis. New information regarding takes of sea turtles in this fishery in the waters off North Carolina has been collected (Table 91).

That provision is now included in section 9.1.2.5. The provision allows the most flexibility between State and Federal regulations to assure that sea turtle mortality is minimized while also minimizing, to the extent possible, negative impacts on fishermen. The idea is to allow the fishery to continue until sea turtles are in the area, at which time the special regulations may be imposed until the turtles leave the area.

These measures are consistent with the reasonable and prudent alternatives given in the Jeopardy Opinion (USDC 1991b).

E.2.b.4. Administrative, enforcement, and information costs

The minimum mesh regulation requires at sea enforcement in addition to the existing dockside enforcement of minimum size. The at sea enforcement efforts will be estimated by determining the number of vessels taking summer flounder in the EEZ (mesh regulation) and the number of vessels landing summer flounder (minimum size regulation). A change in mesh size will not affect enforcement requirements.

The number of vessels that landed at least 100 lbs of summer flounder caught in the EEZ in 1989 is estimated to be 625 (510 from the weighout files, 90 in North Carolina, and the balance for Connecticut and Delaware; section 3.1). However, the following analysis is based on 700 vessels requiring at sea inspection to reflect the redirection of groundfish otter trawlers to summer flounder and some vessels which will not be taking summer flounder but will be trawling in the same area and therefore need to be checked.

At sea enforcement is estimated to require 2 contacts per vessel per year (1,400 contacts) with an average of 4 contacts per enforcement vessel per day (263 days). It is estimated that patrol vessels ($6,828 per day) would be used for most of the contacts although medium endurance cutters ($26,664 per day) would be required during rough weather (assumed to be 15% of the time).

Whenever new fishery regulations are proposed, it is a common misconception that figures such as the above should be totalled and considered as an additional cost to the existing enforcement budget. Such an approach is inaccurate, however. The true costs of enforcing summer flounder mesh regulations equal the value of the *additional* capital and labor resources required to expand current enforcement efforts to encompass the new regulations. They are *not* equal to the costs which would be borne if entirely new vessels and crew were employed to enforce *only* summer flounder mesh regulations.

A simple analogy would be the case where a police cruiser is assigned to patrol a 15 mile stretch of highway. An officer is required to stop vehicles for traffic violations and enforce a suite of local, State, and Federal laws. What is the cost of enforcing one *additional* statute which was just passed into law? There will be a training cost for the officer to be instructed on the specifics of the law and any technical aspects involved in detecting a violation. However, if the new law does not require a substantial modification of the officer's behavior or increase the territory which must be monitored, the additional costs of enforcement are negligible.

The question then, is, beyond the costs of training Coast Guard personnel in the specifics of the new mesh regulation, what are the additional costs of adding the summer flounder mesh regulation to the suite of groundfish regulations, vessel safety regulations, immigration laws, and drug prohibitions which the Coast Guard is already on the water enforcing every day?

The Council is not in a position to determine the answer to this question. Detailed study would be required by Coast Guard personnel on the disposition of its fleet and the additional vessel contacts which would be required to meet the "2 contacts per vessel" target stated. However, if the total annual cost of enforcing EEZ mesh regulations *only* are estimated at $2.6 million, values for the additional costs they would actually entail (beyond enforcement of existing law) might reasonably be considered to be in the 5% to 15% range. Using the $2.6 million figure as a base, then, additional costs would fall within the range of $130,000 to $390,000.

The provisions of this Amendment are intended to minimize any additional burden on enforcement personnel. The minimum size regulations enacted in the original FMP already requires that enforcement be cognizant of fish size and be prepared to measure individual fish. The minimum mesh size provision is intended to make the summer flounder fishery cleaner with regard to small fish, and replace the need for entering fish holds and examining a great many fish by simply measuring the size of a net's mesh.

For those vessels choosing to fish with small mesh, fishermen will be asked to keep their bycatch of summer flounder apart from other species and store them in a standard (36" long x 15" wide x 12" deep; 3.75 cubic feet) box which holds 100 pounds. Enforcement should be straightforward in that vessels will not be allowed to have more than one 100 lb box of summer flounder on board and fish with small mesh.

The enforcement impacts of the recreational minimum fish size were considered in the current, approved FMP. The enforcement costs of recreational fishing should not increase, and may well decrease, as a result of adding the possession limit to the

minimum fish size limit through this Amendment 2. The need to count the number of fish possessed by an angler cannot add significantly to the existing burden of measuring the fish. Given the possession limit, it may be that enforcement personnel will have fewer fish to measure, so there could be a time saving. It is anticipated that most of this enforcement effort will be expended by NMFS and State personnel operating onshore, rather than expensive at sea Coast Guard enforcement activities.

Minimum size regulations currently enforced dockside because State landing restrictions complement the FMP. No additional enforcement costs for size limit regulations result from this Amendment.

The Amendment envisions augmenting the current data collection system in the Northeast with monthly reports gathered from all commercial vessels which harvest summer flounder, as well as weekly from those dealers which buy directly from them. The first objective of this provision is to have the information processed in a timely fashion so that monitoring efforts will be able to accurately set a closure date for the fishery when the quota is reached.

A second objective is to improve the comprehensiveness and accuracy of harvest data to provide a foundation for both current and future management efforts. The most demanding of which would be a system of transferrable individual quotas based on vessel catch histories. It was quite clear from experience in the surf clam and ocean quahog fisheries that accurate records of each vessel's harvests were crucial to the process of dividing the resource amongst the fishery's participants. The fact that the information was provided directly from the fishermen themselves improved fishermen's confidence that their efforts were fairly represented.

The major problem in implementing such a system is in avoiding duplication of effort with the current "weighout" based system. As of 1991, much of this information is obtained by NMFS specialists collecting dealer's weighout slips, which are then supplemented by interviews with vessel captains. The system has evolved over the years to accommodate differences in the way that coastal State agencies collect information as well as the way that fishermen and dealers themselves keep their records.

In many States the most prominent channel for selling fish is through dealers. Fishermen will sell their fish to dealers and have their catches recorded on trip "weighout" forms which the dealers use. Some dealers have agreed to use government supplied forms for this purpose, and simply send a carbon copy to the government in postpaid mailers.

The marketing system in New York is perhaps the most different from the traditional dealer system, in that fish are boxed at sea and sent directly to market via trucks which pull up to the docks. Less grading by size and species is possible with this system, and records kept by the trucking companies may not specify important information. NMFS information specialists must then interview captains and attempt to estimate the correct quantities as best they can.

The timing of information flow also vary along the coast. Reports from some dealers in New England ports are collected on a daily basis, while others report weekly or monthly.

Cost estimates for a new reporting system which collects weekly information from fishermen were generated based on similar programs operated by NMFS.

As of 18 June 1991, 2,346 vessels held valid commercial permits for summer flounder and 8 for catcher/processor vessels. Additionally, there were 302 permits for charter or party vessels. A figure of 2,346 commercial vessels may be considered a high estimate for the number of commercial vessels that would report landings of summer flounder, as many owners obtain permits in order to retain the option to harvest, even though they may not have actually caught much summer flounder for some time. NMFS weighout data (which excludes Connecticut, Delaware, and North Carolina) indicate that, in 1989, 599 vessels landed some summer flounder (Table 52). During the 1983-1989 period, the largest number of commercial vessels which landed summer flounder occurred in 1984 (704; Table 52). North Carolina officials estimate there are about 90 vessels in the summer flounder fishery off that State (Hogarth pers. comm.). For purposes of this analysis, the high number of commercial vessels required to report is estimated at 2,300 and the low number is 800 (704 + 90, rounded).

The figure of 302 permits for party and charter vessels is probably quite low, however, since a great many boats simply have not applied for a Federal license. The Sports Fishing Institute estimated that, in 1985, there were 1,626 charter boats and 454 party boats operating from Maine through North Carolina (Table 63). The Council's party and charter boat survey was mailed to 592 vessels (Table 66). For the purposes of this analysis, a range of 500 - 1,000 party and charter boats will be assumed to be required to submit monthly reports for participating in the summer flounder fishery. Given the 15 May through 30 September season of this fishery, it is assumed that, on average, each vessel will submit 5 monthly reports per year.

The number of dealers which buy and sell summer flounder is perhaps the most difficult to estimate. The National Marine Fisheries Service specified 155 as the number of dealers in the Atlantic bluefin tuna fishery (USDC, 1990c). For the purposes of this analysis, a range of 150 - 400 weekly dealer reports will be utilized.

A summary of reporting requirements follows:

	Commercial	Party/Charter	Dealer
Number of units reporting	800 - 2,300	500 - 1,000	150 - 400
Reports per unit per year	12	5	52
Total Annual Reports	9,600-27,600	2,500-5,000	7,800-20,800

Summing together the end points of each range, the overall spread in the potential number of reports submitted to the government each year ranges from 19,900 - 53,400 reports from between 1,450 and 3,700 entities. Governmental costs of administering such a reporting program would have four major components: printing costs for the report forms, mailing costs for their postpaid return, labor costs in processing them, and capital costs for the computers which processors would use. In each of the sections that follow, calculations will first be made using the low end value of the annual reporting range, then followed with the result at the at the high end value.

All of these costs may be recovered as they are part of the cost of issuing permits.

Printing costs were estimated using the most recent similar report which the Northeast regional office of NMFS purchased: surf clam and ocean quahog record books. Each record book contained 50 weekly report forms (and postpaid mailers) and was printed at a cost of $8.00 each ($8,000 for an order of 1,000 books). Assuming costs would be similar for summer flounder reporting books, first year printing costs for commercial vessel logs would equal (800 books) x ($8.00 per book) or $6,400 at the low end of the reporting range. At the high end of the reporting range the cost would be $18,400. Recall that while commercial vessels must mail their reports in monthly, the data are tow by tow, so the size of the logbooks, and, hence, the printing cost, would be similar to the surf clam and ocean quahog logbooks. For party and charter boats, since there are only 5 reports per boat per year, assume $4.00 per logbook, the printing cost would be $2,000 to $4,000. Dealer reports would be $1,200 to $3,200. Total printing costs, therefore, would be $9,600 to $25,600.

Annual mailing costs would include the cost of mailing out all the record books at the start of the year plus the regular postage for each report as it was returned to the government. The initial mailing would cost ($2.90 per book) x (1,450 books) or $4,205. Monthly mailings for commercial vessels would cost ($0.29 per report) x (12 reports per year) x (800 entities) or $2,784. Monthly reports for party and charter vessels would cost ($0.29 per report) x (5 reports per year) x (500 vessels) or $725. Weekly mailings from dealers would cost ($0.29 per report) x (52 reports per year) x (150 dealers) or $2,262. Total mailing costs would then equal $9,976 at the low end of the reporting range. At the high end of the reporting range the cost would be $26,216.

Labor costs would equal the salary of a GS-5 government employee (Step 1 = $16,973) plus overhead of 29.5% overhead (benefits and taxes) or $21,980 per person per year. At an average of 5 minutes to process one commercial vessel report (Geyer, pers. comm.), the annual amount of time required to process commercial information would equal (5 minutes per report) x (12 reports per year) x (800 vessels reporting) or 107 days of processing time. Monthly reports from party and charter vessels would be expected to take longer to process than weekly reports, as would dealer reports which describe landings from multiple vessels. Using a figure of 15 minutes for each of these, party and charter boats would require (15 minutes per report) x (5 reports per year) x (500 vessels reporting) or 83 processing days. Dealers would require (15 minutes per report) x (52 reports per year) x (150 dealers) or 260 processing days. Totalled together from each sector, low end processing days would equal 450, or 1,167 days at the high end.

An average federal employee would work approximately 230 days per year assuming 24 paid vacation days, 6 days off for illness, and weekends. Dividing 450 processing days by 230 yields an average of 1.96 person years of processing time required, or a full time processing staff of approximately 2 people. With labor costs of $21,980 per person, the total labor costs for processing would equal ($21,980 per person) x (2 people) or $43,960. At the high end estimate of 1,667 processing days, a total staff of 8 people would be required at a cost of $175,840.

Finally, providing computer equipment for a processing staff would cost on the order of

$3,000 per person for a 386 DOS based computer and the necessary accessories. For the entire staff this would cost ($3,000 per machine) x (2 people) or $6,000. Using the high end estimate of 8 staff, the cost would be $24,000. These costs would be reduced to maintenance costs in subsequent years since the computers are durable goods that can be expected to last approximately 5 years.

Totaling the costs across each of the four categories yields the following:

	Low End Range	High end Range
Printing costs	$9,600	$25,600
Mailing costs	9,976	26,216
Labor processing costs	43,960	175,840
Computer capital costs	6,000	24,000
TOTAL	$69,536	$251,656

E.2.b.5. Prices to consumers.

Recent upward trends in the real price per pound of commercially caught summer flounder indicate that the demand and/or supply factors may be shifting. The 1989 price for all size categories of summer flounder was the highest ever, at $1.56/lb (Table 46). Preliminary NMFS data for 1990 indicate an average price of $1.76/lb, ranging from $1.25/lb for small to $2.25/lb for large summer flounder (Schween pers. comm.). It is possible that increased demand for fish in general (e.g., due to health concerns) and summer flounder in particular (e.g. increases in income, section 8.1.3) could be the cause for increased exvessel revenue. To the extent that these factors continue to influence the exvessel price, the FMP effects will be obscured.

It is expected that the reduction in landings and value attributable to this Plan in its early years will not significantly increase overall exvessel summer flounder prices. To the extent that the supply of summer flounder is increased in future years by the reduction in mortality, higher average harvest weight, and stock stability, the price of summer flounder should stay steady or decrease, *ceteris paribus*.

The quantity and value of imports must be considered when the impact of an FMP is considered. Flatfish imports into the US in 1990 totalled 88,444,000 pounds, valued at $161,900,000 for an average of $1.83/lb (Table 70). Preliminary NMFS data for 1990 indicate 11,971,000 lbs of summer flounder landed at an exvessel value of $21,078,000 (Schween pers. comm.). It seems clear that shortfalls in the marketplace, within limits, will likely be met through imports.

E.2.b.6. Redistribution of costs.

The FMP is designed to give fishermen the greatest possible freedom of action in conducting business and pursuing recreational opportunities consistent with the objectives. It is not anticipated that the proposed management measures will redistribute costs between users or from one level of government to another.

E.2.b.7. Marine Mammals and Endangered Species.

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

Four hundred and seventy one large whale sightings, 1547 small whale sightings and 1,172 sea turtles were encountered in the surveys (Table 88). The "estimated minimum population number" for each mammal and turtle species in the area, as well as those species currently included under the Endangered Species Act, were also tabulated.

CeTAP concluded that both large and small cetaceans were widely distributed throughout the study area in all four seasons, and grouped the 13 most commonly seen species into three categories, based on geographical distribution. The first group contained only the harbor porpoise, which is distributed only over the shelf and throughout the Gulf of Maine, Cape Cod, and Georges Bank, but probably not southwest of Nantucket. New information, including stranding data and recent aerial survey data, indicate that harbor porpoise are found south to North Carolina in the winter (Beach pers. comm.). The second group contained the most frequently encountered baleen whales (fin, humpback, minke, and right whales) and the white-sided dolphin. These were found in the same areas as the harbor porpoise, and also occasionally over the shelf at least to Cape Hatteras or out to the shelf edge. The third group indicated a "strong tendency for association with the shelf edge" and included the grampus, striped, spotted, saddleback, and bottlenose dolphins, and the sperm and pilot whales. Because incidental take of marine mammals is unlikely in the summer flounder fishery, it has been listed as a Category III fishery in the Marine Mammal Exemption Program. Category III fisheries must report any lethal takes of marine mammals to the National Marine Fisheries Service (508-281-9254) within 10 days of the vessel's return to dock. Unreported takes are subject to the prohibitions of the Marine Mammal Protection Act.

Loggerhead and leatherback turtles are found throughout the fishery area. CeTAP (University of Rhode Island 1982) hypothesized a northward migration of loggerheads and leatherbacks in the Gulf Stream, followed by a southward return in continental shelf waters closer to shore. This theory has been supported by recent studies conducted in the Chesapeake Bay and the Long Island Sound, and Sea Turtle Stranding and Salvage Network (STSSN) data which indicate that embayments along the east coast, north through Cape Cod Bay, provide important summer foraging habitats for juvenile Kemp's ridleys, loggerheads and green turtles (STSSN unpublished data, Barnard *et al* 1989, Danton and Prescott 1988, Lazell 1980, Morreale *et al*, 1989 Standora 1989).

Very little information exists regarding the impact of recreational fisheries on sea turtles. Data collected through the Marine Recreational Fishery Statistics Survey from 1989 to 1991 indicate that an average of 2 to 3% of the 10,000 intercept interviews conducted

with North Carolina recreational anglers encounter (sight or hook) sea turtles during fishing trips (Epperly pers. comm. and Cross pers. comm.). Intercept interviews conducted throughout the Northeast Region included questions regarding turtle encounters beginning in 1991 and thus, these data are not yet available. Sighting reports from recreational fishermen in North Carolina have included reports that turtles have been hooked and were cut off near the hook or broke the line (Epperly pers. comm. and Cross pers. comm.). The Sea Turtle Stranding and Salvage Network database contains 2 reports of dead loggerhead turtles with hooks in the right front flippers in reports received from 1986 through mid 1991 from North Carolina north through Maine. Ingested hooks were not reported but would only be listed if necropsies were conducted and results reported to the Sea Turtle Stranding and Salvage Network database. In summary, sea turtles may be taken by recreational hook and line gear, however documented takes are low, and the existing records do not define the nature of the interaction.

Recreational and commercial fisheries lose thousands of pounds of fishing gear annually. Incidences of entanglement in and ingestion of this gear are common among sea turtles and marine mammals, and may result directly or indirectly in some deaths. This mortality cannot be quantified at this time.

Pound nets take less then 5% of the summer flounder landed in commercial fisheries. Although pound nets are known to take sea turtles in the Pamlico Sound, Chesapeake Bay and Long Island Sound, mortalities are rare. Lethal takes of loggerheads, and occasionally Kemps ridleys, are known to occur in the Chesapeake Bay pound nets and in some years account for up to 19% of strandings within the Bay (Musick *et al* 1985). Larger mesh sizes in the pound net leaders and loosely set nets have been implicated in those mortalities (Epperly pers. comm.).

Very little is known about the incidental take of sea turtles in the trawl fishery for summer flounder in waters north of Virginia or in deeper offshore waters. Five takes of sea turtles were observed in the mouth of the Delaware Bay in 2 bottom trawl trips in September 1989. Nine trips including 560 hours of trawling were observed north of Cape Charles, Virginia during the winter of 1991-1992, and no sea turtles were observed (Table 91). Incidental captures of sea turtles in bottom trawl fisheries in the coastal waters in mid-Atlantic and New England areas in the summer and early fall are likely, however, additional observer data are needed to document the extent.

Offshore mortality of sea turtles may occur without being reflected in stranding data. Existing evidence suggests that turtles in deeper waters are not likely to be travelling along the bottom where lethal takes probably occur. In New York waters, time spent on the surface increased with increase in water depths, and in waters greater then 15 meters, young Kemp's ridleys spent 80% of the time on the surface (Morreale and Standora 1990). Thousands of hours of direct observations indicate that, despite spending significant amounts of time in deep waters (up to 300 feet), young Kemps ridleys rarely dive below about 40 feet (Morreale pers. comm.). This is consistent with Henwood and Stuntz (1987) who found that turtle captures were rare in waters greater than 60 feet in the southern Atlantic and most common in waters of 40 feets and less. That observation was qualified due to their smaller sample size for observed trawls in deeper waters. In southern New England, loggerheads have been observed incidentally

taken in offshore drift gillnet and surface longline fisheries, while thousands of hours of observed bottom trawls in similar areas have not yielded any sea turtle takes (Christensen pers. comm.). This is difficult to quantify, however, since bottom trawl trips are uncommon during summer and fall months when turtles are most likely to occur in deep mid-Atlantic and southern New England waters. Additional observer data are needed to document the level of incidental capture of sea turtles throughout the summer flounder bottom trawl fishery.

The mid-Atlantic winter trawl fishery for summer flounder begins in the coastal waters of North Carolina and Virginia from as early as mid-October through mid-February, with some annual variability. The fishery in this area includes up to 80 different vessels, although generally averages between 30 and 50 vessels fishing at any time (Cross pers. comm.). After catch declines in coastal waters, effort begins to move north and offshore to Norfolk Canyon (Ross 1991). In most years, this occurs by mid-February (Hogarth pers. comm.).

Prior to the winter of 1990-1991, no direct observations of sea turtle takes in the summer flounder fishery had been documented. Stranding data for North Carolina (Figure 22) illustrated the secondary peak in strandings in the fall and early winter when the trawl fishery for summer flounder was active in State waters. This seasonal increase in strandings was clearly greater in some years than in others, and turtle interactions with this fishery were initially thought to be an intermittent problem related to seasonal shifts in the distribution of sea turtles or the fishery (USDC 1988). Comparison of known turtle distribution (University of Rhode Island 1982) and fishery distribution (Ross pers. comm.) indicated the fishery and the turtles overlap in all years, leading to the conclusion that these takes likely occur in all years (USDC 1991b).

As a result of the large number of strandings in November and December of 1990, the state of North Carolina closed State waters to trawling and conducted a few experimental trawls to test Turtle Excluder Devices (TEDs) and to survey for the continued presence of turtles in the closed area. These trawls were conducted in nearshore waters off Ocracoke Inlet (Table 91). Although the low sample size, lack of information on head rope lengths, and variety of equipment and methodology used during the experimental tows make the data inappropriate for rigorous statistical analysis, it was clear that fishery interactions with sea turtles were high in that area at that time. Standard nets (nets without TEDs) caught an average of 1 sea turtle every seven hours, or about 0.14 turtles per net per hour. This catch rate was almost three times higher than that observed in the shrimp fishery in the south Atlantic according to a study by Henwood and Stuntz (1987). Additionally, forty three percent of the turtles captured off North Carolina in the December 1990 experimental tows were Kemp's ridleys, as compared to less than 4% of the turtles taken in the shrimp fishery in the southern Atlantic (Henwood and Stuntz 1987). Because of the potential for large numbers of takes of endangered Kemp's ridleys in this fishery, a Jeopardy Opinion was issued in November of 1991.

As a result of the Jeopardy Opinion, turtle conservation measures were included in the emergency regulations for the summer flounder fishery published 5 December 1991 (56 *FR* 63685). Limited (75 minute) tow times or TED use were required in Federal waters out to 10 miles from Cape Charles, Virginia, to the southern border of North Carolina,

with the ability to impose stricter measures, including area closures, if determined to be necessary. A voluntary observer program was also implemented to monitor the incidental take level to prevent surpassing the incidental take allowance of 5 observed lethal takes of an endangered species or 15 loggerheads. The North Carolina Division of Marine Fisheries and the NMFS Southeast Fisheries Center (SEFC) Beaufort Laboratory were able to provide real-time monitoring and assessment of sea turtles in the sea turtle conservation area, however cooperation of the fishing industry was variable and prevented confidence in NMFS' ability to monitor incidental take. Mandatory observer coverage was imposed from 24 January to 14 February 1992.

A total of 2,840 hours of fishing were observed in the sea turtle conservation area during the winter of 1991-1992 (Table 91). Eighty three sea turtles were captured, including; 50 loggerheads (5 dead, 1 prior to observed take) 30 Kemp's ridleys (1 dead prior to observed take), 2 green turtles and a hawksbill. The catch rate for the entire observed area was about 0.03 turtles per hour per net. Observed takes in the nearshore waters south of Cape Hatteras in December were as high as 0.15 turtles per hour per net. This is comparable to December 1990 catch rates in the same area. Over 75% of the sea turtles observed taken during the 1992 season were caught south of Cape Hatteras. Sixty percent (26) of those turtles observed south of Cape Hatteras in November and December were Kemp's ridleys.

Sea turtles were sighted on aerial surveys conducted out to 15 miles off North Carolina through the winter and into March of 1991-1992 (Table 92). Archived sea surface temperature data analyzed for 1976 to the present revealed a consistent pattern of warm waters influenced by the Gulf Stream in nearshore waters of North Carolina throughout the winter (Cross pers. comm. and Epperly pers. comm.s). This refutes earlier assessments that takes would occur through mid-January (USDC 1991b), and clearly extends the time for which protective measures should be in place.

Although observed mortality was low, for trips where observers recorded the condition of released turtles, twenty percent of the observed sea turtles taken on vessels complying with 75 minute tow times required resuscitation. Seventy percent of those turtles that required resuscitation were Kemp's ridleys. Some of these turtles would probably have died without treatment and should be counted as lethal takes for management purposes. The National Research Council, in their report "Decline of the Sea Turtles: Causes and Prevention", recommends that comatose sea turtles be considered mortalities due to recent observations that indicate that most of these turtles die after release (NRC 1990).

In summary, sea turtles are taken by the winter trawl fishery for summer flounder off North Carolina and southern Virginia throughout the winter fishing season at overall rates comparable to that documented in the shrimp fishery in the southeast US (Henwood and Stuntz 1987). During the two years for which direct observations were made, incidental takes of Kemp's ridleys were high south of Cape Hatteras through December.

The management measures proposed in Amendment 2 are consistent with the reasonable and prudent alternatives listed in the Biological Opinion issued in November 1991. Fishermen conducting activities regulated under this FMP must also comply with any regulations published by NMFS implementing sea turtles conservation measures including

mandatory limited tow times, observer coverage and the use of Turtle Excluder Devices in bottom trawls participating in the winter fishery for summer flounder in waters from Cape Charles, Virginia, to the southern border of North Carolina. This issue is also addressed in section 9.1.2.5 of Amendment 2 and section G.4.a. of this EIS.

Shortnose sturgeon (*Acipenser brevirostrum*) is an additional endangered species that may be caught incidentally in the summer flounder fishery. Sturgeon will be included in the Incidental Take Statement of the pending Biological Opinion.

One of the goals of this Amendment is to reduce the level of lethal takes of sea turtle sufficiently to avoid jeopardizing endangered turtle populations while allowing fishing activities to continue. As a result of this reduction in lethal takes, implementation of this Amendment will be beneficial to Kemp's ridleys.

E.2.b.8. Conclusions

Data are not available for a formal cost benefit analysis of the summer flounder fishery. However, some observations can be made concerning the likely impacts of the proposed action, particularly as compared to the *status quo*. It is anticipated that improved data collection, including the reporting requirement of the Amendmdent, will allow such a study to be conducted in future amendments.

It must also be recognized that all alternatives (including most particularly, the no action alternative) will have negative economic impacts in the short run. However, it is believed that the adopted alternative will have the least negative impacts in the short term and the greatest benefits (in the form of the rebuilt resource) in the long term in a reasonable time frame (10 years).

The only Federal management measure (other than vessel permits) currently in effect is a 13" minimum fish size limit in both the commercial and recreational fisheries. The proposed action does not change the minimum size limit on the directed commercial fishery for summer flounder.

For the commercial fishery, the 13" minimum size limit remains, a 5.5" minimum net size is added, a commercial quota is added, and a moratorium on entry of additional vessels is imposed. In the recreational fishery, the minimum fish size is increased to 14", there is a 6 fish possession limit, and a season open only 15 May through 30 September.

The impacts of the preferred measures will not impact small entities any greater than large entities. The impacts are the most reasonable possible given the need the eliminate overfishing in the short term, prevent overfishing in the long term, and allow the stocks to rebuild. If the overfishing condition is not eliminated and the stocks are not allowed to rebuild, the resulting depressed stock condition will negatively impact the entire fishery in the long term.

The Amendment was also reviewed relative to Federalism considerations (Executive Order 12612). Clearly, management of summer flounder pursuant to the MFCMA is in the Nation's best interest. The Amendment does not preempt State laws. The proposed

management measures and the implementing regulations are, therefore, consistent with the principles, criteris, and requirements of Executive Order 12612. The concepts of federalism support the approval of the management measures and issuance of the regulations.

E.2.b.8.A. Commercial fishery conclusions

The 5.5" minimum mesh provision is new to the summer flounder regime in the EEZ. However, many trawl fishermen already use a 5.5" mesh net. North Carolina, which accounts for a significant portion of the landings (Table 2), imposed a 5.5" minimum net mesh beginning in the fall of 1990. Many of the fishermen from North Carolina and the mid-Atlantic fish for groundfish in New England under the Northeast Multispecies FMP, which requires 5.5" nets. The number of fishermen that will need to buy larger nets is unknown, but since the proposed action applies only to the codend, which must be replaced frequently through normal use, the net investment cost to comply with the proposed action is not substantial. There will be some loss of bycatch (e.g., *Lolgio* squid and butterfish), but that cannot be quantified.

The quota will not impose a substantial hardship initially because of the significant decline in the fishery in the recent past. During the 1980-1989 period summer flounder commercial landings averaged slightly less than 30 million pounds (Table 2). However, because of the depressed condition of the resource, landings fell to 11 million pounds in 1990. The 1992 quota would be about 11 million pounds.

Significant price impacts cannot be determined since the relative importance of the many factors that determine the price of summer flounder is unknown. An attempt by Hu *et al.* to establish a demand function for flounder yielded an insignificant price-quantity relationship. Clearly, the price of imports and the price of other flat, white fish influence the price of summer flounder.

It must be recognized that the management measures may be changed on an annual basis based on the stock condition by regulatory change not requiring a plan amendment. If the stock recovers rapidly, it may be possible to increase the quota in the near future while still achieving the fishing mortality rate goal.

It must also be recognized that the "no action" alternative will make the situation worse as an increasing percentage of undersized summer flounder are caught, killed, and discarded in an attempt to make a profitable trip from a reducing biomass.

Finally, the commercial moratorium is seen to have positive economic impacts since it will allow fishermen currently in the fishery to benefit from the recovery of the resource rather than have those benefits dissipated over new entrants who did not share in whatever negative impacts might occur. It will also have regulatory benefits by allowing the States to know the number of vessels that will be working in their fisheries, thus helping the States implement their management systems.

E.2.b.8.C. Recreational fishery conclusions

Summer flounder is an important species in the recreational fishery, both for private anglers and for the party and charter boat industry. The *status quo*, and consequent stock decline, have driven recreational summer flounder landings from a high of 26 million fish in 1983 and 1984 to a low of 1.8 million fish in 1989 (the 1980-1989 annual average was 15 million fish).

It is impossible to estimate the total value (willingness to pay) of summer flounder without an estimate of the marginal value per trip. The determination of marginal value requires a demand curve for recreational fishing. In the case of summer flounder, as with many recreationally sought species, an aggregate demand curve is not available. The proposed system of an interrelated possession limit, size limit, and season is designed to meet the fishing mortality rate goal in as flexible a manner as possible. The combination for the first year of a 14" minimum fish size, 6 fish possession limit, and a mid-May through September season was considered as minimizing the impacts on the recreational fishery to the greatest extent possible.

It must be remembered that the size limit and season were largely driven by the possession limit. In the development of the proposed action, the Council worked closely with its industry advisors. The industry advisors included a significant number of party and charter boat operators, as well as commercial fishermen. The party and charter boat operators were concerned that the possession limit be large enough so anglers would feel that a trip for summer flounder was potentially worthwhile. The public hearing document included a series of alternative season-size-possession combinations, all of which would have achieved the fishing mortality rate reduction target.

As a result of the debate, it was concluded that 6 summer flounder was the minimum potential for which an angler would make a fishing trip. The 14" minimum fish size and the mid-May through September open season followed from that possession limit.

Clearly, some fishermen will be impacted by the possession limit. However, for the 1986-1990 period, 94.4% of the successful summer flounder trips landed six or fewer summer flounder (Table 74).

The 14" minimum fish size will mean fewer summer flounder may be retained than under the current regulations. MRFSS data for 1986-1990 indicated that 25% of the trips landing any summer flounder would have been impacted by the 14" minimum size.

The 15 May - 30 September open season will reduce the recreational kill of summer flounder by 13.5% (Table 77), based on MRFSS data for 1985-1989. Clearly, anglers will not be able to fish before and after the open season and some business will be lost to the party and charter boats.

As with the commercial measures, the size limit, possession limit, and open season may be changed annually based on the condition of the resource. Therefore, the more rapidly the resource responds to the management program, the sooner the management system may be liberalized (the possession limit increased, the size limit decreased, or the open

season lengthened).

E.3. ALTERNATIVES TO THE PROPOSED ACTION (from Amendment 2 Appendix 1)

While developing the proposed Amendment to the FMP, the Council considered a wide range of alternatives. Those options are described and evaluated below.

E.3.a. Take No Action at this Time

E.3.a.1. Description

This would mean that the FMP (MAFMC 1988 and MAFMC 1990) would remain in effect. The FMP currently has the following provisions:

1. It is illegal to possess summer flounder less than 13" total length (TL) and it is illegal to possess parts of summer flounder less than 13"to the point of landing.

2. Vessels with permits issued pursuant to this FMP would be required to fish and land pursuant to the provisions of this FMP unless the vessels land in States with larger minimum fish sizes than those provided in the FMP, then the minimum fish sizes would be required to meet the State limits.

3. Foreign fishermen would not be permitted to retain summer flounder since US fishermen, by definition, would be harvesting the Optimum Yield (OY).

4. Vessels fishing commercially for summer flounder, either directly or as a bycatch in other fisheries, and vessels for hire in the recreational fishery (party and charter boats) would be required to obtain annually renewable permits.

5. States with minimum sizes larger than those in the FMP and minimum mesh regulations are encouraged to maintain them.

6. After three years of Plan implementation the Council would begin to annually examine fishing mortality estimates of age 2 summer flounder to measure the effectiveness of the size limit relative to the FMP's objectives. If the Council finds that the fishing mortality of age 2 summer flounder has increased, based on the following adjustment criteria, and if the NMFS Northeast Regional Director concurs with the Council, the minimum fish length would be increased by the NMFS Northeast Regional Director to a minimum fish length of 14" TL.

The adjustment criteria are (1) estimated fishing mortality from the NEFC spring survey and (2) estimated fishing mortality from a virtual population analysis (VPA) which would be tuned using commercial and recreational fishery CPUE indices. If a three year trend of either of these mortality estimates increases, an increase in the minimum fish length would be required.

The trend in post-FMP fishing mortality rate (age 2 fish) estimated from the NEFC spring survey will be measured relative to the baseline level defined from pre-FMP fishing

mortality rates (age 2 fish) from NEFC survey data (catch at age available from 1976-1989). Likewise, the trend in post-FMP fishing mortality rates (age 2) estimated from virtual population analysis (VPA) will be measured relative to the baseline level defined from pre-FMP fishing mortality rates (age 2) from VPA (catch at age also available from 1976-1989). Best estimates of discards will be incorporated into both the catch-at-age data and commercial catch per unit effort (CPUE) data. Catch per unit effort indices to be used to tune the VPA will be evaluated from standardized fishing power analyses of commercial and recreational fisheries data. Candidate data series for CPUE indices include (but are not limited to) NEFC commercial weighout (1976-1989), North Carolina winter trawl fishery (1982/83 - 1988/89) and Marine Recreational Fishery Statistics Survey (MRFSS) (1979-1989) data.

E.3.a.2. Evaluation

This alternative would not achieve the fishing mortality rate reduction strategy. Therefore, it would not reduce overfishing to the F_{max} target level. Hence, it could not be approved. The socio-economic condition of the fishery will continue to decline and the human environment will be negatively impacted because of the stock declines. The situation of the interaction between the summer flounder fishery and sea turtles will also worsen without the proposed Amendment. Hence, it could not be approved and is not a reasonable alternative.

E.3.b. Alternative Vessel Moratorium Provisions

E.3.b.1. Description

The following moratorium provisions are based on those being considered by the New England Fishery Management Council for the Northeast Multispecies FMP (NEFMC 1990). They could be implemented in the Summer Flounder FMP together or combined with the provisions of the preferred alternative.

A. To be issued a Summer Flounder Permit for 1992 a vessel must meet one of the following criteria:

1. hold a valid Summer Flounder Permit as of 26 January 1990, and show proof of landing summer flounder during the time period 1 January 1989 through 26 January 1990; or

2. for a charter or party boat, hold a valid Summer Flounder Charter and Party Boat Permit as of 26 January 1990, and show proof that it carried recreational fishing parties for a fee during the time period 1 January 1989 through 26 January 1990; or

3. show written proof that a vessel was under construction, reconstruction, or was under written contract for purchase as of 26 January 1990, and landed summer flounder by 26 January 1991, or if a charter or party boat, show proof that it carried recreational fishing parties for a fee as of 26 January 1991.

B. For the permits issued for 1993 and beyond, eligibility requirements described above will be based on the preceding calendar year.

C. Any Summer Flounder permit held by a vessel that is lost or destroyed will become invalid. However, the owner may (within one year) apply for a replacement permit for a vessel, not to exceed a 10% increase in length, GRT, or fish hold capacity, as listed on the vessel permit, in the case of party or charter boats, not to exceed a 10% increase in passenger carrying capacity, as described on the USCG certificate.

D. Transfer: A permit issued under this proposal is not transferable or assignable except to a new owner. Any transfer or assignment to a new owner must be in writing and must be sent to NMFS in order that a permit may be issued in the name of the new owner.

E. Appeal of permit denial

1. Any applicant denied a permit may appeal such denial. Any such appeal must be in writing. Any of the following grounds may form the basis for review:

i. the denial was based on mistaken or incorrect information or data;

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

iii. applicant has new or additional information which might change the initial decision.

2. The applicant will have the right to an oral hearing.

F. Vessels may change gear types within the fishery. The Council should encourage vessels to shift effort to more selective types of fishing (that is, less discards and waste).

G. Upgrading: any vessel with a valid Summer Flounder permit will not be allowed to increase length, GRT, or fish hold capacity. In the case of party and charter boats, they will not be allowed to increase passenger carrying capacity.

E.3.b.2. Evaluation

The primary advantage of this alternative relative to the preferred alternative is that, should it be adopted by the New England Council as an amendment to the Multispecies FMP as well as by the Mid-Atlantic Council through this Amendment, then the entry rules for both FMPs would the identical, an advantage in that many fishermen participate in both fisheries.

This alternative allows replacement vessels to increase 10% in length, GRT, fish hold capacity, and passenger carrying capacity. The preferred alternative requires that replacement vessels have the same GRT, length, and passenger carrying capacity as the vessels being replaced. Clearly, not permitting an increase in capacity of replaced vessels would tend to minimize increased in fishing power.

This alternative prohibits existing vessels from being expanded (upgraded) in their capacity (length, GRT, fish hold capacity, or passenger capacity), while the preferred alternative is silent on modifications to existing vessels. Clearly, limiting or prohibiting expansion of existing vessels, as well as replacement vessels, maintains the equality of the moratorium. An example of vessel modification under a moratorium occurred in the surf clam fishery when a new center section was added to a vessel to increase its carrying capacity.

E.3.c. Commercial Quota, 14" Minimum Size Limit, and 6.0" Minimum Diamond Mesh (recreational as in the preferred alternative or 8 or 9)

E.3.c.1. Description

E.3.c.1.1. Minimum net mesh

The commercial otter trawl fishery would be managed by a minimum diamond mesh net size of 6.0" or 6.5" (square mesh) applied in the cod end during the first year of implementation and throughout the body of the net during the second and subsequent years following implementation, unless the fish are landed in a State with a larger minimum net mesh size, in which case the State limit would prevail.

Only nets of at least the legal size would be allowed on boats taking summer flounder. Any combination of mesh or liners that effectively decreases the mesh below the minimum size is prohibited.

E.3.c.1.2. Minimum fish size

It would be illegal to possess summer flounder less than 14" total length (TL). It would be illegal to possess parts of summer flounder less than 14" to the point of landing.

E.3.c.1.3. Commercial quota

The quota setting process is specified in the preferred alternative (9.1.2.2). Quotas would be distributed to the States based on their share of commercial landings for the period 1980-1989 (Table 72) minus any landings in that State in excess of its quota for the year prior to that for which the quotas are being set.

The annual commercial quota will be set at a range of between 0 and the maximum allowed by the adopted fishing mortality rate reduction strategy.

The quota must apply throughout the management unit, that is, in both State and Federal waters. All commercial landings in a State would count toward that State's quota. When a State's quota has been caught, taking summer flounder would be prohibited in that State. A commercial vessel may catch, retain, and sell up to 100 lbs of summer flounder per trip if it has a moratorium permit.

It is the responsibility of each State to assure that its quota is not exceeded. The Regional Director may prohibit taking summer flounder in the EEZ by fishermen of any

State not in compliance with this FMP. Noncompliance by the State would include any failure to prohibit taking summer flounder after any annual quota has been reached. If the inaction of one or more States leads the Regional Director to conclude that the FMP will be adversely affected, he may close the entire EEZ.

E.3.c.2. Evaluation

This alternative would establish a commercial quota in 1992 of 9 million pounds based on a minimum mesh size of 6.0", a minimum commercial fish size of 14" TL and a minimum recreational fish size of 14" TL (Table 80). This quota assumes an average level of recruitment in 1989, 1990 and 1991. The quota will be calculated each year to reflect the most current information on recruitment, stock status, and level of compliance.

A 14" TL minimum fish size and a 6.0" minimum mesh would result in a higher discard rate than the preferred alternative. Approximately 27% of the fish that would be caught and landed with a 6.0" mesh would now be discarded (Table 80). In addition, the quota associated with this mesh/minimum fish size combination initially would be lower than that associated with the preferred alternative. Finally, although some States now require fishermen to use 5.5" mesh to harvest summer flounder, none require the use of a 6.0" mesh. The combined effect of a lower quota and gear modification for all commercial summer flounder fishermen would now impose a greater economic burden than that necessary to achieve the objectives of the plan.

E.3.d. Commercial Quota, 13" TL Minimum Commercial Fish Size Limit, and 6" Net Mesh Minimum Size Limit (recreational as in the preferred alternative or 8 or 9)

E.3.d.1. Description

This is the same as alternative 4 except that the minimum fish size for commercial fish would be 13", subject to change during the annual monitoring process.

E.3.d.2. Evaluation

This alternative would establish a commercial quota in 1992 of 9.6 million pounds based on a minimum mesh size of 6.0", a minimum commercial fish size of 13" TL and a minimum recreational fish size of 14" TL (Table 80). This quota assumes an average level of recruitment in 1989, 1990 and 1991. The quota will be calculated each year to reflect the most current information on recruitment, stock status, and level of compliance.

A 13" TL minimum fish size and a 6.0" minimum mesh would result in a lower discard rate than the preferred alternative. Approximately 16% of the fish that would be caught and landed with a 6.0" mesh would now be discarded (Table 80). However, the quota associated with this mesh/minimum fish size combination would be lower than that associated with the preferred alternative. Finally, although some States now require fishermen to use 5.5" mesh to harvest summer flounder, none require the use of a 6.0" mesh. The combined effect of a lower quota and gear modification for all commercial summer flounder fishermen would now impose a greater economic burden than that necessary to achieve the objectives of the plan.

E.3.e. 14" TL Minimum Fish Size, 6.0" (diamond mesh) Minimum Net Mesh Size, and Seasonal Closures (recreational as in the preferred alternative or 8 or 9)

E.3.e.1. Description

The commercial fishery would be managed by a minimum net mesh size of 6.0" (diamond mesh) or 6.5" minimum mesh (square mesh) applied in the cod end during the first year of implementation and throughout the body of the net, unless the fish are landed in a State with a larger minimum net mesh size, in which case the State limit would prevail, and a minimum fish size in the commercial fishery with the ability to change the minimum fish size annually as part of the review process.

It would be illegal to possess summer flounder less than 14" total length (TL). It would be illegal to possess parts of summer flounder less than 14" to the point of landing.

Fishing for summer flounder could be prohibited from January through June during at least the first year in order to meet the F target level of 0.53.

The minimum fish size, minimum mesh size, and seasonal closure would be reviewed annually by the Summer Flounder Monitoring Committee and could be adjusted in accordance with the process set forth in the preferred alternative.

States with minimum mesh regulations larger than in the FMP are encouraged to maintain them.

Because there is a relatively low probability of detection of an offense, even with only legal mesh on board, the penalty for those detected must be sufficient to provide an adequate deterrent. Nets of the same size can be double bagged or used as liners. Therefore, it is recommended that penalty for the first offense of a mesh regulation be a six month loss of permit and the penalty for a second offense be a one year loss of permit.

E.3.e.2. Evaluation

E.3.e.2.1. Introduction

This is the major commercial fishery alternative to the preferred alternative in that it replaces the commercial quota with seasonal closures. The minimum fish size and minimum net mesh are continued, as are the recreational management measures.

E.3.e.2.2. Seasonal closures

The impacts of seasonal closures for summer flounder are difficult to predict because fishing effort can be transferred to periods when the fishery is open, and thus mortality on the targeted species is not decreased. The only way that mortality is actually reduced by closing seasons is that effort becomes more costly. Closures of short duration will result in nearly all effort simply being shifted. The longer the closure the higher proportion of effort transferred to other species, thus reducing fishing mortality on those species

that are being managed.

Average monthly statistics for 1980-1989 for summer flounder landings were examined to evaluate possible seasonal closures (Tables 22-25). A potential seasonal closure could occur in October through December, a period when Marine Resources Monitoring, Assessment, and Prediction Surveys data indicate that summer flounder egg abundance peaks in all areas from Georges Bank to Cape Hatteras. Thirty three percent of all summer flounder landings occurred during this calendar quarter (Table 23). The major problem with an October through December closure is that 28% of October, 72% of November, and 79% of December landings are in Virginia and North Carolina (Table 24).

A January through June closure appears more equitable in terms of impacts among the States, while reducing landings by 53% (Table 25). An additional benefit of a closure during this period would be that the fishery occurs substantially (61%) in the EEZ. Therefore, a substantial saving could be realized by prohibiting taking summer flounder in the EEZ during those months, even without comparable action by the States.

In order to understand the impacts for prohibiting taking summer flounder, it is necessary to consider the species that are caught in conjunction with summer flounder. Weighout data indicate that summer flounder accounted for 18% of the average otter trawl trip (for trips when any summer flounder was landed) in 1983, a value that increased to 30% in 1988 and fell to 20% in 1989 (Table 29). For the same period and trips, *Loligo* landings increased steadily from 6% in 1983 to 24% in 1989 while landings of miscellaneous species (largely yellowtail flounder, among the economically valuable species,Table 33) fell from 50% in 1983 to 27% in 1989.

If landings data where trips landing 100 pounds or more of summer flounder are examined (Table 31), the 1983-1989 average summer flounder share was 31% (as opposed to an average 24% for all trips landing summer flounder; Table 29). The *Loligo* and miscellaneous species shares fall slightly for these restricted trips as opposed to the all trips values (11% to 10% and 32% to 30%, respectively), but those five categories continue to be the most important landings other than summer flounder.

Based on the average number of days fished for North Carolina vessels (Table 89), it is estimated that only about 10% more effort could possibly be expended by those vessels already in the fishery. Thus, effort transference is estimated to be between 10 and 35%.

Clearly, a seasonal closure provision would need to be described in a framework manner so that the length and time of the closure could be adjusted from year to year based on the condition of the resource and the effectiveness of other management measures.

E.3.e.2.3. Size limit and mesh size

A 14" TL minimum fish size and a 6.0" minimum mesh would result in a higher discard rate than the preferred alternative. Approximately 27% of the fish that would be caught and landed with a 6.0" mesh would now be discarded (Table 80). In addition, although some States now require fishermen to use 5.5" mesh to harvest summer flounder, none require the use of a 6.0" mesh. The combined effect of a lower quota and gear

modification for all commercial summer flounder fishermen would now impose a greater economic burden than that necessary to achieve the objectives of the plan.

E.3.e.2.3. Conclusion

The system based on fish size, mesh size, and seasonal closure, even when coupled with a moratorium on the entry of additional vessels, is difficult to manage since effort cannot be accurately forecasted and the fishery cannot be closed. Therefore, the management system must always respond to what previously happened. The measures for the upcoming year must account for not only the target mortality for that year, but the amount that the target for the current year will be exceeded. The quota based preferred alternative allows the fishery to be closed (at least to a bycatch level), so the absolute amount that the target mortality level can be exceeded is far less with a quota based system than with this alternative.

It is not unreasonable to conclude that, if effort were underestimated for several years that the fishery would need to be closed all year. Weather and related considerations present absolute limits to effort transfer, but, within those limits, the longer the closure periods, the more effort the fishermen will apply during the open periods to meet market demand and maintain their incomes. The effort that is applied will likely become more and more costly to the fishermen as the closed periods get longer because the open season will increasingly be those months when summer flounder are least available.

E.3.f. Impose Trip Limits in the Commercial Fishery

E.3.f.1. Description

This measure could theoretically be used alone or in conjunction with the minimum fish size, minimum mesh size, and/or seasonal closure measures previously discussed. An annual commercial fishery target catch would be established following the procedures set forth in preferred alternative for commercial quotas. The maximum quantity of fish that could be landed on each trip would then be calculated, the objective being to not exceed the target catch while keeping the fishery open as long as possible. A moratorium on entry would be absolutely necessary if trip limits would have even the remotest chance of working.

E.3.f.2. Evaluation

A trip limit is a mechanism for addressing the problem of continual application of additional effort identified in section 7.2.4. A given vessel may make as many trips as it can, but the maximum quantity of summer flounder landed on each trip is determined. If there is a moratorium, then the number of vessels potentially making trips is fixed. The remaining variable is the number of trips a given vessel can make in a period of time. The fishery, therefore, would be more closely managed with seasonal closures and trip limits combined than with seasonal closures alone.

However, this increased control comes at the price of significantly increased enforcement effort. With seasonal closures, enforcement effort is limited to the fish and mesh size (in

common with all of the commercial alternatives) and to making sure summer flounder are not landed during a closed season. This alternative adds to those costs the need to inspect a sufficiently large sample of vessels as they land to assure that the trip limit is adhered to by the fishermen. Given the temporal and spatial nature of the summer flounder fishery, this means that virtually every harbor large enough to dock a commercial vessel between North Carolina and Massachusetts (if not New Hampshire and Maine also) would need to be visited by enforcement officers frequently enough so that fishermen would not feel safe landing more than the legal trip limit.

E.3.g. Recreational Harvest Levels

E.3.g.1. Description

Coastwide recreational harvest levels would be allocated to the States based on 1980-1989 recreational landings data (Table 72). As with the commercial quotas, the recreational target would be modified on an annual basis to reflect changes in stock status. States would have to have the ability to attain the recreational target by a system of size limits, possession limits, seasonal closures, and other means unless the State wanted to allocate its target harvest level between sectors in its recreational fishery (for example, party boats, charter boats, and private recreational fishermen). If the State wanted to allocate its recreational target harvest level between recreational sectors, then its recreational target would need to be managed as a true quota, with a real time system to account for catch and the provision to close the fishery when necessary.

It is the responsibility of each State to assure that it implements measures compatible with the Federal FMP. The Regional Director may prohibit taking summer flounder in the EEZ by recreational vessels (party, charter, and private boats) of any State not in compliance with this FMP, including any failure to prohibit taking summer flounder after any annual quota has been reached. If the inaction of one or more States leads the Regional Director to conclude that the FMP will be adversely affected, he may close the entire EEZ.

The States would be required to demonstrate to the Summer Flounder Monitoring Committee that their regulations complied with the FMP.

E.3.g.2. Evaluation

This alternative would replace the coastwide management for the recreational fishery of the preferred alternative with State by State management. Each State would have the option of managing by quotas, size limit, possession limit, seasonal closure, or other method, as long as the Summer Flounder Monitoring Committee concluded that the State's system complied with the FMP (that is, had a reasonable chance of assuring that the fishing mortality targets were not exceeded). If the State chose to assign the target catch to specific sectors, then the mortality targets would automatically become quotas.

This system gives the individual States much more flexibility than the coastwide system that would be imposed by the preferred alternative. However, the price of that flexibility is a need for greater State involvement in monitoring the fishery than would be the case

with a coastwide program. If the State choose to allocate between recreational sectors (for example, between party and charter boats and private fishermen), then the monitoring burden would be counting harvested fish against the quota, clearly a major burden for the States.

Another potential negative impact of this alternative is that fishermen operating from adjacent ports could be fishing under significantly different rules. This is simply a result of the fact that the percentage reduction in fishing mortality would be applied the same to each State, but the resultant absolute reduction would vary significantly based on the State's historical share of the recreational catch (Table 72). It is likely that this could lead to party and charter boat customers patronizing vessels operating in States with limits more liberal than other States.

The advantage to this alternative is that it allows closure of the recreational fishery of a particular State by that State and by the Regional Director if the State does not act. Therefore, it has a high probability of not exceeding the fishing mortality targets.

E.3.h. Regional Possession, Fish Size, and Seasonal Management of the Recreational Fishery

E.3.h.1. Description

This would be the same as the preferred alternative, but the possession limit and season would be determined on a regional basis. The regions proposed are Maine through Connecticut, New York through Delaware, and Maryland through North Carolina. There are several examples of first year possession limits and seasons for a 14" minimum recreational fish size limit for which the Council is soliciting comments (Table 90).

E.3.h.2. Evaluation

MRFSS data were used to analyze the impact of recreational limits on a subregional basis. The Atlantic coast was divided into three geographic areas: Maine through Connecticut, New York through Delaware, and Maryland through North Carolina. These areas reflect subregional differences in availability of summer flounder (section 5).

MRFSS intercept data from the years 1986 to 1990 were used to determine the impact of alternative bag/size limits on recreational landings. Based on this analysis, possession limits with a 14" minimum size, had the greatest impact on landings in the most southern area, Maryland through North Carolina (Table 90). In addition, the percent reduction associated with the implementation of 14" minimum size was greatest in this area, 37.4%.

Recreational landings data from 1985 to 1989 indicated peak landings occurred in the July - August period in each area (Table 77). In the northern and middle area, all of the landings occurred between May and October whereas in the south, summer flounder were landed throughout the year. Assuming a combined effort transference/hooking mortality rate of 33%, the implementation of various seasons would have reduced exploitation by 5.5% to 18.8% in those years depending on the length of the season and

the area (Table 77).

Combinations of recreational limits and seasons were examined to determine which limits had an associated reduction of approximately 47% (Table 78). Without a season, a 2 fish possession limit combined with a minimum size of 14" TL would have had an associated reduction of 48% and 42% for the Maine through Connecticut and New York through Delaware regions, respectively (Table 79). Alternatively, a 6 fish possession limit and no season would have reduced exploitation by 46% in the area from Maryland through North Carolina.

The implementation of a season would allow for larger possession limits in each area. For example, a fishing season extending from 1 May to 31 December in the south, Maryland through North Carolina, would allow for a possession limit of 10 fish; the associated reduction would be 47% (Table 79). Alternatively, the season could only extend from 15 May to 30 September in the New York through Delaware area if a 3 fish possession limit was implemented. In addition, a 5 five fish possession limit could be implemented from Maine through Connecticut but with a longer season extending from 15 June to 31 December.

This alternative recognizes subregional differences in availability of summer flounder as well as in the way that the recreational fishery has been prosecuted in the past. It would allow for identical regulations in States within each of the three areas. However, it could also cause confusion and resentment among participants in neighboring States from different areas, for example, Connecticut and New York. In addition, fishermen operating from adjacent ports could be fishing under significantly different rules with the likely result that party/charter boat customers would patronize vessels operating in States with more liberal limits.

E.3.i. Require that Owners or Operators of Fishing Vessels Derive More than 10% of Their Annual Income from Fishing in Order to Renew Their Annual Summer Flounder Permit

E.3.i.1. Description

The only criteria in the preferred alternative for maintaining a vessel permit under the moratorium is that the vessel is presumed to have retired from the fishery if it fails to land any summer flounder for 52 consecutive weeks (section 9.1.2.1.1.1). This alternative would add a requirement that a vessel owner or operator must obtain at least 10% of his/her annual income from fishing in order to maintain eligibility for the permit.

E.3.i.2. Evaluation

The eligibility requirements for the moratorium are relatively liberal in that there is a simple need to document activity in the summer flounder fishery.

The surf clam moratorium also had reasonably simple eligibility rules. There was a rule that failure to land surf clams during any 52 consecutive week period was presumed to constitute retirement from the fishery. That provision was not terribly effective and,

when that moratorium was finally replace by an allocation system in 1990, vessels that had not fished since the earliest days of the moratorium still had permits and were eligible for allocations.

The SAFMC FMP for Coastal Migratory Pelagic Resources (mackerels) requires that: "All fishermen who apply for permits must be able to show they derived more than ten percent of their earned income from commercial fishing, i.e., the sale of one's catch, during the previous calendar year." The regulations for this SAFMC FMP require that a "sworn statement" is necessary to show they derived 10% of their income. Similar requirements exist for the draft NMFS Shark FMP. The Gulf of Mexico Fishery Management Council established a 50% income requirement in order to annually renew a permit. This 50% income requirement was also adopted in Amendment 4 to the South Atlantic Fishery Management Council Snapper - Grouper FMP.

This limitation of permits to fishing vessels (commercial, party, and charter) is not intended as economic distribution , but rather as a means of achieving an equitable reduction in catch by all user groups. In order to prevent large numbers of recreational fishermen from fishing under the commercial permit system, not selling their catches, and causing the commercial quota to be exceeded through this uncounted catch, the permit limitation to commercial, charter, and party boats has been added. The 10% of earned income from fishing was judged to be sufficient to include those who may be partially dependent on social security , retirement benefits, or investments.

While there clearly is no commitment at this time to replace the summer flounder moratorium with an allocation system, equity suggests that there not only be a performance requirement to maintain a permit, but that the permit holder have some economic reliance on the fishery.

E.3.j. Deduct Commercial Summer Flounder Bycatch Prior to Quota Distribution.

E.3.j.1. Description

The preferred alternative includes a commercial quota that is calculated coastwide and then distributed to each of the States in the management unit based on the historical commercial landings distribution. The preferred alternative also allows for a 100 pound boxed catch of summer flounder before the large mesh net is required and after a closure of the summer flounder fishery. This summer flounder bycatch in other fisheries must be counted against the quota, which represents all fishing mortality on summer flounder. The preferred alternative required that the bycatch be counted throughout the year, so that closure of the directed fishery can be projected and implemented in a manner that the bycatch after closure will not result in the quota being exceeded.

This alternative would require that the overall quota be reduced by the estimated amount of summer flounder bycatch before the State by State quota distribution is made.

E.3.j.2. Evaluation

To understand this alternative, it is necessary to review the basic provisions of the

preferred alternative. Summer flounder may be landed and sold only by vessels with commercial moratorium permits, whether the vessel lands 1 pound or 10,000 pounds. If the vessel has more than 100 pounds of summer flounder boxed or 1 or more summer flounder in the hold, a legal mesh net must be in use and no other nets may be on board. The large mesh fishery may be closed by the State or the Regional Director to assure that the quota is not exceeded. However, vessels may not be prohibited from landing the 100 pounds per trip of boxed summer flounder.

It must also be understood that anticipated discards of undersized summer flounder are deducted from the catch estimates before the coastwide quota is calculated. Summer flounder landings for sale would be tracked by the vessel and dealer reports to NMFS. The remaining source of fishing mortality would be the catch and discard of summer flounder by vessels that did not qualify for summer flounder permits; mortality that would need to be estimated from sea sampler surveys and interviews with captains through the weighout or State systems.

The preferred alternative is based on all of these estimates and projections being made by each State, based on NMFS data, and backed up by analyses by the Council and NMFS to assure that the States act in a timely manner. This alternative takes the responsibility for estimating the bycatch away from the States by deducting it prior to quota distribution.

It order to reduce the chances of exceeding the quota, it is likely that this alternative would result in generous bycatch estimates, particularly in the early years of Amendment implementation. Given the probable size of quotas in the near future, long closures of the directed fishery are likely, and the price of flounder during the bycatch only periods would likely be such that every vessel that could legally land the 100 pounds would do so. In 1989, weighout data (excludes CT, DE, and NC) show that there were 5,613 trips that landed between 1 and 99 pounds of summer flounder (Table 53), with an average for the 1983-89 period of 5,552 trips. If it is assumed that the average number of trips prevails in 1992 and each one of those trips takes the legal 100 pounds/trip catch, that would account for 555,200 pounds, or 5% of the anticipated maximum quota for that year (section 9.1.2.3.1).

E.3.k. Commercial Fishery Landing Window

E.3.k.1. Description

Vessels with commercial permits issued pursuant to this FMP may only land summer flounder during periods specified by the Regional Director. The purpose of this requirement is to facilitate enforcement of the provisions of this FMP.

E.3.k.2. Evaluation

The landing window provided through this alternative is intended to improve the probability that violations would be detected. Given that there are limits on the absolute number of enforcement officers and that summer flounder are landed in virtually every port throughout the management unit, if landings are permitted during any time period,

the chances that an enforcement officer will observe a given landing are extremely small. This situation is complicated by the fact that enforcement officers work a normal government work week, so work at night might require authorization for overtime. Hence, if landing is restricted to certain daylight hours, the probability of an enforcement officer observing the offloading is improved, so the probability of detecting a violation is improved.

F. AFFECTED ENVIRONMENT (from Amendment 2 section 6)

F.1. Introduction

Summer flounder range from the Gulf of Maine to Florida with the greatest concentration of fish south of Cape Cod (section 5.1). Morphometric and meristic characteristics of summer flounder suggest at least two distinct populations (Wilk *et al.* 1980 and Fogarty *et al.* 1983). The Middle Atlantic Bight population (it is possible there may be subpopulations within this population) includes fish found between Cape Cod and Cape Hatteras generally, whereas the South Atlantic Bight population consists of fish south of Cape Hatteras.

Summer flounder migrate seasonally, though their movement is often not extensive relative to highly migratory species such as bluefish and swordfish. Adults migrate during late fall and winter months from their summer grounds close along ocean beaches and estuaries. They remain in shelf waters (Bigelow and Schroeder 1953), primarily on the wintering grounds located between Norfolk and Veatch Canyons east of Virginia and Rhode Island, respectively, although they are known to migrate as far northeast as Georges Bank. The southern population is believed to undertake less extensive offshore migrations (Fogarty *et al.* 1983). Tagging studies reveal that some adult fish migrate little and remain permanent residents in the northern segment of the Mid-Atlantic Bight (Lux and Nichy 1980), as well as possible year round residents in Delaware Bay (Smith and Daiber 1977). Tagging studies currently being conducted in Virginia (Desfosse *et al.* 1988) preliminarily indicate the contention of two subpopulations of summer flounder in Virginia inshore waters.

Adult summer flounder return inshore to coastal waters in April through June. In Delaware Bay, the greatest number of fish were captured from the shoreline to a maximum depth of 75 feet from May through September (Smith and Daiber 1977). Optimal habitat areas are shallow coastal waters having salinities higher than 28%, sandy bottoms, especially near inlets, and locations having fast flowing current or wave action (Powell and Schwartz 1977). Tagging studies conducted by Poole (1962) and Lux and Nichy (1980) on summer flounder released off Long Island and southern New England revealed that fish usually began seaward migrations in September and October. Recaptures demonstrated that adults migrated as far as 140 miles eastward to Veatch Canyon and 210 miles southward to the Baltimore Canyon area.

Spawning habitat occurs over the entire shelf between Cape Cod, Massachusetts, and Cape Lookout, North Carolina. Spawning begins in September in the northern most area and progresses through February south of Chesapeake Bay (Smith 1973). Optimal spawning areas have bottom water temperatures between 53 and 66° F. There is no

evidence that salinity has any effect on spawning or distribution on eggs. Based upon the sampling of eggs, Smith (1973) concluded that spawning peaked in October north of Chesapeake Bay and in November south of the Bay. The great majority of eggs were taken over depths ranging from 60 to 100 feet (Smith 1973).

Spawning peaks in fall but extends from September through February (Able *et al.* 1990). While eggs and larval stages are found only at sea, juveniles are found only in or near the mouths of estuaries, indicating that the young are estuarine dependent. Summer flounder larvae enter estuarine areas soon after hatching, generally from February through April. Peak immigration periods of summer flounder larvae through Beaufort Inlet and into North Carolina estuaries were from late February through March for the years 1986 - 1988 (Monaghan pers. comm.). Estuaries along the Virginia and North Carolina coastline are believed to be principal nursery habitat for young of year flounder. Orth and Heck (1980) determined that post larvae utilize eel grass (Zostera) beds of the lower Chesapeake Bay as principal habitat areas. Juvenile flounder were found to concentrate in sea grass beds during late summer and fall, whereas earlier in the year the fish were more randomly dispersed in the bays (Weinstein and Brooks 1983). Post larval summer flounder, collected in North Carolina estuaries, have been found in waters ranging in salinities from 0.02 to 35°, with optimal conditions at 18° (Williams and Deubler 1968). Norcross and Wyanski (1988) presented evidence that juvenile summer flounder require shallow, mud bottom habitats during their first months of life. These nursery areas often are found adjacent to, and within, salt marshes. In estuaries north of Chesapeake Bay, juveniles remain in their estuarine habitat for about 10 to 12 months before migrating offshore their second fall and winter. In North Carolina sounds, they often remain for 18 to 20 months.

Open ocean areas of the continental shelf that are used for summer flounder spawning (Figure 1) are critical for the survival of this species. Estuaries and inshore oceanic water habitats are also critically important to the life cycle of summer flounder. These areas are also utilized for summer feeding by summer flounder adults and as nurseries by juveniles. Major alterations to the habitat could be disruptive to the species' life cycle.

Summer flounder larvae begin development at sea, then are moved into estuaries by wind and currents because the larvae are pelagic (Williams and Deubler 1968). Spawning success and, therefore, recruitment, is often determined during the larval and early juvenile stages, and these life stages are greatly impacted by the prevailing environmental conditions. Poole (1966) stated that published and unpublished reports indicate primary nursery grounds for juveniles are the sounds of North Carolina, Chesapeake Bay, and the bays of the eastern shore of Virginia; however, juveniles are distributed in spring, summer, and fall in estuaries from Massachusetts to North Carolina. Early juvenile stages of summer flounder have been captured only in estuaries, suggesting estuarine dependence. Their tolerance to wide ranging temperatures (36 - 72° F) and salinities (0.02 - 35‰) further suggests that they are physiologically adapted to estuarine nursery grounds (Smith 1973).

F.2. State Identified Essential Habitat and Fishery Surveys

The Council, attempting to coordinate and obtain the best information available,

requested each State from North Carolina to Maine to identify the essential summer flounder habitat under their jurisdiction. The following paragraphs are paraphrased from the responses of the States' summer flounder experts.

Summer flounder habitats vary with life stage; the most important habitats are the spawning areas on the continental shelf for summer flounder (Figure 1). The coastal areas that also serve as nursery and feeding areas for summer flounder are essential to their survival. Migratory pathways are recognized as important habitat because of the range of environmental conditions and contaminants to which summer flounder are exposed.

Important habitat in North Carolina for summer flounder was identified by Monaghan (pers. comm.), who agreed with the studies of Powell and Schwartz (1977). They found that small juvenile summer flounder were most abundant in the relatively high salinities in the eastern and central parts of Pamlico Sound, all of Croatan Sound, and around inlets. Powell and Schwartz (1977) also noted that small juvenile summer flounder were most abundant in areas with a predominantly sandy substrate, or where there was a transition from fine sand to silt and clay. Street (pers. comm.) mentioned that summer flounder distribution varied in response to salinity changes. In dry years the area of higher salinity greatly expands in Pamlico Sound, and nursery areas similarly expand. Certainly, substrate and salinity preferences are valuable as this species grows.

The most important nursery areas for summer flounder in Virginia appear to be in the lagoon system behind the barrier islands on the seaside of the Eastern Shore, and the shoal water flat areas of higher salinity (greater than 18 ppm) in lower Chesapeake Bay (Musick pers. comm.). Young of the year enter these nursery areas in early spring (March and April) and remain there until fall when water temperatures drop. Then these yearlings move into the deeper channel areas and down to the lower Bay and coastal areas. In most winters these age 1+ fish migrate out in the ocean but in warmer years some may remain in deep water in lower Chesapeake Bay (Musick pers. comm.). In addition to the use of Virginia habitats by summer flounder for nursery areas, subadults and adult flounder use the Eastern Shore seaside lagoons and inlets and the lower Chesapeake Bay as summer feeding areas. These fish usually concentrate in shallow warm water at the upper reaches of the channels and larger tidal creeks on the Eastern Shore in April, then move toward the inlets as spring and summer progress. They are most abundant in the ocean near inlets by July and August. In Chesapeake Bay, the summer flounder first arrive in numbers in mid-April then remain in the Bay till late September or early October (Musick per. comm.).

Virginia's Artificial Reef Program provides additional suitable habitat for summer flounder, with four Atlantic Ocean reef sites and three Chesapeake Bay reef sites. Reef materials include discarded vessels, automobile tires, and fabricated concrete structures. Colonization of reef materials by encrusting marine and estuarine life forms provides food and shelter for many finfish species. Summer flounder were taken in fair abundance (Travelstead pers. comm.).

Maryland's coastal bays, rich in benthic invertebrates which form the bulk of young of year food sources, are excellent summer flounder habitat (Casey, pers. comm.). Casey (pers. comm.) indicated that in areas where notable pollution exists, a lack of proper food

sources preclude the presence of summer flounder. Areas which lack sufficient water circulation appear to have considerably reduced populations. Shoreside development and resultant runoff also appear to have reduced some local populations (Casey, pers. comm.). Since the early 1970s, Maryland has been conducting trawl and seine surveys around Ocean City inlet. Casey (pers. comm.) reports that over the past few years, however, sharp declines in young of year flounder have been noted in coastal bay trawl samples. The majority of the summer flounder taken in this sampling are between 3" and 4", with larger fish basically absent. Summer flounder are sometimes found in Maryland's portion of the Chesapeake Bay with the majority of these fish in the 8" to 12" range.

Delaware Bay is an important nursery and summering area for both juvenile and adult summer flounder (R. Smith pers. comm.). Post larvae find their way into Delaware's waters during early spring, they remain and grow, some throughout the warm months, some even into their second year. Juvenile summer flounder (ages 1 and 2) have been captured in Delaware Bay during all months of the year, however they are most common from April to November, as are the adults (R. Smith pers. comm.). Delaware's coastal bays are used by summer flounder as nursery and summering areas, but their overall importance is not well documented. Young of year flounder are often found in shallow near shore areas, and thus, shoreline development potentially could have negative impacts.

The total contribution of New Jersey's estuaries from Sandy Hook Bay to Delaware Bay as nursery areas cannot presently be quantified, but these estuaries provide viable nursery habitat during most years (Freeman pers. comm.). Tagging studies by Murawski (1970) provided recaptured summer flounder from the entire New Jersey coastline (Figure 10). Summer flounder overwinter offshore of New Jersey in 100 to 600 ft of water. Freeman (pers. comm.) therefore states that all of the ocean waters off New Jersey to the 600 foot line should be considered essential habitat for migratory pathways, spawning, and overwintering.

The intertidal areas and shallow bays of the south shore of Long Island are of unknown importance to young of year summer flounder. Young of year under 3" are found in beach seines in low numbers every year (striped bass survey on the Hudson River and around Long Island). Commercial trawlers have collected samples of yearling summer flounder in the inner New York bight during January and February, supporting the offshore juvenile hypothesis of Able (Castenada pers. comm.). Based on the recently revised ageing protocol, supported by the work of Able and others, it is yearling summer flounder which enter New York waters from early May through October. Long Island's coastal bays and the Hudson - Raritan estuary support major concentrations of fast growing juveniles, which in turn support a May through October intensive sport fishery. In most years more fish are released as undersized than kept, especially early in the season. With the exception of 1987 and 1988 young of year summer flounder from 8" to 12" are recruited to hooks in the sport fishery by August (Castenada pers. comm.). The sandy bottoms of the inshore and near shore waters of New York, particularly areas around inlets and bay mouths, are critical to juvenile (yearling) summer flounder. The importance of State waters to larval and young of year summer flounder is not known. It may be that the habitat critical to the early life states of summer flounder lies in the EEZ, particularly in the northern end of its range (Castenada pers. comm.).

Summer flounder migrate from offshore, overwintering grounds to inshore waters of Connecticut in late April and early May (E. Smith pers. comm.). Summer flounder are present in Long Island Sound throughout the April - November trawl survey period, and probably occur in limited numbers in winter as well (Simpson pers. comm.). Peak abundance is from August to October. Summer flounder are ubiquitous in summer, occurring on all bottom types, in the deepest sites sampled by trawl (150 ft) as well as in water as shallow as three feet. Survey indices indicate a tendency toward shallow water (<30 ft). Salinity range appears to be at least to 15‰ and greater. The trawl survey usually takes 400 to 700 fish in 320 tows per year. In 1989, only 47 fish were taken (Simpson pers. comm.). From the Marine Angler Survey, about two-thirds of the sport summer flounder catch is from east of the Connecticut River, while the trawl survey catches indicate that the greater New Haven area is also important (Figure 11).

Adult and juvenile summer flounder have been observed within the full range of Narragansett Bay (Lynch pers. comm.). In addition the coastal waters of Rhode Island, the immediate waters surrounding Block Island, and the waters of Little Narragansett Bay, all provide critical habitat for these three species. Larval occurrence within Rhode Island waters have been documented for these species. Lynch (pers. comm.) concludes that all the territorial waters of the State of Rhode Island are critical to the various life stages of these three species.

Summer flounder in Massachusetts migrate inshore in early May to their spring and summer feeding grounds that consist of the entire shoal area south of Cape Cod and Buzzards Bay, Vineyard Sound, Nantucket Sound, and the coastal waters around Martha's Vineyard (Figure 12). In some years summer flounder are found along the eastern side of Cape Cod and as far north as Provincetown by early May. Summer feeding grounds also include the shoal waters in Cape Cod Bay (Howe pers. comm.). Massachusetts considers the shoal waters of Cape Cod Bay and the region east and south of Cape Cod, including all estuaries, bays, and harbors thereof, as critically important habitat (Howe pers. comm.). Summer flounder begin moving offshore in late September and October. Howe (pers. comm.) believes that spawning occurs within territorial waters south of Cape Cod because occasional ripe and running fish have been taken there (Figure 12). Summer flounder are regularly taken in southern Massachusetts waters as late as December, presumably as fish are dispersing to offshore wintering grounds. In most years the wintering grounds are well out on the continental shelf from approximately Veatch Canyon to Baltimore Canyon. The winter of 1985-86 was unusual with anomalous overwintering occurring near shore (Figure 12). Howe (pers. comm.) states that in years following a build up in the local adult summer flounder population (1974-76 and 1982-85), comparatively "strong" cohorts, represented by age 0+ flounder, have been captured in early summer in estuaries along the southern shore of Cape Cod and in Buzzards Bay. Thus local nursery grounds are recipients of young fish from a northern spawning. Massachusetts considers their coastal embayments as primary nursery grounds and of critical importance in augmenting the more traditional sources of recruits from the "offshore stock".

Summer flounder in New Hampshire are not abundant (Nelson pers. comm.). New Hampshire does consider various estuaries important as food sources for visiting adults.

In Maine, summer flounder is regarded as a straggler in the Gulf of Maine (Honey pers. comm.).

Several States have been running fisheries surveys for the past decade (Table 5). These surveys may allow for the detection of trends in abundance and for the detection of relatively poor or good year classes. Nearly every State had poor recruitment in 1988 (Table 5). Preliminary indices indicate that the 1989 and 1990 year classes appeared no better than average. The VIMS young-of-the-year survey is the only available predictor of recruitment for the 1989 and 1990 year classes that is consistent with past VPA estimates (USDC 1990b, and discussion of VPA in Amendment section 5.4).

In general these State surveys are good from a qualitative view and allow detection of trends which often support the NEFC offshore bottom trawl survey. The State and University scientists that conduct these research surveys acknowledge that generally summer flounder is not the targeted species. Considerable effort has been spent during the last two (October 1990 and 1991) Summer Flounder Working Group meetings and at the Stock Assessment Review Committees attempting to interpret these surveys so that consistent patterns emerge. The difficulty lies in most cases with the variability within the surveys on an annual basis. There are currently no State surveys that target summer flounder which have a long enough time series with limited variability that could be used for characterizing population trends within an estuary system, as is done for striped bass.

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

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

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

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

In general wetland loss is not something the Council can directly affect. The Council's Congressional mandate is to reduce fishing mortality when a resource is overfished. Loss of habitat and reduced ability to reproduce because of environmental degradation are generally considered part of the natural mortality estimate when stock assessments are

performed and thus outside the control of the MFCMA. It is becoming increasingly apparent that fishing mortality reductions are significantly hampered by the constant loss of species habitat. For this reason, although the Council cannot directly control habitat losses, the Council monitors development acitvities and, in cooperation with NMFS, EPA, the States, and the Corps of Engineers, comments on proposed activities that may have negative impacts on the environment.

Significant coastal wetlands have been lost recently. Tiner (1987) in a report entitled "Mid-Atlantic wetlands A disappearing natural treasure", quantifies the current status and recent trends in wetlands in the mid-Atlantic. The trends are alarming. Between 1955 and 1981, Delaware lost about 42,000 acres of coastal wetlands and inland vegetated wetlands. Delaware lost 3.8% of its coastal wetlands. Most of this loss occurred prior to several environmental programs initiated in the early 1970's (Bryson pers. comm.). Between 1955 and 1978, about 24,000 acres of Maryland's coastal wetlands and inland vegetated wetlands disappeared. Maryland lost 9% of its coastal wetlands. Between 1956 and 1977, over 63,000 acres of Virginia's coastal and inland vegetated wetlands were lost, with an overall loss of 6.3% of the coastal wetlands. The coastal areas of Virginia, Maryland, and Delaware are absolutely critical habitat for young stages of summer flounder.

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

The preservation and restoration of wetlands and essential estuarine habitats are mainly State responsibilities as well as the Federal EPA and Corps of Engineers. The Council's Habitat Committee which generally includes personnel from ASMFC, Fish and Wildlife Service and the Coast Guard works closely with the ASMFC Habitat Committee and the EPA and Corps. Numerous meeting have been held with these agencies during the development of this Amendment. Several projects (Cedar Island development, marina development in Ocean City, Dam Neck dredge spoil disposal, etc.) have been commented on and modified because of summer flounder habitat impacts.

F.3. Anthropogenic Impacts on Summer Flounder

Summer flounder are exposed to a full range of human activities during their life history. Assessments made by the former Ocean Pulse and Northeast Monitoring Programs, which have now been replaced by the Status and Trends Program, indicate extensive,

detrimental amounts of toxic organic and inorganic contaminants, such as heavy metals, PCBs, and petroleum hydrocarbons in the various physical compartments of the marine ecosystem (Boehm and Hirtzer, 1982; Boehm, 1983; Pearce, 1979; Reid *et al.* 1982). This is particularly true for sediments in the Mid-Atlantic Bight that receive contaminated dredged materials, sewage sludge, and industrial wastes. Elevated levels of petroleum hydrocarbons have even been found in all estuaries as far north as Maine. Elevated PCB levels have been found in sediments and biota in Buzzards Bay, in the New York Bight apex, as well as other locations (Reid *et al.* 1982).

Generally, the nation's most contaminated estuaries are in highly urban areas (Turgeon *et al.* 1989) such as those around much of the mid Atlantic coast. Turgeon *et al.* (1989) describe concentrations of toxic metals and toxic organics in Long Island Sound and relate them to nationwide levels as found in mussel tissues and fish livers, however since the fish were not specified, it is unknown whether summer flounder were included in the study. Zdanowicz and Gadbois (1990) provide a data summary for the baseline phase of the National Status and Trends Program during 1984-1986. Estuaries over the entire range of summer flounder were sampled for concentrations of selected chemical contaminants, as well as indicators of potential biological effects from 20 sites throughout the northeast region. Bottom sediments and tissue samples were collected in this program. Sediments were analyzed for both hydrocarbons and metals with composite samples. Fish stomach contents were analyzed for both hydrocarbons and metals with composite samples, while the sampling of fish livers were not composited. Unfortunately, no data specific to summer flounder are presented.

While very few studies have actually explored the effects of environmental degradation on summer flounder (Robohm *et al.* 1979 did measure increased antibodies in summer flounder from polluted waters), winter flounder is a species where a significant association between environmental degradation and population impacts has been found. The Second Habitat Assessment Workshop was held in February 1992 in Rhode Island to attempt to correlate the cause and effect of population declines with environment degradation and the winter flounder was used as the model species. Any productive results of that Workshop will be evaluated for the applicability to summer flounder since the life history strategy between these two species is similar. Right now however, very little is specifically known for summer flounder.

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

The NMFS issued its Habitat Conservation Policy in November 1983 (48 *FR* 53142-53147). The goal of the policy is: "to maintain or enhance the capability of the environment to ensure the survival of marine mammals and endangered species and to maintain fish and shellfish populations which are used, or are important to the survival and/or health of those used, by individuals and industries for both public and private

benefits: jobs, recreation, safe and wholesome food and products". The Habitat Conservation Policy provided impetus to NMFS's Regional Action Plan (RAP) process which is to foster coordinated management and research responses to major habitat conservation issues and problems, and to develop better steps to address them in the future (USDC 1985).

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

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

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

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

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

> "Estuaries and coastal waters around the country receive the vast majority of pollutants introduced into marine environments. As a result, many of these waters have exhibited a variety of adverse impacts, and their overall health is declining or threatened.
>
> "In the absence of additional measures, new or continued degradation will occur in many estuaries and some coastal waters around the country during the next few

decades (even in some areas that exhibited improvements in the past).

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

The Council, in efforts to coordinate with NMFS, has adopted the NMFS Regional Action Plan (USDC 1985), which identified environmental threats as potential issues that may affect the summer flounder habitat.

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

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

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

The discussion in Section 6.3 of the Amendment identifies and describes each multiple use issue and the potential threats associated with that issue (USDC 1985). For the purposes of this discussion, an "issue" is a point of debate or controversy evolving from any human activity, or group of activities, that results in an effect, product, or consequence.

The NMFS priorities on the multiple use issues and threats to living marine resources were identified in the RAP document (USDC 1985). Activities identified as high priority included urban and port development, ocean disposal, dams and agricultural practices. Medium priority activities included industrial waste discharges, domestic waste discharges, and OCS oil and gas development (Table 17).

F.4. PROGRAMS TO PROTECT, RESTORE, PRESERVE, AND ENHANCE THE HABITAT OF THE STOCKS FROM DESTRUCTION AND DEGRADATION

The MFCMA provides for the conservation and management of living marine resources

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

The MFCMA established Regional Fishery Management Councils that have the responsibility to prepare fishery management plans which address habitat requirements, describe potential threats to that habitat, and recommend measures to conserve those habitats critical to the survival and continued optimal production of the managed species. The NMFS Habitat Conservation Policy (48 *FR* 53142 - 53147), specifically Implementation Strategy 3, established the basis for a partnership between NMFS and the Councils to assess habitat issues pertaining to individually managed species.

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

In addition to the above mentioned NMFS authorities, other laws regulate activities in marine and estuarine waters and their shorelines. Section 10 of the River and Harbor Act of 1899 gives the Army Corps of Engineers (COE) authority to regulate construction in navigable waters of the United States. Section 404 of the Clean Water Act of 1977 gives the COD and EPA authority to regulate the discharge of dredge and fill material into waters of the Unived States, including wetlands. The COE and EPA jointly administer the 404 program. The EPA, in conjunction with the COE, developed the 404(b)(1) Guidelines which govern COE issuance of section 404 permits. The EPA has veto authority over COE permit decisions. Section 401 of the Clean Water Act gives the EPA or States with approved programs, authority to regulate any activity which may result in discharge into navigable waters. The EPA and COE each have regulatory responsibilities under the Marine Protection, Research, and Sanctuaries Act off 1972.

All of the activities affected bythese laws have the potential to adversely affect living marine resources and their habitat. The NMFS, EPA, FWS, and State fish and wildlife agencies have authority to review these activities, assess the impact of the activities on resources within their jurisdiction, and comment on and make recommendations to ameliorate those impacts to regulatory agencies. Review and comment authority is provided by the Fish and Wildlife Coordination Act of 1934 (as amended 1958) and the National Environmental Policy Act of 1969. Consultative authority extends to all projects which modify waters of the United States require Federal permits or licenses, or that are implemented with Federal funds.

Other legislation under which NMFS provides comments relative to potential impacts on living marine resources, their associated habitats, and the fisheries they support include, but are not limited to, the Coastal Zone Management Act of 1972; the Marine Protection, Research, and Sanctuaries Act of 1972; and the Endangered Species Act of 1973 (Section 7 consultation).

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

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

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

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

F.5. Recommendations for Environmental Conservation and Investigation for Summer Flounder

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

As stated in section 4, summer flounder are overexploited. Recognizing that the stock of summer flounder is in poor shape, it is worthwhile to stress habitat conservation for increasing the survivability of juveniles, as well as management actions to control fishing mortality, which will strengthen the use of the habitat information in meeting the MAFMC mandates that "irreversible or long term adverse effects on fishery resources and the marine environment are avoided".

Commercial landings of summer flounder fell significantly during the 1980s, from the 40 million pound high in 1979 (section 5.2). Landings for 1989 were less than 18 million pounds. Numerous State survey indicators of summer flounder abundance showed extremely low abundance for 1988 (section 5.2). Fishing mortality rates are excessive (at least six times the F_{max} level) relative to desirable levels (section 4), but the loss of habitat is probably also a significant reason for the decline of summer flounder.

At present, both commercial and recreational catches of summer flounder are comprised primarily of ages 0-2 fish. Individuals of this species have previously been known to live up to 20 years, yet older, larger fish are now infrequent. Such age class compression

poses great risk to recruitment because the older, more fecund spawning adults are being too rapidly removed from the population and nearly all of the new recruits are being spawned by individuals that only get to spawn once or twice before they are killed.

Summer flounder are highly dependent on estuarine habitats (section 6.1) for much of their prespawning life. It is precisely these habitats that are most vulnerable to anthropogenic impacts and loss. While fishing mortality may be the primary reason for these population declines, the essential habitat areas designated by the States (section 6.1.2) must be protected in order to allow summer flounder populations to rebuild and be maintained when fishing mortality is decreased.

In order to resolve the above problems and prevent overfishing, very significant reductions in fishing mortality will be required. The reductions in fishing mortality are needed to reduce the risk of stock failure. The Council has the ability to control the fishing mortality and reduce that component of risk through the Magnuson Act.

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

The Mid-Atlantic Council strongly encourages States and other agencies to continue their environmental restoration and enhancement measures to improve the habitat for summer flounder. To this end, the artificial reefs programs for the numerous States like Virginia, Maryland, Delaware, and New Jersey should be continued with care devoted to creating new diverse habitat for summer flounder. Superfund clean ups that are currently ongoing and planned should be continued. Settlement negotiations under the Oil Pollution Act (1990) like those for the *Presidente Rivera* in Delaware Bay, the *Exxon Bayways* on the Arthurkill in New York, and the *World Protege* in Naragansett, Rhode Island should all be encouraged to be strict enough to recover the true cost of the environmental degradation.

It is the policy of the Mid-Atlantic Fishery Management Council (MAFMC 1987 and 1989) to oppose any loss of essential aquatic habitat or wetlands which contributes to the conservation of fish stocks. Where loss of habitat is unavoidable locally, the Council endorses recreation of quantitatively and qualitatively equivalent habitat. The Council recognizes the multiple resource base of our coastal areas and recognizes the need to accommodate other natural resource management objectives with special sensitivity to goals that may be contrary to the objectives of fishery management. The intent of the Council is to support "no net loss" of fishery habitat while minimizing all detrimental alterations of these essential habitats.

This policy will allow the MAFMC to optimize the management of fisheries in the

mid-Atlantic EEZ through a concerted effort to establish a quality habitat and to seek to reverse the serious problems affecting the reproduction, size frequency and distribution of fish. The Council will accomplish this through participation in the review of private and government projects which would adversely affect fish production. The Council will also become involved in review of activities which adversely affect the safety of fish products which are intended for direct or indirect human consumption.

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

F.5.a. Environmental conservation

1. All available or potential natural habitat for migratory summer flounder should be preserved by encouraging management of conflicting uses to assure access by the fish to important habitat and maintenance of high water quality standards to protect summer flounder migration, spawning, nursery, overwintering, and feeding areas. Some considerations that should be incorporated into protection of nursery habitats are: no dredging and filling in eelgrass beds; stringent controls should be employed to control nonpoint source pollution; and point source discharges into nursery areas should be eliminated.

2. Filling of wetlands should not be permitted in or near nursery summering areas. In particular, filling of wetlands should not be permitted in the lagoon system behind the barrier islands on the seaside of the Eastern Shore of Virginia and North Carolina because of its importance to summer flounder. Project proponents must demonstrate that project implementation will not negatively affect summer flounder, their habitat, or their food sources.

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

4. The disposal of sewage sludge, industrial waste, and contaminated(means any substance that could affect the fish directly, its habitat, the food chain, or the public's perception of those parts of the ecosystem) dredged material in summer flounder habitat, including the New York Bight, should not be allowed. Advanced garbage, industrial waste, and sludge handling techniques are now available and must be encouraged. Specifically:

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

b. It is urgent that appropriate agencies enforce all existing laws and regulations until ocean dumping ceases. Emphasis must be placed on prevention of short dumping and required release rates.

c. The Council requests EPA to require each permitted ocean dumping vessel be required to furnish detailed information concerning each trip to the dump site. This might be in the form of transponders; locked Loran C recorder plots of trip to and from the dump site; phone call to EPA when vessel leaves and returns to port; or other appropriate method to ascertain that vessels dump only in the 106 area and take legal action to abate illegal (short or improper) material dumping.

d. The Council requests fishermen and other members of the public to report to the EPA, Coast Guard and the Council any observance of vessels dumping other than in the approved dump sites. A list of permitted vessels would accompany this request with the additional request for reporting of any vessel not on the approved list. The report should include date, time, location (longitude, latitude, Loran bearings), vessel name of the dumping vessel, the nature of the material dumped, name of reporting individual and vessel. This would enable EPA to take appropriate action against illegal dumping.

e. The Council's Executive Director is directed to contact necessary Congressional delegations, as necessary, relative to strengthening current measures being considered to cease ocean dumping by a date certain.

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

g. The Council will take appropriate steps under the Magnuson Act and any other Federal laws and regulations to assure the required responses to its concerns and opposition to dump site 106.

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

6. The siting of industries requiring water diversion and large volume water withdrawals should be avoided in summer flounder critical areas. In particular, due to the link between

higher salinity and summer flounder nursery areas, diversions which disrupt the local circulation or dilute existing conditions will adversely impact the use as a nursery area and should be avoided. Project proponents must demonstrate that project implementation will not negatively affect summer flounder, their habitat, or their food supply. Where such facilities currently exist, best management practices must be employed to minimize adverse effects on the environment.

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

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

9. The EPA, for the EEZ, and States, for the coastal zone, should review their water quality standards and make changes as needed with respect to the habitat requirements of summer flounder migratory passage and feeding and to maintain edible summer flounder; that is, flesh and organ buildup of contaminants must be considered.

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

11. Appropriate measures must be taken as soon as possible to reduce acid precipitation and runoff into estuaries and near shore waters.

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

F.5.b. Environmental Investigations

The National Status and Trends Program of NOAA (USDC 1987a and 1989b) should provide guidance in making intelligent decisions involving the use and allocation of resources in the nation's coastal and estuarine regions. These decisions require reliable

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

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

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

F.6. EFFECT ON THE COASTAL ZONE

The FMP was reviewed relative to CZM programs of Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and North Carolina. Letters were sent to all of the States listed above. The letters to all of the States except New Hampshire and Pennsylvania stated that the Council concluded that Amendment 2 would affect the State's coastal zone and was consistent to the maximum extent practicable with the State's CZM program as understood by the Council. For New Hampshire, the evaluation was that Amendment 2 might affect the coastal zone and was consistent. For Pennsylvania, the evaluation was that Amendment 2 would not affect the coastal zone. New Hampshire, Massachusetts, New York, New Jersey, Pennsylvania, and North Carolina have concurred with the Council's opinion. No other States have responded.

F.7. EFFECTS ON FLOOD PLAINS OR WETLANDS

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

G. ENVIRONMENTAL CONSEQUENCES

The analysis of impacts is conducted with specific reference to the guidance presented in NOAA Manual 216-6 regarding the determination of environmental significance. Section 13(b) presents 5 criteria against which the proposed action and any alternatives should be evaluated.

G.1. Will the proposed action be reasonably expected to jeopardize the long-term productive capability of any stocks that may be affected by the action?

G.1.a. Proposed Action (commercial moratorium, quota, minimum net mesh, and minimum size limit, recreational season, possession limit, and minimum size limit, and sea turtle conservation measures) -

Analysis conducted by the NEFC shows that mesh restrictions would have a moderate conservation effect. The effects of a 5.5" mesh requirement would impact age 1 and age 2 fish only since age 3 fish have no escapement through 5.5" mesh. Age 1 and age 2 fish comprise most of the commercial catch due to the age structure of the current stocks.

With regards to landings by market category, there would be approximately a 50-100% reduction in PeeWee landings and a 25-50% reduction in small market category landings.

The above effects on summer flounder due to a 5.5" mesh minimum size requirement should generally increase yield/recruit, increase standing stock biomass/recruit, and increase the number of fish alive and able to spawn after the first quarter. These benefits would be realized to some degree assuming that all the fish saved from capture by this emergency measure are not immediately caught in February after the end of the 5.5" mesh regulation or later in the year. However, the fish do start to move inshore in April in the North Carolina and Virginia area, possibly giving some protection to these fish. Also, there is a 5.5" minimum mesh size requirement in force for North Carolina inshore waters and trawls are prohibited in Virginia waters. The proposed action may help to further protect the summer flounder as they move into inshore waters. Implementation of sea turtle conservation measures by Notice in the *Federal Register* as provided in the proposed action will reduce the lethal takes of endangered species of sea turtles in the summer flounder fishery sufficiently to avoid jeopardy to the continued existence of the Kemp's ridley population. Publication of Notice will be dependant on consultation with the Director of the North Carolina Division of Marine Fisheries regarding their program to monitor the occurrence of the fishery and sea turtles in North Carolina waters. In most years, the fishing occurs in state waters prior to entering the EEZ. Fishery/sea turtles conflicts will presumably be documented in state waters prior to high levels of take EEZ. Data do not exist regarding the level of takes that may occur in the EEZ off southern Virginia. No monitoring program is planned for that area.

The proposed actions of this Amendment will place summer flounder resources under management. Overfishing will be prevented and the fishery will eventually be maintained at maximum sustainable yield levels. A stock rebuilding plan is proposed. Other proposed actions provide for the acquisition of critical data and information to improve

future summer flounder management. A framework adjustment procedure is incorporated in the Amendment to allow changes to be made in the management measures as new and better information is acquired. It is important to note that the cooperation of state governments is essential if summer flounder are to be successfully managed throughout their range.

The proposed actions to rebuild the summer flounder resources requires significant reductions in the landings through a low quota to the commercial fishery and a bag limit, season, minimum size limit for the recreational fisheries. These measures may force some commercial fishermen to divert their activities to other fisheries. When the State quota is reached, an unknown number of fishermen probably will switch from full-time fishing for summer flounder to targeting other species like New England groundfish, scup, black sea bass, or squids. Congressional staff members, Council staff, and processors are seeking ways to increase the market potential for Atlantic mackerel, which isone of the few desirable species that is in abundant supply. Which fisheries may be switched to is very uncertain but a knowledge of the summer flounder directed fisheries and the species composition of the catch, as well as, the predator prey interaction would all be germane to any speculation. The following material is condensed from the Amendment.

Over 97% of the summer flounder that were reported landed between 1983 and 1989 in the weighout system were landed by fish otter trawls (Table 28). Summer flounder are part of an overall mixed bottom trawl fishery which generally includes: winter flounder, yellowtail flounder, *Loligo*, scup, butterfish, and other species (Amendment section 7.1.6).

According to 1983-1989 weighout data, mean catch of summer flounder per otter trawl trip was 2,404 pounds or 24% of total trip catch (Table 29). Since summer flounder are landed as bycatch from fisheries directed at other species as well as from directed effort, many small incidental catches can lower the mean catch estimate of summer flounder trips.

Generally, sorting of otter trawl caught fish is begun immediately after redeployment of the net. Marketable species are sorted by size category and placed on ice as rapidly as possible. Once the valuable catch is stored, undersized fish and non-marketable bycatch are generally shoveled or picked overboard. Several hours may lapse before discarded fish are returned to the sea, resulting in high discard mortality rates.

Fishery discards (juvenile fish and unmarketable species) are difficult to monitor accurately since they are obviously unavailable to port samplers. The operational problems of estimating the size/age composition and magnitude of discards at sea can be great (Murawski 1985). Data on fishery discards (if available at all) are expensive to obtain by direct observation and are generally imprecise relative to landings information. Fish catches may be discarded for a variety of reasons including: undersized individuals of marketable species, undesirable species, specimens damaged, specimens infected with parasites, and bycatch or trip quotas. The amount of discards in relation to landings is influenced by a variety of factors including: net mesh size, season, area fished, the age or size structure of the population, and the particular regulatory scheme in place. Factors significantly influencing the survival of discarded fish include: degree of net damage,

duration of trawl tow, time on deck, handling stress, temperature, water depth and fish size (Murawski 1985).

Weighout data from 1983-89 were examined for species composition for the flounder fishery with landings of more than 100 pounds of summer flounder per trip (Table 31). For otter trawl trips landing at least 100 pounds of summer flounder, principal bycatch species consisted of black sea bass, scup, bluefish, butterfish, winter flounder, mackerel, whiting, and *Loligo*. Other species were also landed in fair quantities, amounting to 30% of the mean catch per trip. The large percent composition of miscellaneous species was mostly in New England waters, however, where other groundfish species such as cod, haddock and other flatfish are more abundant than in the mid-Atlantic region.

The NMFS contracted with the Manomet Bird Observatory to place observers on US boats beginning in 1989 to collect a variety of data on the vessels, personnel, and catch. In 1990, the sea sampling program found summer flounder caught in sixteen 3-digit statistical areas (Table 32 and Figure 14), with 58% of the catch coming from areas 621 and 622 (off the mouth of Delaware Bay; Figure 14).

It is important to understand the significance of the sea sampling data. The weighout data discussed above are gathered from dealers and vessel operators by NMFS Port Agents. The weighout data set used to generate the preceding tables (Tables 29-31) contains monthly average landings by vessel sampled in the weighout system. Clearly, during any month a vessel can fish in several areas and experience differing catch compositions. However, the weighout data cannot be dismissed because those data represent the most complete coverage geographically and in number of vessels surveyed. The sea sampling data are tabulated tow by tow by trained personnel, so, while the number of trips covered is relatively small, the data per tow are highly accurate. For example, the weighout data used represent 94,510 trips during the 1983-1989 period (10,828 in 1989 alone; Table 30), while the sea sampling data cover 505 tows during which at least 1 pound of summer flounder was caught in 1990 and 153 tows in which more than 100 pounds of summer flounder were caught in 1990 (Table 33). Note that all of the sea sampling data presented here (Tables 32-34) show the total haulback; in other words, possible discards have not been subtracted. The weighout data set (Tables 29-31) does not include discards.

The sea sampling data were analyzed to identify species caught in conjunction with summer flounder (Tables 33 and 34). For tows when at least 1 pound of summer flounder was caught, summer flounder accounted for only 6% of the weight of the haulback. The most weight was accounted for by skates (22%), followed by dogfish and *Loligo* at 10% each, silver hake (whiting) at 9%, scup at 8%, sea robins at 7%, and yellowtail flounder at 6% (Table 33).

For tows catching 100 pounds or more of summer flounder, most of the haulback weight was sea robins (22%), with summer flounder second at 18% (Table 33). Other important species were skates (15%), *Loligo* (12%), and silver hake (8%).

The sea sampling data were also examined to identify the relationship of summer flounder as a bycatch in the *Loligo* and scup fisheries in order to provide a background for

evaluation of possible minimum net mesh regulations (Table 34). For the 214 sampled tows when 100 pounds or more of *Loligo* was caught, *Loligo* accounted for 31% of the haulback weight, while summer flounder accounted for only 4%. For the 87 sampled tows when 500 pounds or more of *Loligo* was caught, *Loligo* accounted for 49% of the haulback weight, while summer flounder accounted for only 2%. For the 97 sampled tows when 100 pounds or more of scup was caught, scup accounted for 37% of the haulback weight, while summer flounder accounted for only 2%. For the 39 sampled tows when 500 pounds or more of scup was caught, scup accounted for 59% of the haulback weight, while summer flounder accounted for only 1%.

In general, the species that coexist with summer flounder were also the species that commonly appeared in the directed summer flounder fishery. Summer flounder are active, voracious feeders with fish making up a very significant part of their diet. They are most active during daylight hours and may be found well up in the water column as well as on the bottom (Olla *et al.* 1972). Included in their diet are: winter flounder, northern pipefish, Atlantic menhaden, bay anchovy, red hake, Atlantic silverside, American sand lance, bluefish, weakfish, mummichog, rock crabs, squids, shrimps, small bivalve molluscs, small crustaceans and snails, marine worms and sand dollars (Bigelow and Schroeder 1953 and Poole 1964).

The natural predators of adult summer flounder are not fully documented, but larger predators such as large sharks, rays, and goosefish probably include summer flounder in their diets. Larval and juvenile summer flounder undoubtedly are preyed upon until they grow large enough to fend for themselves. Results of food habit studies by NMFS from 1969-72 showed that Pleuronectiformes occurred in the stomachs of the following fish eating species: spiny dogfish, goosefish, cod, silver hake, red hake, spotted hake, sea raven, longhorn sculpin, and fourspot flounder (Bowman *et al.* 1976). These data do not indicate the proportion of summer flounder among the flatfish prey but it is likely they are represented.

The composition and distribution of fish assemblages in the Middle Atlantic Bight was described by Colvocoresses and Musick (1979) by subjecting NMFS bottom trawl survey data to the statistical technique of cluster analyses. Summer flounder, scup, northern sea robin, and black sea bass, all warm temperate species, were regularly classified in the same group during spring and fall. In the spring this group was distributed in the warmer waters on the southern shelf and along the shelf break at depths of approximately 500 ft. During the fall this group was distributed primarily on the inner shelf at depths of less than 200 ft where they were often in an area shared by smooth dogfish.

The ecological relationship between juvenile summer flounder and southern flounder was studied by Powell and Schwartz (1977) in North Carolina estuaries. The spatial distribution of the two species relative to each other appeared to be related to the salinity gradient. Southern flounder were dominant at low salinities (less than 11 ppm) while summer flounder were dominant at intermediate to high salinities (12-35 ppm). In a study of meroplankton in North Carolina estuaries, Williams and Deubler (1968) found that the distribution of gulf flounder was also controlled by salinity to some degree, finding the species only in salinities ranging from 22-35 ppm. Benthic substrate also appeared to influence summer flounder and southern flounder distributions. Summer flounder were

dominant in sandy substrates while southern flounder were dominant in muddy substrates (Powell and Schwartz 1977).

The proposed action will also decrease bycatch of other species frequently taken in the mixed trawl fishery. The minimum net mesh will reduce catches of smaller fish of numerous species and reduce ecological impacts associated with the summer flounder fishery.

Reduced effort, ranging from shorter seasons to fewer vessels, can be assumed to decrease the environmental effects of trawling. Though unquantified, it is assumed that bottom trawls do have some effect on the sea floor. Those beneficial (food availability) and adverse (disrupted habitats) impacts are reduced by the significant decreases in total fishing effort included in the proposed action.

The proposed action is also intended to rectify species diversity and abundance problems that have been increasing over the past decade. Summer flounder abundance has been plummeting since at least the early 1980's and is expected to continue downward until serious limits are placed on harvest and effort. The proposed action will enable the summer flounder stocks to recover, and will hopefully prevent the type of species replacement (by less desirable species like skates and rays) that has occurred on Georges Bank and elsewhere after major targeted species have been cropped by fishing pressure. The problem of species replacement is becoming a great concern for the holistic approach to ecosystem management. The 1991 autumn bottom trawl survey conducted by NEFC showed a continuing dominance of cartilaginous fish (dogfish, skates, and rays). Nearly three fourrths of the survey's ttotal weight was of cartilaginous species whereas catches of the three "traditional" groundfish species (cod, haddock, and yellowtail flounder) comprised only 4% of the total (USDC 1991a).

The summer flounder fishery also has a documented effect on sea turtles. Again, the proposed action includes management measures designed exclusively to decrease takes of endangered and threatened sea turtles while maintaining the economic integrity of the fishery. During public hearings and throughout the 1991-1992 fishing season, the industry and management agencies exhibited a great willingness to collaborate on fishing practices, onboard observers, reporting requirements, and other controls for the benefit of sea turtles. The end result was a much better data base on which to plan for future seasons. The improvements will be recognized in the revised Biological Opinion being prepared by NMFS.

G.1.b. No Action - The no action alternative will jeopardize the long-term productive capability of the summer flounder resource, quite likely leading to a stock collapse. No action will also jeopardize the endangered sea turtles.

For summer flounder, no action translates into continued pressure on a dwindling resource. The implications for summer flounder would be extremely negative. Other species could also fill the ecological void left by the lack of summer flounder, which could then hamper rebuilding efforts. That scenario has occurred on Georges Bank, where traditional groundfish species were overfished and have now been replaced by cartilaginous species (skates, rays, and dogfish) that once occupied a minor role in that

ecosystem.

No action could prove disastrous for sea turtles, too. Without major changes in gear or fishing practices it is expected that continued takes of protected sea turtles will occurr. Those takes could prompt a finding of jeopardy by NMFS, which would in turn jeopardize the long-term future of trawl gear in the summer flounder fishery.

G.1.c. Other Alternatives - adoption of the alternatives other than the proposed action may jeopardize the long-term productive capability of the summer flounder resource. In general, the other alternatives do not assure the required reduction to the fishing mortality rate target as well as the proposed action does.

It must be recognized that a standard cost/benefit analysis was not developed on the Amendment because the requisite data were not available. It is anticipated that improved data collection, including the reporting requirement of the Amendmdent, will allow such a study to be conducted in future amendments. It must also be recognized that all alternatives (including most particularly, the no action alternative) will have negative economic impacts in the short run. However, it is believed that the adopted alternative will have the least negative impacts in the short term and the greatest benefits (in the form of the rebuilt resource) in the long term in a reasonable time frame (10 years).

The impacts of the preferred measures are the most reasonable possible given the need the eliminate overfishing in the short term, prevent overfishing in the long term, and allow the stocks to rebuild. If the overfishing condition is not eliminated and the stocks are not allowed to rebuild, the resulting depressed stock condition will negatively impact the entire fishery in the long term.

G.2. Will the proposed action be reasonably expected to allow substantial damage to the ocean and coastal habitats?

The proposed action includes numerous references to the importance of suitable habitats for a healthy summer flounder stock. While there is no information proving that harvest does affect habitats, there is ample evidence that other human activities could affect summer flounder or their essential habitats. On that basis, this EIS and the associated FMP Amendment anticipates a closer working relationship with State and Federal agencies empowered to make decisions that could affect summer flounder and their habitat. That Council and NMFS responsibility is especially important in nearshore waters. Juvenile and young summer flounder are dependent on estuaries and coastal bays, which are often the same waters affected by dredging, discharges, run-off, water diversions, and other permitted and unpermitted actions.

There is considerable awareness of the potential impact of otter trawling on the ocean bottom habitat. The South Atlantic Council (1988) in its Amendment 1 for the snapper grouper fishery prohibited the use of trawl gear to harvest fish in the directed fishery south of Cape Hatteras and north of Cape Canaveral. That Council based the trawl prohibition on habitat destruction and the desire to prevent overfishing of vermillion snapper. Their main concern was the destruction of sponge-coral habitat and did not address the effect of trawling on other types of ocean environment.

There are no known coral-sponge habitats north of Cape Hatteras which is where this summer flounder fishery is prosecuted. The issue of ocean bottom habitat degradation caused by trawling is largely an unknown at this time. The very few published papers that do exist deal with specific habitats. It is important to note that when habitat damage is described it is often from as little as one tow of trawl gear through the study area (Van Dolah *et al.* 1987 and SAFMC 1988). Under commercial fishing conditions, the bottom would be fished over and over until the catches from such an area become unprofitable. Under such conditions, habitat damage could be expected to be much greater than would occur with towing through the area once. Obviously, more research efforts are likely to be directed towards this issue in the future.

G.3. Will the proposed action be reasonably expected to have a substantial adverse impact on public health or safety?

All Alternatives: None of the alternatives are expected to have an adverse impact on public health or safety. Summer flounder are known to be afflicted with various parasites and diseases (Amendment section 5.3.10). Fin rot disease may be the most common and is most often associated with stressful conditions. Fish from polluted waters are subject to increased prevalence of disease. Robohm et al. (1979) found that summer flounder from polluted areas had significantly higher antibody levels (which is a response to bacterial pathogens) and antibody to a greater diversity of bacteria than fish from unpolluted areas. Summer flounder are exposed to the full range of human activities during their lifetime. They are exposed to extensive, detrimental amounts of toxic organic and inorganic contaminants, such as heavy metals, PCBs, and petroleum hydrocarbons in the various physical compartments of the marine ecosystem (Amendment section 6.2). Most research on the toxicological effects of various contaminants in fish in general, and summer flounder, in particular is recent and ongoing. While more research is certainly necessary on toxicological effects associated with summer flounder (EIS section F.4.b.) none of the alternatives are expected to have a differential adverse impact on public health or safety. In fact, heightened awareness and improved data collection will occur with the implementation of this Amendment. The proposed action will not create situations that would have an adverse impact on public health and safety.

G.4. Will the proposed action be reasonably expected to adversely affect an endangered or threatened species or marine mammal population?

G.4.a. Proposed Action - The proposed action, because of required reduction in fishing activity will tend to reduce contacts with endangered and threatened turtle species and with marine mammals. Amendment 2 includes a provision through which the NFMS Regional Director may implement species measures (for example, closed areas, limits on tow times, and observers) that will reduce conflicts between the summer flounder fishery and threatened and endangered sea turtles.

Activities conducted under the Summer Flounder Fishery Management Plan were considered for their impacts on endangered species in 1988, pursuant to Section 7 of the Endangered Species Act, as amended. The resultant Biological Opinion, (2 August 1988) concluded that threatened loggerhead (*Caretta caretta*) and endangered Kemp's ridley

(*Lepidochelys kempi*) sea turtles were taken in the summer flounder trawl fishery off North Carolina and southern Virginia in some years, as indicated by intermittent sea turtle stranding events. However, due to the infrequency of these events, it was concluded that the continued existence of turtle populations was not jeopardized by fishing activities.

Between 26 November and 7 December 1990, 54 sea turtles, including at least 8 endangered Kemp's ridleys, stranded on North Carolina beaches. The North Carolina Division of Marine Fisheries closed State waters to summer flounder bottom trawling from Cape Hatteras Light to Ocracoke Inlet on 7 December 1990. Twenty one additional sea turtles stranded before the end of December. The total mortality included 56 loggerheads, 9 Kemp's ridleys, 6 green turtles, and 4 unidentified sea turtles. During the closure period a Turtle Excluder Device (TED) was developed, in conjunction with the NMFS Pascagoula Laboratory, for use on summer flounder bottom trawlers. Experimental tows conducted without TEDs during this time indicated that about 0.14 sea turtles were taken per hour for each net towed off Ocracoke in December 1990. On 26 December 1990, waters were opened to trawlers pulling TEDs until early January, at which time turtles were no longer encountered in North Carolina waters and fishing without TEDs was allowed.

Because of the above information, fishing activities managed under the FMP were reconsidered for impacts on endangered species. Evaluation of the sea turtle and fishery distribution data, trawl data collected off North Carolina in November and December, 1990 and stranding data indicated that the conflict between turtles and the summer flounder fishery occurs annually in the winter in North Carolina. The Biological Opinion resulting from the reinitiated consultation concluded that continued unrestricted operation of this fishery would jeopardize the endangered Kemp's ridley sea turtle population. Reasonable and prudent alternatives, including mandatory sea sampler coverage, limited tow times or use of turtle excluder devices (TEDs), were determined to be necessary to allow fishing to continue in a manner that would sufficiently reduce the level of take of sea turtles.

The Council was notified of this situation by NMFS in late August 1991. Management proposals were drafted and hearings held 30 September and 1 and 2 October in North Carolina and Virginia. These proposals have been incorporated in the final version of Amendment 2 (section 9.1.2.5). They were also implemented by NMFS emergency action effective 2 December 1991.

A voluntary observer program was also implemented to monitor the incidental take level to prevent surpassing the allowance of 5 observed lethal takes of an endangered species or 15 loggerheads, assuming observer coverage on at least 10 percent of the vessels fishing in the conservation area. The North Carolina Division of Marine Fisheries and the NMFS Southeast Fisheries Center (SEFC) Beaufort Laboratory were able to provide real-time monitoring and assessment of sea turtles in the sea turtle conservation area, however cooperation of the fishing industry was variable and prevented confidence in NMFS' ability to monitor incidental take. Mandatory observer coverage was imposed from 24 January to 14 February 1992.

A total of 2,840 hours of fishing were observed in the sea turtle conservation area during the winter of 1991-1992 (Table 91). Eighty three sea turtles were captured, including; 50 loggerheads (5 dead, 1 dead prior to observed take) 30 Kemp's ridleys (1 dead prior to observed take), 2 green turtles, and a hawksbill. The catch rate for the entire observed area was about 0.03 turtles per hour per net. Observed takes in the nearshore waters south of Cape Hatteras in December were as high as 0.15 turtles per hour per net. This is comparable to December 1990 catch rates in the same area. Over 75% of the sea turtles observed taken during the 1992 season were caught south of Cape Hatteras. Sixty percent (26) of those turtles observed south of Cape Hatteras in November and December were Kemp's ridleys.

Sea turtles were sighted on aerial surveys conducted out to 15 miles off North Carolina through the winter and into March of 1991-1992 (Table 92). Archived sea surface temperature data analyzed for 1976 to the present revealed a consistent pattern of warm water influenced by the Gulf Stream in nearshore waters of North Carolina throughout the winter (Cross pers. comm. and Epperly pers. comm.). This refutes earlier assessments that takes would occur through mid-January (USDC 1991b), and clearly extends the time for which protective measures should be in place.

Although observed mortality was low, for trips where observers recorded the condition of released turtles, twenty percent of the observed sea turtles taken on vessels complying with 75 minute tow times required resuscitation. Seventy percent of those turtles that required resuscitation were Kemp's ridleys. Some of these turtles would probably have died without treatment and should be counted as lethal takes for management purposes. The National Research Council, in their report "Decline of the Sea Turtles: Causes and Prevention", recommends that comatose sea turtles be considered mortalities due to recent observations that indicate that most of these turtles die after release (NRC 1990).

In summary, sea turtles are taken by the winter trawl fishery for summer flounder off North Carolina and southern Virginia throughout the winter fishing season at overall rates comparable to that documented in the shrimp fishery in the southeast US (Henwood and Stuntz 1987). During the two years for which direct observations were made, incidental takes of Kemp's ridleys were high south of Cape Hatteras through December.

Shortnose sturgeon (*Acipenser brevirostrum*) is an additional endangered species that may be caught incidentally in the summer flounder fishery. Sturgeon will be included in the Incidental Take Statement of the pending Biological Opinion.

Attempts were made to put this summer flounder fishery/sea turtle interaction into perspective of other sources of mortality for these endangered species. The Congressionally mandated report *Decline of the Sea Turtles: Causes and Prevention* (NRC 1990) states that "Of all the known factors, by far the most important source of deaths was the incidental capture of turtles (especially loggerheads and Kemp's ridleys) in shrimp trawling. This factor acts on the life stages with the greatest reproductive value for the recovery of sea turtle populations."

Mortality associated with other fisheries and with lost or discarded fishing gear is much more difficult to estimate than that associated with shrimp trawling, and there is a need

to improve these estimates (NRC 1990). This report identified possible turtle losses from the winter flounder trawl fishery north of Cape Hatteras (about 50-200 turtles per year); the historical Atlantic sturgeon fishery, now closed, off the Carolinas (about 200 to 800 turtles per year); and the Chesapeake Bay passive-gear fisheries (about 25 turtles per year). Considering the large numbers of fisheries from Maine to Texas that have not been evaluated and the problems of estimating the numbers of turtles entangled in the 135,000 metric tons of plastic nets, lines, and buoys lost or discarded annually, it seems likely that more than 500 loggerheads and 50 Kemp's ridleys are killed annually by nonshrimp fisheries (NRCs 1990). These other fishery operations, lost fishing gear, and marine debris are known to kill sea turtles, but the reported deaths are only about 10% of those caused by shrimp trawling. Dredging, entrainment in power-plants intake pipes, collisions with boats, and the effects of petroleum-platform removal all are potentially and locally serious causes of sea turtle deaths. However these collectively amount to less than 5% of the mortality caused by shrimp trawling (NRC 1990).

The NRC report (1990) concludes that all species of marine turtles need increased protection under the Endangered Species Act and other relevant legislation. While the report does not recommend specific conservation measures for the summer flounder fishery, the recommendations for the shrimp trawling are germane. The NRC report (1990) recommended TEDs, 60 minute winter tow-time limits, and limited time/area closure for turtle "hot spots". At this time, there is only a Recovery Plan for the loggerhead turtle (The Loggerhead/Green Turtle Recovery Team 1991). Other Recovery Plans for other species of sea turtles are in preliminary draft form and not yet ready for distribution. Of the six "Actions Needed" that are identified by the Recovery Plan to achieve recovery of loggerheads is item 5: "minimize mortality from commercial fisheries."

One of the goals of this Amendment is to reduce the level of lethal takes of sea turtle sufficiently to avoid jeopardizing endangered turtle populations while allowing fishing activities to continue. As a result of this reduction in lethal takes, implementation of this Amendment will be beneficial to Kemp's ridleys.

The gears managed under this FMP are on the Category III list of fisheries under the Marine Mammal Exemption Program because there was no information to suggest that they take marine mammals. The summer flounder fishery has no known impacts on any other protected species.

G.4.b. No Action - No action may jeopardize the continued existence of the Kemp's ridley population. Sea turtle conservation measures are considered necessary to protect turtles from October through mid-January to allow fishing activities to continue in a manner consistent with the Endangered Species Act.

G.4.c. Other Alternatives - adoption of the alternatives other than the proposed action may jeopardize the continued existence of the Kemp's ridley population. Sea turtle conservation measures are considered necessary to protect turtles from October through mid-January to allow fishing activities to continue in a manner consistent with the Endangered Species Act.

G.5. Will the proposed action be reasonably expected to result in cumulative adverse effects that could have a substantial effect on the target resource species or any related stocks that may be affected by the action?

G.5.a. Proposed action

The proposed action will be expected to result in cumulative beneficial effects on the target resource and other associated non targeted species that are greatly overfished. Given the Congressional mandate to prevent overfishing the rebuilding of this resource must occur. The current level of fishing mortality has driven this summer flounder resource to a level where the spawning stock biomass is only two to three percent of what would exist in an unfished condition. Unquestionably, the human impacts will be significant in the short term, but as the resource rebuilds and stabilizes it will be able to sustain higher removals.

As stated above, some switching of target species will occur and the prediction of the fishermen's behavior is very difficult, however species of fish which are truly caught as a bycatch with summer flounder will be likely to sustain a decrease in fishing effort as effort switches away from summer flounder. Very few trawl-targeted species in the Northwest Atlantic are underfished, but it is the underfished species like Atlantic mackerel , skates, and dogfish which will have to be targeted by fishermen as efforts increase to reduce overfishing on many presently targeted species.

The proposed action has been selected to reduce short- and long-term impacts on the resource. The management measures will reduce mortality and improve stock health. Related activities directed to State and Federal regulatory agencies may offer indirect benefits to summer flounder habitats.

The socio-economic impacts of the proposed action could be significant. This is merely a result of the significant reduction in fishing mortality necessary to eliminate overfishing. However, the management system incorporated in the proposed action is flexible so that management measures may be adjusted annually (for example, the quota increased) as soon as the resource responds favorably to the management regime. Further, the moratorium on entry of additional commercial vessels into the summer flounder fishery will enable the fishermen who absorb the impact of the management regime to recover as the stock recovers, rather than having the benefits dissipated among new entrants, as is always the case in an open access fishery.

G.5.b. No action - no change from present conditions.

G.5.c. Other Alternatives - adoption of the alternatives other than the proposed action may jeopardize the long-term productive capability of the summer flounder resource. In general, the other alternatives do not assure the required reduction to the fishing mortality rate target that the proposed action does.

G.6. Economic Effects of the Proposed Action

G.6.a. Proposed Action - The economic effects of the Amendment will be short-term loss

of income as stocks rebuild in order to provide long-term gains through stock rebuilding and stabilization in the fishery as the resource recovers. More information will be collected on sea turtles and better effective ways will be developed to reduce the turtle/fishery interaction.

The anticipated impacts of the proposed action are discussed in detail in section E.2. The measures in the proposed action will have short-term impacts because of the quota and minimum mesh size on the commercial fishery and the seasonal limits, possession limit, and larger size limit on the recreational fishery. However, these measures should assure rebuilding of the resource so that harvest levels can stabilize over the long term. In the commercial fishery, the moratorium on entry of additional vessels into the commercial fishery should assure that the participants that continue in the fishery during the rebuilding period benefit from the sacrifice.

It is not expected that there will be redistributional effects of the proposed action. The potential for redistribution became a matter of concern, particularly with the States, as soon as quota management was introduced into the management regime. The Demersal Species Committee and ASMFC Board reviewed many options, from coastwide management with a calendar year fishing your, to alternative fishing years, to regional quotas, and finally, the agreed upon State by State quotas. The time period used as basis for calculating the quota distribution was also studied. The agreed upon system in the hearing draft was State by State landings for the period 1980-1989 using NMFS data. This meant that the North Carolina landings included southern flounder as well as summer flounder, since the Federal statistics do not discriminate. Following hearings, this issue was reviewed, using shorter time periods. The final distribution formula used the 1980-1989 time period, but reduced the North Carolina share by deleting southern flounder landings using North Carolina State data. This revised formula was agreed to unanimously by the Atlantic States Marine Fisheries Commission.

Under this system, there is some chance that boats from one State may experience difficulty in landing in another State, but there is no way to quantify this or to influence an individual State's management system so long as that system assures that the State's quota will not be exceeded. To the extent there are such impediments, there is no reason to believe that they would not be applied along the coast and so, should impact fishermen equivalently.

It must be recognized that a standard cost/benefit analysis was not developed on the Amendment because the requisite data were not available. It is anticipated that improved data collection, including the reporting requirement of the Amendmdent, will allow such a study to be conducted in future amendments. It must also be recognized that all alternatives (including most particularly, the no action alternative) will have negative economic impacts in the short run. However, it is believed that the adopted alternative will have the least negative impacts in the short term and the greatest benefits (in the form of the rebuilt resource) in the long term in a reasonable time frame (10 years).

The impacts of the preferred measures are the most reasonable possible given the need the eliminate overfishing in the short term, prevent overfishing in the long term, and allow the stocks to rebuild. If the overfishing condition is not eliminated and the stocks are not

allowed to rebuild, the resulting depressed stock condition will negatively impact the entire fishery in the long term.

G.6.b. No action - no change from present conditions in the short-term. In the long-term, the summer flounder resource would likely decrease, so it is likely the fishery would collapse.

G.6.c. Other Alternatives - adoption of the alternatives other than the proposed action may jeopardize the long-term productive capability of the summer flounder resource. In general, the other alternatives do not assure the required reduction to the fishing mortality rate target that the proposed action does. Therefore, although short-term costs might be less, long-term benefits will also be less.

G.7. Federal Agencies that may be Affected.

The Federal Agencies that may be affected by this proposed Amendment include:

Dept. of Army Civil Works: scheduling of dredging projects, discharge of dredged materials, identification of aquatic borrow sites.

Dept. of Army Regulatory 1404 Program: issuing of permits for water development projects (e.g. dredging, filling, bulkheading, construction of piers, and installation of piles).

Environmental Protection Agency: Section 401 -- individual state review of 404 discharges, Section 402 -- point source discharges, Section 404 -- discharge of dredge or fill into waters of the U.S., Section 208 -- nonpoint source pollution control. Marine Protection, Research, and Sanctuaries Act. Ocean Dumping, RCA, Superfund.

Minerals Management Service: Outer Continental Shelf Land Act, Hydrocarbon Exploration and Development, Hard Mineral Mining.

Dept. of Commerce: Endangered Species Act, Marine Mammals Protection Act, Coastal Zone Management Act.

H. LIST OF PREPARERS OF THE EIS AND PLAN AMENDMENT

The Amendment was prepared by a team of fishery managers and scientists with special expertise in the summer flounder resource including:

Mid-Atlantic Council Demersal Fisheries Committee - Mid- Atlantic Council members Gordon Colvin (Chair, NY), Richard Cole (DE), Jack Travelstead (VA), Bruce Freeman (NJ), W. Peter Jensen (MD), and Richard Christian (ASMFC); South Atlantic Council members Elaine Knight and Gerald Schill; and New England Council member Bob Smith.

ASMFC Summer Flounder Management Board - Gordon Colvin (Chair, NY), William A. Pruitt (VA), Bruce Freeman (NJ), Philip G. Coates (MA), and William Hogarth (NC).

ASMFC Summer Flounder Scientific and Statistical Committee - Dick Sisson (Chair, RI),Jack Musick (VIMS), Paul Scarlett (NJ), Raoul Castenaga (NY), Rick Monaghan (NC), Kathi Rodrigues (NMFS NERO), Wendy Gabriel (NMFS NEFC), John Merriner (NMFS SEFC), Dave Simpson (CT), Tom Currier (MA), Louis Rugolo (MD), Rich Seagraves (DE), Roger Pugliese (SAFMC), Howard Russell (NEFMC) and Dave Keifer (MAFMC)

Mid-Atlantic Council Summer Flounder Advisors - Randy Gant (NY), Robert Jackson, Jr. (MD), Paul Mumford (MD), Gordon Roman (NY), Gary Dickerson (NJ), Charles Amory (VA), Charlie Wertz (NY), Wil Laaksonen (VA), and A. F. Evans (DE).

MAFMC staff - John C. Bryson, David R. Keifer, Thomas B. Hoff, Christopher M. Moore, and Clayton E. Heaton.

I. LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES OF THE EIS ARE SENT

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

Copies of the DEIS will be sent to all persons who received Amendment 2.

J. REFERENCES FROM AMENDMENT 2

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Note: Tables and Figures have the same numbers as in Amendment 2, but only the Tables and Figures used in the EIS are reprinted here.

Table 2. Summer Flounder Commercial Landings (thousands of lbs) by State by Distance from Shore (miles) and Percent of Total Summer Flounder Landings Taken from the EEZ, 1980-1989

Year	Distance	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	NC+	All
1980	0-3	-	-	218	185	3	1,090	493	1	65	1,238	3,399	6,696
	3-200	4	-	147	1,091	44	155	4,311	-	1,258	7,265	10,242	24,520
	Total	4	-	365	1,276	48	1,245	4,805	1	1,323	8,503	13,642	31,216
	% EEZ	100	-	40	85	91	12	89	-	95	85	75	78
1981	0-3	-	-	406	352	21	1,727	853	6	8	441	837	4,655
	3-200	2	-	191	2,507	59	257	3,155	-	394	3,210	6,621	16,400
	Total	2	-	597	2,860	81	1,984	4,008	6	403	3,651	7,459	21,056
	% EEZ	100	-	32	87	73	12	78	-	97	87	88	77
1982	0-3	-	-	855	475	8	1,282	402	7	59	463	2,103	5,657
	3-200	17	1	810	3,507	56	582	3,916	-	300	3,868	4,211	17,270
	Total	17	1	1,665	3,982	64	1,865	4,318	7	360	4,331	6,315	22,927
	% EEZ	100	100	48	88	87	31	90	-	83	89	66	75
1983	0-3	1	-	693	507	32	977	485	5	125	2,757	3,644	9,228
	3-200	82	-	1,648	4,091	96	458	4,340	-	811	5,376	3,413	20,319
	Total	83	-	2,341	4,599	129	1,435	4,826	5	936	8,134	7,057	29,547
	% EEZ	98	-	70	88	74	31	89	-	86	66	48	68
1984	0-3	-	-	721	617	59	1,571	1,342	8	125	3,618	3,174	11,239
	3-200	2	1	766	3,862	71	722	5,021	-	687	6,055	9,334	26,525
	Total	2	1	1,488	4,479	130	2,294	6,364	8	812	9,673	12,509	37,764
	% EEZ	100	100	51	86	54	31	78	-	84	62	74	70
1985	0-3	1	-	530	822	133	1,419	1,187	4	79	928	1,454	6,561
	3-200	1	0	1,718	6,710	50	1,098	4,446	-	498	4,107	7,160	25,791
	Total	2	1	2,249	7,532	183	2,517	5,634	4	577	5,036	8,614	32,352
	% EEZ	28	100	76	89	27	43	78	-	86	81	83	79
1986	0-3	-	-	465	914	145	1,808	1,049	3	27	510	2,176	7,101
	3-200	-	1	2,488	6,127	15	929	2,967	-	288	3,202	3,747	19,764
	Total	-	1	2,953	7,042	160	2,737	4,016	3	315	3,712	5,923	26,865
	% EEZ	-	100	84	87	9	33	73	-	91	86	63	73
1987	0-3	-	-	727	349	82	1,062	480	4	122	1,500	1,204	5,534
	3-200	7	1	2,600	4,424	526	1,578	3,970	-	196	4,290	3,922	21,517
	Total	7	1	3,327	4,774	609	2,641	4,450	4	318	5,790	5,127	27,051
	% EEZ	100	100	78	92	86	59	89	-	61	74	76	79
1988	0-3	-	-	801	338	277	1,685	834	6	192	1,078	1,869	7,084
	3-200	4	-	1,619	4,380	463	1,753	5,171	1	321	6,677	4,900	25,292
	Total	4	-	2,420	4,718	740	3,438	6,006	6	513	7,756	6,770	32,377
	% EEZ	100	-	66	92	62	50	86	3	62	86	72	78
1989	0-3	-	-	283	140	27	133	126	2	104	319	201	1,338
	3-200	9	-	1,594	2,942	485	1,330	2,738	-	99	3,369	4,004	16,574
	Total	9	-	1,877	3,082	513	1,463	2,864	2	204	3,688	4,205	17,913
	% EEZ	100	-	84	95	94	90	95	-	48	91	95	92

- = zero

Note: numbers may not total due to rounding.

Source: unpublished NMFS General Canvass data.

Table 5. Summary of Summer Flounder Recruitment Indices from State, Federal, and University Research Surveys, North Carolina through Massachusetts

	Year Class										
Survey	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
NEFC1 (age 1)	0.58	0.53	0.36	0.24	0.42	1.23	0.55	0.41	0.07	0.56	
NEFC1 (age2)	1.09	0.44	0.46	1.18	0.36	0.51	0.58	0.32	0.03		
MASS2 (age 1)	0.40	0.38	0.24	0.04	0.14	0.97	0.62	0.15		0.25	
MASS2 (age 2)	1.42	1.30	0.07	1.19	0.53	0.58	0.97	0.34	0.02		
VIMS3 (age 0)	1.36	1.25	1.65	0.73	0.50	0.53	0.45	0.19	0.14	0.28	0.38
MASS4 (age 0)			3.00	3.00	1.00	19.00	5.00	5.00	2.00	3.00	11.00
VIMS5 (age 0)							3.23	0.75	0.06	0.77	1.98
NC6 (age 0)								19.86	2.61	6.86	4.20

1 Number-per-tow (fitted Δ values), NEFC Survey, Offshore Strata 1-12, 61-76.
2 Number-per-tow (stratified mean), Massachusetts Division of Marine Fisheries spring trawl survey.
3 Number-per-tow (stratified mean), Virginia Institute of Marine Science historical trawl survey.
4 Total number, Massachusetts Division of Marine Fisheries beach seine survey (fixed stations).
5 Number-per-tow, Virginia Institute of Marine Science young-of-the-year survey (fixed stations).
6 Number-per-tow (stratified mean), North Carolina Division of Marine Fisheries.

Source: USDC 1990b.

Table 15. Fishing Mortality and Stock Number for Summer Flounder by Age

	Fishing Mortality (F) at Age								
Age	1982	1983	1984	1985	1986	1987	1988	Ave F 82-85	Ave F 82-88
0	0.0755	0.1516	0.2574	0.0586	0.0834	0.0599	0.1234	0.1358	0.1157
1	0.6824	0.9200	0.7382	0.6932	0.6663	0.6413	0.9567	0.7585	0.7569
2	1.4778	0.7983	1.5229	1.3175	1.4297	1.3955	1.4643	1.2791	1.3437
3	1.0456	0.4543	0.8599	1.9470	1.5683	0.9755	1.3766	1.0767	1.1753
4	1.2617	0.6263	1.1914	1.6323	1.4990	1.1855	1.4196	1.1779	1.2594
+gp	1.2617	0.6263	1.1914	1.6323	1.4990	1.1855	1.4196		

	Stock Number-At-Age (start of year)								
Age	1982	1983	1984	1985	1986	1987	1988	1989	Ave stock 82-85
0	79,185	93,820	58,362	46,986	60,741	50,311	33,588		67,183
1	42,066	60,118	66,011	36,938	36,279	45,751	38,795	24,307	49,832
2	17,213	17,407	19,615	25,832	15,120	15,255	19,725	12,202	19,739
3	1,362	3,215	6,414	3,502	5,664	2,963	3,094	3,735	3,149
4	422	392	1,671	2,222	409	966	915	639	885
+gp	323	347	571	609	1,043	762	312	243	
Total	140,570	175,299	152,644	116,090	119,256	116,010	96,428	41,126	

Source: USDC 1990b.

Table 16. Indirect Methods for Estimating Alpha Based on Life History Parameters.

Source	Equation	Input	Alpha
Hoenig *et al.* (1987)	$r = 425.2 \times t_m^{-0.949}$ (3 years)	t_m = 1095 days	2.84
Cushing (1973)	$alpha = 1.98 + 0.0306 \times F^{0.33}$	F = 687,873	2.45
Longhurst (1983)	$r = 3K[(L\infty/L)-1]$	$L\infty$ = 82.7 L = 42.3 K = 0.1731 t_o = -1.039	2.47
Boudreau and Dickie (1989)	r = 2.88 * w-0.33	w = 190.6 Kcal	2.48
Krebs (1972)	Leslie model	age specific	2.41

Table 17. Preliminary Ranking of Major Threats to Living Marine Resources and Habitats in the Northeast.

1. Urban and Port Development *
2. Ocean Disposal #
3. Dams
4. Agricultural Practices •
5. Industrial Waste Discharges @
6. Domestic Waste Discharges @
7. OCS Oil and Gas Development
8. Insect Control
9. Water Diversion
10. Sand and Gravel Mining
11. Power Generation

* Includes dredge and fill and construction activities covered by Section 10/104 permits, as well as point source pollution covered by NPDES permits and nonpoint source pollution.

Includes dredged material disposal in State waters, as well as actual ocean dumping of dredged material, sewage sludge, etc., covered by Section 103 permits.

• Includes nonpoint source pollution (fertilizers, animal wastes, biocides, sediments, heavy metals, etc.) that affects coastal aquatic areas.

@ Point source pollution covered by NPDES permits.

Source: USDC, 1985.

Table 19. Summer Flounder Commercial Landings by Gear, ME-NC, 1980-89 Combined.

Gear	1000 Pounds	Percent
Haul Seines, Beach	94	*
Haul Seines, Long(Danish)	6	*
Stop Nets	2	*
Purse Seines, Menhaden	239	*
Beam Trawls, Other	8	*
Otter Trawl Bottom, Fish	269,179	96
Otter Trawl Bottom, Lobster	119	*
Otter Trawl Bottom, Scallop	52	*
Otter Trawl Bottom, Shrimp	5	*
Otter Trawl Bottom, Other	1,248	*
Otter Trawl Midwater	1	*
Trawl Midwater, Paired	110	*
Trawl Bottom, Paired	27	*
Scottish Seine	5	*
Weirs	1	*
Pound Nets, Fish	2,862	1
Pound Nets, Other	25	*
Floating Traps (Shallow)	619	*
Fyke And Hoop Nets, Fish	13	*
Pots And Traps, Crab, Blue	1	*
Pots And Traps, Eel	1	*
Pots And Traps, Fish	22	*
Pots And Traps, Lobster Inshore	2	*
Pots And Traps, Lobster Offshore	1	*
Gill Nets, Other	170	*
Gill Nets, Drift, Other	79	*
Gill Nets, Drift, Runaround	2	*
Gill Nets, Stake	17	*
Lines Hand, Other	688	*
Lines Troll, Other	61	*
Lines Long Set With Hooks	10	*
Spears	1	*
Dredges, Clam	1	*
Dredges, Conch	1	*
Dredges Scallop, Bay	1	*
Dredges Scallop, Sea	3,389	1
Unk. 989	1	*
ALL GEAR	279,072	100

* = less than 0.5 %
Source: Unpublished NMFS General Canvass data.

Table 20. Summer Flounder Commercial Landings by State and Gear, 1980-89 Combined.

Gear	ME % of Total	NH % of Total	MA % of Total	RI % of Total	CT % of Total	NY % of Total	NJ % of Total	DE % of Total	MD % of Total	VA % of Total	NC % of Total
Haul Seines, Beach	-	.	-	0.0	0.0	0.0	-	2.8	0.4	0.1	.
Haul Seines, Long(Danish)	-	.	0.0	-	.	-	0.0	-	.	-	.
Stop Nets	-	.	-	0.0	-	.	-	.	-	.	.
Purse Seines, Menhaden	-	.	1.2	-	.	-	0.0	-	.	0.0	.
Beam Trawls, Other	-	.	-	.	-	.	-	.	-	0.0	.
Otter Trawl Bottom, Fish	93.5	76.9	93.6	94.3	99.2	97.9	98.4	-	93.8	92.5	100.0
Otter Trawl Bottom, Lobster	-	.	-	0.0	-	0.5	0.0	-	.	0.0	.
Otter Trawl Bottom, Scallop	-	.	0.0	-	.	0.0	0.0	-	0.0	0.1	.
Otter Trawl Bottom, Shrimp	3.5	15.4	0.0	-	.	-	.	-	.	-	.
Otter Trawl Bottom, Other	-	.	-	2.8	-	.	-	.	-	.	.
Otter Trawl Midwater	-	.	-	.	-	.	-	.	-	0.0	.
Trawl Midwater, Paired	-	.	0.5	0.0	-	.	0.0	-	.	-	.
Trawl Bottom, Paired	-	.	-	0.1	-	0.0	-	.	-	.	.
Scottish Seine	0.5	-	0.0	0.0	-	.	0.0	-	.	-	.
Weirs	-	.	-	.	-	.	-	.	-	0.0	.
Pound Nets, Fish	-	.	0.6	-	0.0	0.8	0.2	-	2.1	3.9	.
Pound Nets, Other	-	.	0.1	-	.	-	.	-	.	-	.
Floating Traps (Shallow)	-	.	-	1.4	-	.	-	.	-	.	.
Fyke And Hoop Nets, Fish	-	.	-	0.0	-	.	-	1.0	0.2	0.0	.
Pots And Traps, Crab, Blue	-	.	-	.	-	.	-	.	-	0.0	.
Pots And Traps, Eel	-	.	0.0	-	.	-	.	-	.	0.0	.
Pots And Traps, Fish	-	.	0.0	-	.	-	.	-	0.2	0.0	.
Pots And Traps, Lobster Inshore	-	.	-	.	0.0	-	0.0	-	.	-	.
Pots And Traps, Lobster Offshore	-	.	-	.	-	.	0.0	-	.	-	.
Gill Nets, Other	1.7	7.7	0.0	0.1	0.0	0.0	0.0	83.1	1.1	0.0	.
Gill Nets, Drift, Other	-	.	-	.	0.0	-	0.0	8.7	0.0	0.1	.
Gill Nets, Drift, Runaround	-	.	-	.	-	.	0.0	-	.	-	.
Gill Nets, Stake	-	.	-	.	-	.	-	.	0.3	-	.
Lines Hand, Other	-	.	1.7	0.3	0.6	0.5	0.0	4.4	1.5	0.0	.
Lines Troll, Other	-	.	0.0	0.1	-	.	-	.	-	.	.
Lines Long Set With Hooks	-	.	0.0	0.0	-	.	-	.	-	.	.
Spears	-	.	-	.	0.0	-	.	-	.	-	.
Dredges, Clam	-	.	-	.	-	.	-	.	0.0	-	.
Dredges, Conch	-	.	-	.	-	.	-	.	0.0	0.0	.
Dredges Scallop, Bay	-	.	-	.	-	.	-	.	0.0	-	.
Dredges Scallop, Sea	0.8	-	2.1	0.8	-	0.2	1.3	-	0.4	3.2	.
Unk. 989	-	.	-	.	0.0	-	.	-	.	-	.
ALL GEAR	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* = less than 0.05 %
Source: Unpublished NMFS General Canvass data.

Table 22. Summer Flounder Commercial Landings (thousands of lbs) by State by Month, All Gear, 1980-1989 Mean

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
ME	1	1	1	1	2	1	2	1	1	T	1	1	13
NH	1	-	1	1	1	1	1	-	1	1	1	1	1
MA	45	47	93	97	129	267	277	223	192	303	134	53	1,866
RI	550	708	725	435	296	127	108	144	300	546	247	225	4,417
NY	167	128	119	90	421	176	153	241	316	181	66	86	2,149
NJ	743	597	438	184	196	155	89	337	792	517	325	351	4,729
MD	87	63	48	34	19	11	24	29	48	46	65	97	576
NC	2,299	967	556	331	110	33	18	13	56	152	982	2,239	7,762
FL	937	898	659	412	117	53	87	113	210	477	1,167	890	6,027
Total	4,832	3,413	2,643	1,588	1,293	826	761	1,105	1,918	2,225	2,989	3,946	27,543
EEZ	4,300	3,339	2,622	1,557	727	403	269	453	1,096	1,709	1,801	2,900	21,181
State	531	73	20	29	565	423	490	651	819	512	1,187	1,045	6,351

- = zero. Source: Unpublished NMFS General Canvass data.

Table 23. Distribution (%) of Summer Flounder Commercial Landings by Month by State, All Gear, 1980-1989 Mean

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
ME	9.8	14.6	3.9	6.5	15.0	1.0	17.0	11.1	4.3	2.6	1.8	12.4	100.0
NH	9.1	-	26.6	21.4	1.6	4.1	12.7	-	1.3	9.5	7.0	6.7	100.0
MA	2.4	2.6	5.0	5.2	6.9	14.3	14.9	12.0	10.3	16.3	7.2	2.9	100.0
RI	12.5	16.0	16.4	9.9	6.7	2.9	2.5	3.3	6.8	12.4	5.6	5.1	100.0
NY	7.8	6.0	5.6	4.2	19.6	8.2	7.1	11.2	14.7	8.4	3.1	4.0	100.0
NJ	15.7	12.6	9.3	3.9	4.2	3.3	1.9	7.1	16.8	10.9	6.9	7.4	100.0
MD	15.1	11.0	8.5	5.9	3.3	2.0	4.2	5.2	8.4	8.0	11.4	16.9	100.0
VA	15.6	14.9	10.9	6.8	2.0	0.9	1.4	1.9	3.5	7.9	19.4	14.8	100.0
NC	29.6	12.5	7.2	4.3	1.4	0.4	0.2	0.2	0.7	2.0	12.7	28.8	100.0
Total	17.5	12.4	9.6	5.8	4.7	3.0	2.8	4.0	7.0	8.1	10.9	14.3	100.0
EEZ	20.3	15.8	12.4	7.4	3.4	1.9	1.3	2.1	5.2	8.1	8.5	13.7	100.0
State	8.4	1.2	0.3	0.5	8.9	6.7	7.7	10.3	12.	98.1	18.7	16.4	100.0

- = zero. Source: Unpublished NMFS General Canvass data.

Table 24 . Distribution (%) of Summer Flounder Commercial Landings by State by Month, All Gear, 1980-1989 Mean

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
ME	*	*	*	*	*	*	*	*	*	*	*	*	*
NH	*	-	*	*	*	*	*	-	*	*	*	*	*
MA	0.9	1.4	3.6	6.2	10.0	32.3	36.4	20.2	10.0	13.6	4.5	1.4	6.8
RI	11.4	20.8	27.4	27.4	22.9	15.5	14.3	13.1	15.7	24.6	8.3	5.7	16.0
NY	3.5	3.8	4.5	5.7	32.6	21.3	20.1	21.8	16.5	8.1	2.2	2.2	7.8
NJ	15.4	17.5	16.6	11.6	15.2	18.8	11.8	30.6	41.3	23.3	10.9	8.9	17.2
MD	1.8	1.9	1.8	2.2	1.5	1.4	3.2	2.7	2.5	2.1	2.2	2.5	2.1
VA	19.4	26.3	25.0	26.0	9.1	6.5	11.5	10.2	11.0	21.5	39.1	22.6	21.9
NC	47.6	28.3	21.1	20.9	8.5	4.1	2.4	1.2	2.9	6.9	32.9	56.8	28.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EEZ	89.0	97.8	99.2	98.1	56.2	48.7	35.4	41.0	57.2	76.8	60.3	73.5	76.9
State	11.0	2.2	0.8	1.9	43.8	51.3	64.6	59.0	42.8	23.2	39.7	26.5	23.1

- = zero; * = less than 0.5%. Source: Unpublished NMFS General Canvass data.

Table 25. Distribution (%) of Summer Flounder Landings by State, Jan-Jun vs. Jul-Dec, 1980-89

State	Jan-Jun	Jul-Dec	Total
ME	50.8	49.2	100.0
NH	62.7	37.3	100.0
MA	36.5	63.5	100.0
RI	64.4	35.6	100.0
NY	51.4	48.6	100.0
NJ	49.0	51.0	100.0
MD	45.9	54.1	100.0
VA	51.1	48.9	100.0
NC	55.4	44.6	100.0
All	53.0	47.0	100.0
EEZ	61.1	38.9	100.0
State	25.9	74.1	100.0

Source: Unpublished NMFS General Canvass data.

Table 28. Total Summer Flounder Landings and Percent Taken by Otter Trawl for States Included in Weighout, 1983-89.

	Summer Flounder Landings (Pounds)		Otter Trawl
Year	All Gear	Otter Trawl	Percent
1983	20,415,693	20,047,416	98.2
1984	22,173,282	21,641,547	97.6
1985	20,752,977	20,001,042	96.4
1986	20,508,872	19,942,525	97.2
1987	20,980,158	20,311,298	96.8
1988	24,394,428	23,640,259	96.9
1989	12,912,205	12,478,982	96.6
Total	142,137,615	138,063,069	97.1

Source: Unpublished NMFS weighout data (CT, DE, NC not included).

Table 29. Mean Catch Composition of all Otter Trawl Trips Landing Summer Flounder, 1983-89.

	83		84		85		86		87		88		89		All Years	
Species	Lbs	%	Lbs	%	Lbs	%	Lbs	%	Lbs	%	Lbs	%	Lbs	%	Lbs	%
Black Sea Bass	195	1	233	1	152	1	204	2	223	2	166	1	151	1	190	1
Scup	766	5	711	5	580	6	669	7	555	6	503	5	460	4	613	6
Bluefish	80	1	103	1	126	1	135	1	118	1	88	1	100	1	108	1
Butterfish	341	2	1,002	8	391	4	383	4	348	4	199	2	275	2	432	4
Croaker	2	*	14	*	21	*	13	*	12	*	5	*	25	*	13	*
Winter Flounder	1,045	7	839	7	642	7	524	6	480	5	425	4	334	3	627	6
Summer Flounder	2,553	18	2,564	21	2,351	28	2,257	26	2,345	28	2,725	30	1,941	20	2,404	24
Mackerel	58	*	129	1	231	2	91	1	109	1	259	2	245	2	157	1
Weakfish	88	1	93	1	69	1	106	1	97	1	58	1	53	1	82	*
Tautog	3	*	21	*	19	*	15	*	12	*	11	*	8	*	13	*
Whiting	715	5	791	6	781	9	830	9	964	11	828	9	873	9	822	8
Lobster	11	*	20	*	11	*	8	*	19	*	17	*	10	*	14	*
Sea Scallop	46	*	28	*	40	*	23	*	108	1	152	1	96	1	68	*
Loligo Squid	856	6	846	7	810	9	1,111	13	1,005	12	1,446	16	2,339	24	1,158	11
Misc. Species	7,004	50	4,474	37	2,139	25	2,104	24	1,786	21	2,022	22	2,656	27	3,219	32
Total Trip	13,763	100	11,866	100	8,362	100	8,473	100	8,182	100	8,904	100	9,568	100	9,920	100

* = less than 0.5%
Source: Unpublished NMFS weighout data (CT, DE, NC not included).

Table 30. Weighout Otter Trawl Trips Landings Summer Flounder. Note that weighout data are a sample of fishing activity, not a census.

	83	84	85	86	87	88	89	Mean 83-89
				100 lbs or more				
Mean lbs/trip	3,899	3,863	3,428	3,382	3,463	3,961	3,219	3,618
# of trips	6,509	7,632	8,147	10,165	9,674	8,306	5,215	7,950
Landings ('000)	19,900	21,504	19,774	19,067	19,331	20,879	11,429	18,841
% of WO Total*	99	99	99	99	99	99	99	99
				Less than 100 lbs				
Mean lbs/trip	28	30	31	28	26	29	25	28
# of trips	5,134	4,690	6,527	6,553	5,079	5,266	5,613	5,552
Landings ('000)	147	136	226	194	136	160	146	164
% of WO Total*	1	1	1	1	1	1	1	1

* Percent of weighout total summer flounder where effort data available.
Source: Unpublished NMFS weighout data (CT, DE, NC not included).

Table 31. Mean catch Composition of Summer Flounder Otter Trawl Trips Landing 100 Lbs/trip or Greater, 1983-89.

	83		84		85		86		87		88		89		All Years	
Species	Lbs	%	Lbs	%	Lbs	%	Lbs	%	Lbs	%	Lbs	%	Lbs	%	Lbs	%
Black Sea Bass	263	1	312	2	197	2	288	2	262	2	210	2	214	1	251	2
Scup	713	4	706	5	599	6	771	7	556	6	571	5	515	4	638	5
Bluefish	79	*	120	*	121	1	166	1	140	1	102	*	106	*	120	1
Butterfish	338	2	1,212	8	476	5	513	5	453	4	251	2	360	3	528	4
Croaker	3	*	12	*	27	*	11	*	10	*	5	*	21	*	12	*
Winter Flounder	1,042	6	708	5	570	6	498	5	454	4	413	4	246	2	578	5
Summer Flounder	3,899	24	3,863	28	3,428	36	3,382	34	3,463	37	3,961	38	3,219	28	3,618	31
Mackerel	47	*	69	*	244	2	84	*	95	1	281	2	181	1	142	1
Weakfish	97	*	77	*	60	*	78	*	61	*	44	*	43	*	67	*
Tautog	3	*	22	*	21	*	19	*	14	*	13	*	9	*	15	*
Whiting	504	3	504	3	559	5	637	6	747	8	674	6	774	6	620	5
Lobster	15	*	20	*	9	*	9	*	21	*	16	*	8	*	14	*
Sea Scallop	65	*	26	*	55	*	30	*	131	1	179	1	148	1	86	*
Loligo Squid	790	4	913	6	717	7	1,125	11	1,023	11	1,634	15	2,880	25	1,219	10
Misc. Species	8,289	51	4,908	36	2,266	24	2,101	21	1,729	18	1,902	18	2,689	23	3,455	30
Total Trip	16,145	100	13,471	100	9,350	100	9,711	100	9,160	100	10,258	100	11,403	100	11,363	100

* = less than 0.5%
Source: Unpublished NMFS weighout data (CT, DE, NC not included).

Table 32. Summer Flounder Catch by 3-Digit Area, 1990 (3-digit areas on Figure 14)

3-digit area	% summer flounder
513	*
521	*
522	*
525	*
526	*
537	5
538	*
539	2
613	4
614	1
616	12
621	20
622	38
623	*
626	15
632	2
Total	100

* = less than 0.5%.
Source: Unpublished NEFC sea sampling survey data.

Table 33. Average Species Composition (%) of Tows Catching Summer Flounder, 1990

Species	Tows catching any summer flounder (505 tows)	Tows catching > 100 lbs summer flounder (153 tows)
Summer flounder	6	18
Skates	22	15
Dogfish	10	3
Loligo	10	12
Silver hake	9	8
Scup	8	4
Sea robins	7	22
Yellowtail flounder	6	*
Horshoe crab	5	2
Red hake	3	2
Fourspot flounder	2	3
Butterfish	1	1
Atlantic mackerel	1	1
Angler	1	2
Black sea bass	1	2
Sea scallops	1	2
Other species	9	5
Total	100	100

* = less than 0.5%; percentages may not sum to 100% because of rounding.
Source: Unpublished NEFC sea sampling survey data.

Table 34. Average Species Composition (%) of Selected Otter Trawl Tows , 1990

Species	Tows catching >100 lbs Loligo (214 tows)	Tows catching >500 lbs Loligo (87 tows)	Tows catching >100 lbs Scup (97 tows)	Tows catching >500 lbs Scup (39 tows)
Summer flounder	4	2	2	1
Skates	8	7	5	2
Dogfish	3	2	6	3
Loligo	31	49	13	7
Silver hake	12	11	10	5
Scup	14	6	37	59
Sea robins	7	6	5	3
Red hake	2	2	5	3
Butterfish	5	7	4	3
Atlantic mackerel	2	*	6	7
Other species	12	10	8	7
Total	100	100	100	100

* = less than 0.5%; percentages may not sum to 100% because of rounding.
Source: Unpublished NEFC sea sampling survey data.

Table 37. Seasonal Mean Catch/trip (lb/trip) for the Dominant Species in the 1982-89 North Carolina Nearshore Flounder Trawl Fishery, Including the Species Percent of the Total Weight of the Catches Sampled.

Species		Season 1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	7-season mean CPUE
Summer Flounder	lb/trip	12,311	21,753	18,325	7,405	6,837	9,121	6,909	11,808
	%	94	93	89	74	62	82	92	87
Weakfish	lb/trip	448	547	761	1111	2674	783	40	908
	%	3	2	4	11	24	7	1	7
Loligo pealei	lb/trip	187	289	461	234	282	172	163	256
	%	1	1	2	2	3	2	2	2
Bluefish	lb/trip	66	276	445	260	337	485	55	276
	%	1	1	2	3	3	4	1	2
Northern Kingfish	lb/trip	64	18	11	95	37	15	<2	35
	%	1	*	*	1	*	*	*	*
Southern Kingfish	lb/trip	<2	7	11	90	31	40	<2	24
	%	*	*	*	1	*	*	*	*
Butterfish	lb/trip	9	66	18	46	79	29	2	35
	%	*	*	*	1	1	*	*	*
Atlantic Sturgeon	lb/trip	15	15	37	15	15	13	2	18
	%	*	*	*	*	*	*	*	*
Goosefish	lb/trip	2	220	201	40	44	53	31	84
	%	*	1	1	*	*	1	*	1
Southern Flounder	lb/trip	26	0	26	4	15	108	2	26
	%	*	*	*	*	*	1	*	*
Atlantic Croaker	lb/trip	4	9	18	130	364	71	31	90
	%	*	*	*	1	3	1	*	1
Totals (11 species)	lb/trip	13,133	23,199	20,313	9,431	10,717	10,889	7,236	13,563
	%	100	100	99	95	97	97	97	100

* = less than 0.5%. Source: North Carolina 1990.

Table 39. Summer Flounder - Commercial and Recreational Landings (thousands of pounds)

Year	Comm	Rec	Total	% Comm	% Rec
1980	31216	25842	57058	55	45
1981	21056	11297	32353	66	35
1982	22928	18901	41829	55	45
1983	29548	35651	65199	45	55
1984	37765	28878	66643	57	43
1985	32352	17085	49437	65	35
1986	26866	17573	44439	60	40
1987	27052	13131	40183	67	33
1988	32377	18422	50799	64	36
1989	17913	3192	21105	85	15
Ave	27907	18997	46905	62	38

Source: Commercial - NMFS General Canvass data; Recreational - unpublished NMFS MRFSS data.

Table 40. Number of Recreational Fishing Trips (000s) for All Species in Bimonthly State/fishing Mode/Fishing Area Cells with Summer Flounder Catch, Compared with Numbers of Nominal Summer Flounder Recreational Trips (000s) in these Cells, Aggregated at the Subregional Level, 1980-1988.

Year	Subregion	All species trips	Nominal summer flounder trips	Proportion nominal summer flounder to all species trips
1980	New England	2,626	277	0.106
	Mid-Atlantic	21,097	9,295	0.441
	South Atlantic	2,270	287	0.126
	Total	25,992	9,859	0.379
1981	New England	1,701	196	0.115
	Mid-Atlantic	10,919	4,532	0.415
	South Atlantic	1,740	623	0.358
	Total	14,361	5,351	0,373
1982	New England	3,607	551	0.153
	Mid-Atlantic	11,463	5,541	0.483
	South Atlantic	2,905	1,010	0.358
	Total	17,974	7,102	0.395
1983	New England	4,792	745	0.155
	Mid-Atlantic	19,407	01,100	0.520
	South Atlantic	3,396	855	0.252
	Total	27,595	11,700	0.424
1984	New England	2,996	667	0.223
	Mid-Atlantic	17,018	9,075	0.533
	South Atlantic	3,811	1,348	0.354
	Total	23,826	11,090	0.465
1985	New England	3,369	388	0.115
	Mid-Atlantic	12,152	5,311	0.437
	South Atlantic	3,584	1,501	0.419
	Total	19,105	7,200	0.377
1986	New England	4,653	670	0.144
	Mid-Atlantic	17,428	6,578	0.377
	South Atlantic	2,090	666	0.318
	Total	24,172	7,914	0.327
1987	New England	3,870	583	0.150
	Mid-Atlantic	16,069	6,649	0.401
	South Atlantic	3,098	307	0.099
	Total	23,037	7,340	0.319
1988	New England	4,929	650	0.132
	Mid-Atlantic	15,142	7,366	0.486
	South Atlantic	3,870	884	0.228
	Total	23,941	8,900	0.372

Source: Essig pers. comm.

Table 43. Estimated Total Summer Flounder Recreational Catch Number and Weight by Region & Mode of Fishing, 1989.

	Number			Pounds		
Region/Mode	State	EEZ	Total	State	EEZ	Total
New England						
Shore	8,059	-	8,059	6,530	-	6,530
Party/Charter	1,819	2,357	4,176	9,222	-	9,222
Private/Rental	169,024	5,940	174,964	334,772	-	334,772
Mid-Atlantic						
Shore	174,879	-	174,879	175,043	-	175,043
Party/Charter	230,193	50,212	280,405	363,926	8,495	372,421
Private/Rental	1,727,549	61,476	1,789,025	3,205,923	91,501	3,297,424
North Carolina						
Shore	154,548	-	154,548	206,390	-	206,390
Party/Charter	223	-	223	276	-	276
Private/Rental	216,595	1,286	217,881	282,205	1,120	283,325
Total						
Shore	337,486	-	337,486	387,963	-	387,963
Party/Charter	232,235	52,569	284,803	373,424	8,495	381,919
Private/Rental	2,113,168	68,702	2,181,870	3,822,900	92,621	3,915,521

Source: Unpublished NMFS MRFSS data.

Table 46. Exvessel Value, Nominal Price and 1989 Adjusted Price of Summer Flounder by Year, ME-NC, All Gear Combined.

Year	Nominal Value 1000 $	Nominal Price Mean	1989 Adj. Price Mean
80	16,035	0.51	0.64
81	14,629	0.69	0.80
82	16,628	0.73	0.81
83	19,926	0.67	0.75
84	25,935	0.69	0.74
85	31,027	0.96	1.04
86	32,667	1.22	1.36
87	37,953	1.40	1.53
88	40,602	1.25	1.32
89	27,992	1.56	1.56

Note: Prices adjusted with PPI (1982 = 100).
Source: Unpublished NMFS General Canvass data.

Table 47. Total Value of All Finfish and Shellfish Landings, Value of Summer Flounder Landings, and Summer Flounder Percent of Total Value by State, 1989.

State	Total Value ($1000)	Summer flounder ($1000)	Summer Flounder Percent
ME	132,522	5	0.0
NH	10,247	0	0.0
MA	272,847	3,668	1.3
RI	75,004	5,308	7.1
CT	18,309	1,282	7.0
NY	51,096	2,589	5.1
NJ	78,802	4,141	5.3
DE	3,453	4	0.1
MD	52,050	359	0.7
VA	100,014	5,116	5.1
NC	70,582	5,516	7.8

* = less than 0.1%
Sources: Unpub. NMFS General Canvass data.

Table 48. Total US Flounder Landings and Exvessel Value, Summer Flounder Landings and Exvessel Value, and Summer Flounder Percent of Total, 1980-89.

	Total Flounders		Summer Flounder		SF % of Total	
Year	1000 lbs	$ 1000	1000 lbs	$ 1000	Lbs	Value
80	216,920	82,488	31,216	16,035	14	19
81	201,053	85,892	21,056	14,629	10	17
82	228,341	102,029	22,928	16,628	10	16
83	253,528	116,440	29,548	19,926	12	17
84	219,995	124,259	37,765	25,935	17	21
85	195,718	129,121	32,352	31,027	17	24
86	169,050	124,586	26,866	32,667	16	26
87	199,711	145,080	27,052	37,953	14	26
88	228,620	140,142	32,377	40,602	14	29
89	202,489	119,831	17,913	27,992	9	23

Source: Unpublished NMFS General Canvass data.

Table 49. Landings, Value and Price of Summer Flounder by State for 1989, All Gear Combined.

State	Landings (1000 lbs)	Value ($ 1000)	Price ($/lb)
ME	9	5	0.58
MA	1,877	3,668	1.95
RI	3,082	5,308	1.72
CT	513	1,282	2.50
NY	1,463	2,589	1.77
NJ	2,864	4,141	1.45
DE	2	4	1.68
MD	204	359	1.76
VA	3,688	5,116	1.39
NC	4,205	5,516	1.31

Source: Unpublished NMFS General Canvass data.

Table 50. Landings, Value and Price of Summer Flounder by Month, 1980-89 averaged, All Gear Combined.

	State (<3 mi)			EEZ (>3 Mi)			All		
Month	1000 Lbs	Value $1000	Adj. Price	1000 Lbs	Value $1000	Adj. Price	1000 Lbs	Value $1000	Adj. Price
JAN	531	495	0.93	4,300	3,789	0.88	4,832	4,285	0.89
FEB	73	58	0.79	3,339	3,563	1.07	3,413	3,621	1.06
MAR	20	20	0.99	2,622	3,366	1.28	2,643	3,386	1.28
APR	29	36	1.24	1,557	1,883	1.21	1,588	1,921	1.21
MAY	565	727	1.29	727	874	1.20	1,293	1,602	1.24
JUN	423	588	1.39	403	580	1.44	826	1,170	1.42
JUL	490	757	1.54	269	478	1.78	761	1,237	1.62
AUG	651	935	1.44	453	589	1.30	1,105	1,526	1.38
SEP	819	848	1.04	1,096	1,028	0.94	1,918	1,879	0.98
OCT	512	435	0.85	1,709	1,585	0.93	2,225	2,026	0.91
NOV	1,187	891	0.75	1,801	1,453	0.81	2,989	2,345	0.78
DEC	1,045	724	0.69	2,900	2,453	0.85	3,946	3,178	0.81
ALL	6,351	6,519	1.03	21,181	21,646	1.02	27,543	28,180	1.02

Note: Prices adjusted with PPI (1982 = 100).
Source: Unpublished NMFS General Canvass data.

Table 51. Landings, Exvessel Value & Price of Summer Flounder by Size Category for 1989, All States & All Gear Combined.

Size Category	Landings (1000 lbs)	Value ($1000)	Price ($/lb)
Jumbo	1,223	2,359	1.93
Large	6,216	9,741	1.57
Medium	5,458	7,861	1.44
Small	904	988	1.09
Unclassified	4,113	7,044	1.71

Source: Unpublished NMFS General Canvass data.

Table 52. Annual Number of Otter Trawl Vessels Landing a Given Threshold of Summer Flounder, 1983-89. (Note that weighout data are a sample of fishing activity, not a census.)

Lbs/trip	83 Vessels	84 Vessels	85 Vessels	86 Vessels	87 Vessels	88 Vessels	89 Vessels
> = 1 lb	702	704	653	640	603	624	599
> = 100 lbs	612	604	596	553	522	563	510
> = 200 lbs	572	576	562	525	502	540	468
> = 300 lbs	543	555	535	511	478	521	443
> = 400 lbs	530	531	509	494	464	488	433
> = 500 lbs	519	517	495	477	448	470	422

Source: Unpublished NMFS weighout data (CT, DE, NC not included).

Table 53. Annual Number of Otter Trawl Trips Landing a Given Threshold of Summer Flounder, 1983-89. (Note that weighout data are a sample of fishing activity, not a census.)

Lbs/Trip	83 Trips	84 Trips	85 Trips	86 Trips	87 Trips	88 Trips	89 Trips
> = 1 lb	11,643	12,323	14,674	16,719	14,753	13,572	10,828
> = 100 lbs	6,509	7,632	8,147	10,166	9,674	8,306	5,215
> = 200 lbs	5,412	6,124	6,863	8,678	7,835	6,686	3,969
> = 300 lbs	4,816	5,181	6,005	7,347	6,584	5,840	3,386
> = 400 lbs	4,349	4,599	5,445	6,474	5,611	5,084	3,016
> = 500 lbs	4,045	4,212	5,013	5,881	5,084	4,632	2,856

Source: Unpublished NMFS weighout data (CT, DE, NC not included).

Table 54. Mean Exvessel Value of all Otter Trawl Trips Landing Summer Flounder, 1983-89.

	83		84		85		86		87		88		89		All Years	
Species	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%
Black Sea Bass	125	1	157	2	140	2	179	2	213	3	149	2	163	2	160	2
Scup	296	4	320	5	292	5	329	5	360	5	310	4	316	4	319	5
Bluefish	8	*	13	*	16	*	21	*	21	*	11	*	15	*	15	*
Butterfish	109	1	369	4	122	2	308	5	220	3	143	2	130	1	188	3
Croaker	-	-	3	*	5	*	4	*	4	*	2	*	8	*	4	*
Winter Flounder	454	7	499	8	453	9	414	6	452	6	413	6	350	5	437	7
Summer Flounder	1,767	27	1,797	30	2,256	44	2,758	45	3,249	48	3,345	53	3,017	45	2,563	41
Mackerel	8	*	16	*	36	*	9	*	12	*	36	*	33	*	21	*
Weakfish	23	*	32	*	32	*	31	*	26	*	18	*	25	*	27	*
Tautog	-	-	3	*	3	*	4	*	4	*	4	*	3	*	3	*
Whiting	133	2	130	2	148	2	181	2	335	5	207	3	174	2	185	3
Lobster	30	*	66	1	32	*	27	*	71		63	*	35	*	46	*
Sea Scallop	31	*	19	*	23	*	13	*	54	*	68		45	*	35	*
Loligo Squid	264	4	210	3	224	4	378	6	372	5	483	7	797	12	373	6
Misc. Species	3,068	48	2,440	40	1,242	24	1,463	23	1,256	18	1,045	16	1,464	22	1,734	28
Total Trip	6,318	100	5,972	100	5,028	100	6,119	100	6,649	100	6,296	100	6,576	100	6,109	100

* = less than 0.5%
Source: Unpublished NMFS weighout data (CT, DE, NC not included).

Table 55. 1985-1989 Mean Exvessel Value by Month per Trip by Species for Trips Landing Any Summer Flounder ($)

	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Black Sea Bass	386	445	447	305	116	73	65	10	13	26	73	130
Scup	678	643	692	711	322	188	126	65	96	202	373	456
Bluefish	25	4	12	9	7	17	23	25	29	22	28	21
Butterfish	927	415	432	98	53	60	40	35	60	87	97	540
Croaker	*	*	*	1	*	*	*	14	18	17	4	*
Winter Flounder	150	79	153	400	730	768	758	429	313	367	431	278
Summer Flounder	4,818	5,452	4,760	2,470	1,375	1,438	1,886	2,087	2,336	2,598	1,937	2,447
Mackerel	38	17	121	212	112	23	*	*	*	*	4	42
Weakfish	15	9	7	8	1	2	7	12	43	75	88	35
Tautog	*	*	*	2	9	10	11	4	3	2	2	*
Whiting	235	353	383	348	204	402	131	74	75	90	120	156
Lobster	4	4	4	8	13	26	72	182	139	103	22	12
Sea Scallop	38	44	78	117	34	17	10	15	1	38	14	23
Loligo Squid	1,081	730	686	728	675	418	317	278	196	234	402	803
Misc. Species	1,516	1,661	1,663	1,646	1,588	1,053	686	410	389	836	1,184	1,684
Total Trip	9,913	9,857	9,437	7,062	5,238	4,493	4,133	3,639	3,712	4,698	4,778	6,627

* = less than $1.
Source: Unpublished NEFC weighout data (excludes CT, DE, and NC).

Table 56. 1985-1989 Distribution of Mean Exvessel Value by Month per Trip by Species for Trips Landing Any Summer Flounder (%)

	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Black Sea Bass	3	4	4	4	2	1	1	*	*	*	1	1
Scup	6	6	7	10	6	4	3	1	2	4	7	6
Bluefish	*	*	*	*	*	*	*	*	*	*	*	*
Butterfish	9	4	4	1	1	1	*	*	1	1	2	8
Croaker	*	*	*	*	*	*	*	*	*	*	*	*
Winter Flounder	1	*	1	5	13	17	18	11	8	7	9	4
Summer Flounder	48	55	50	34	26	31	45	57	62	55	40	36
Mackerel	*	*	1	3	2	*	*	*	*	*	*	*
Weakfish	*	*	*	*	*	*	*	*	1	1	1	*
Tautog	*	*	*	*	*	*	*	*	*	*	*	*
Whiting	2	3	4	4	3	8	3	2	2	1	2	2
Lobster	*	*	*	*	*	*	1	4	3	2	*	*
Sea Scallop	*	*	*	1	*	*	*	*	*	*	*	*
Loligo Squid	10	7	7	10	12	9	7	7	5	4	8	12
Misc. Species	15	16	17	23	30	23	16	11	10	17	24	25
Total Trip	100	100	100	100	100	100	100	100	100	100	100	100

* = less than 1%.
Source: NEFC weighout data (excludes CT, DE, and NC).

Table 57. 1985-1989 Mean Exvessel Value by Month per Trip by Species for Trips Landing > 100 Lbs of Summer Flounder ($)

	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Black Sea Bass	497	516	497	352	77	113	108	14	15	31	93	192
Scup	588	567	509	683	239	251	151	77	105	207	389	573
Bluefish	29	5	9	12	7	19	20	16	29	24	29	26
Butterfish	1,008	455	505	64	37	27	15	12	39	52	66	553
Croaker	*	0	*	0	*	0	*	7	17	16	6	1
Winter Flounder	93	46	103	300	846	762	504	255	257	385	479	205
Summer Flounder	6,536	6,872	6,393	3,939	1,955	2,345	3,197	2,787	2,831	3,452	2,960	3,919
Mackerel	11	12	81	74	81	*	0	*	0	*	3	11
Weakfish	21	11	8	5	1	2	10	13	41	59	59	45
Tautog	*	0	*	2	10	14	16	5	4	3	2	
*												
Whiting	221	399	422	397	198	129	22	17	31	64	95	107
Lobster	2	5	5	10	10	23	55	118	148	114	11	10
Sea Scallop	52	55	105	136	46	16	10	19	2	49	20	36
Loligo Squid	1,078	843	495	540	630	434	96	110	118	159	296	860
Misc. Species	1,425	1,634	1,715	1,837	1,687	799	546	270	289	947	1,404	2,089
Total Trip	11,562	11,421	10,845	8,351	5,825	4,934	4,751	3,722	3,925	5,566	5,913	8,626

* = less than $1.
Source: NEFC weighout data (excludes CT, DE, and NC).

Table 58. 1985-1989 Distribution of Mean Exvessel Value by Month per Trip by Species for Trips Landing > 100 Lbs of Summer Flounder (%)

	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Black Sea Bass	4	4	4	4	1	2	2	*	*	*	1	2
Scup	5	4	4	8	4	5	3	2	2	3	6	6
Bluefish	*	*	*	*	*	*	*	*	*	*	*	*
Butterfish	8	3	4	*	0	*	*	*	*	0	1	6
Croaker	*	*	*	*	*	*	*	*	*	*	*	*
Winter Flounder	*	*	*	3	14	15	10	6	6	6	8	2
Summer Flounder	56	60	58	47	33	47	67	74	72	62	50	45
Mackerel	*	*	*	0	1	*	*	*	*	*	*	*
Weakfish	*	*	*	*	*	*	*	*	1	1	*	*
Tautog	*	*	*	*	*	*	*	*	*	*	*	*
Whiting	1	3	3	4	3	2	*	*	*	1	1	1
Lobster	*	*	*	*	*	*	1	3	3	2	*	*
Sea Scallop	*	*	*	1	*	*	*	*	*	*	*	*
Loligo Squid	9	7	4	6	10	8	2	2	3	2	5	9
Misc. Species	12	14	15	21	28	16	11	7	7	17	23	24
Total Trip	100	100	100	100	100	100	100	100	100	100	100	100

* = less than 1%.
Source: NEFC weighout data (excludes CT, DE, and NC).

Table 59. Annual number of plants processing Flounder (all species) by State, 1980-88.

Year	ME	NH	MA	RI	CT	NY	NJ	MD	VA	NC	All
80	15	1	52	2	-	14	1	2	7	31	125
81	18	1	49	2	-	17	1	2	7	26	123
82	18	2	48	9	-	18	2	2	6	28	133
83	19	2	47	13	1	18	2	3	4	27	136
84	23	2	49	12	1	17	2	3	4	25	138
85	21	2	51	8	2	19	2	3	4	20	132
86	26	2	49	7	1	19	2	3	5	18	132
87	27	3	49	8	-	22	2	3	4	20	138
88	21	1	50	6	1	19	2	3	4	20	127

Note: These plants also processed seafood other than flounders.
Source: Unpublished NMFS Processed Products Survey data.

Table 60. Value of Flounder (all species, thousands of $) processed product by State, 1980-88.

Year	ME	NH	MA	RI	CT	NY	NJ	MD	VA	NC	ALL
80	2,395	82	45,456	1,483	-	8,971	391	174	7,978	3,305	70,239
81	8,148	1,315	50,356	559	-	11,275	410	123	5,508	2,016	79,715
82	8,847	498	90,794	4,038	-	7,375	1,532	96	5,336	7,190	125,710
83	7,365	3,236	73,071	11,194	680	7,853	1,386	176	5,662	6,891	117,519
84	10,030	1,934	89,046	8,146	1,584	12,537	1,413	115	2,800	8,797	136,407
85	7,177	494	100,319	3,618	1,692	11,155	960	1,424	1,019	10,470	138,332
86	8,031	361	104,898	6,852	1,740	12,811	1,000	3,011	907	10,713	150,326
87	10,746	551	87,936	6,884	-	18,740	860	2,161	831	22,150	150,861
88	8,614	19	85,489	3,481	1,440	15,949	850	2,658	1,962	9,506	129,972

Note: Flounder product passed between firms has been double counted.
Source: Unpublished NMFS Processed Products Survey data.

Table 61. Fulton Market Share of Total Summer Flounder Landings (lbs x 000) 1984 and 1985

	1984			1985*		
	State Landings	Fulton Market	% Fulton	State Landings	Fulton Market	% Fulton
ME	2.4	.0	-	2.5	.0	-
NH	.2	.0	-	.3	.0	-
MA	1,488.1	47.9	3.22	2,249.4	147.2	6.54
RI	4,479.3	535.7	11.96	7,532.8	712.6	9.46
CT	130.8	112.1	85.70	183	124.6	68.09
NY	2,294.7	697.1	30.38	2,517.4	1,004.3	39.89
NJ	6,364.4	174.7	2.74	5,634.2	147.5	2.62
DE	8.7	.0	-	4.1	.0	-
MD	812.7	7.5	.92	577.4	.0	-
VA	9,673.4	126.9	1.31	5,036.7	29.8	.59
NC	12,509.8	692.6	5.54	8,614.4	771.0	8.95
Total	37,764.5	2,394.5	6.34	32,352.2	2,937.0	9.08
Total ME-DE	14,768.6	1,567.5	10.61	18,123.7	2,136.2	11.79

Source: Unpublished NMFS General Canvass data.

Table 62. National Economic Impacts of Total Flounder and Summer Flounder Commercial Fishing in the Mid-Atlantic Region. (Employment in person-years and income/output in $1000.)

	Total Flounders			Summer Flounder		
	Employment	Income	Output	Employment	Income	Output
Harvest	368	6,154	14,547	309	5,169	12,219
Processing	379	3,408	15,855	318	2,863	13,318
Distribution	93	1,815	3,378	78	1,525	2,838
Food Service	1,660	11,742	20,983	1,394	9,863	17,626
Retail	225	2,558	5,026	189	2,149	4,222
Cumulative	2,726	2,5677	59,789	2,290	21,569	50,223

Sources: Total flounders from National Fisheries Education and Research Foundation 1989. Summer flounder estimates were modified by unpublished NMFS General Canvass data.

Table 63. Estimated Number of Party and Charter Boats Operating Along the Atlantic Coast and Associated Revenues by State, 1985.

State	Charter	Party	Revenues ('000 1985 $)
Maine	35	10	2,696
New Hampshire	19	21	3,226
Massachusetts	136	41	10,717
Rhode Island	78	6	4,164
Connecticut	46	15	3,753
New York	300	100	24,723
New Jersey	375	100	28,074
Delaware	80	12	2,511
Maryland	221	109	11,307
Virginia	200	30	5,196
North Carolina	136	10	4,376
Total	1,626	454	100,723

Source: Sport Fishing Institute 1988a.

Table 64. National Direct Economic Impacts of All Species and Summer Flounder Recreational Fishing in the Mid-Atlantic Region.

	Employment (Person-years)	Wages (Million $)	Retail Sales (Million $)
All species	17,114	213.8	1,048.8
Summer Flounder	1,795-2,494	22.4-31.1	110.0-152.8

Sources: Sport Fishing Institute 1988 a and b.

Table 65. The percent of summer flounder (number) landed by anglers fishing on party and charter boats, Maine to North Carolina, 1985-89.

State	1985	1986	1987	1988	1989	1985-89
MA	0.0	0.0	0.6	0.2	1.0	0.1
NH	0.0	27.4	0.0	0.0	0.0	2.0
RI	0.1	5.4	1.0	0.0	0.1	3.4
CT	1.2	2.1	0.8	0.0	0.0	1.4
NY	15.9	19.3	11.2	15.3	32.5	16.0
NJ	10.4	25.9	23.6	14.1	7.7	16.5
DE	32.5	8.0	46.4	20.6	6.5	23.3
MD	7.3	1.4	0.2	0.6	1.3	0.8
VA	3.6	1.5	4.2	13.1	2.1	6.4
NC	28.1	0.5	0.0	0.0	0.1	13.1

Source: Unpublished NMFS MRFSS data.

Table 66. Charter and Party Boat Survey Distribution and Returns, 1990

State	Number sent	Usable returns	Non-usable returns
ME	24	5	1
NH	21	5	-
MA	80	17	9
RI	15	7	2
CT	17	4	2
NY	92	24	3
NJ	159	51	6
PA	16	7	1
DE	14	3	-
MD	4	2	-
VA	143	44	5
NC	1	1	-
FL	6	2	1
Total	592	172	30

Table 67. Relative Customer Interest and Success in Catching Selected Species in 1989. (1 = Low, 2 = Somewhat Low, 3 = Moderate, 4 = Somewhat High, and 5 = High)

Species	Charter boats Interest (mean)	Charter boats Success (mean)	Party boats Interest (mean)	Party boats Success (mean)
Large pelagics (marlin, tunas)	3.9	2.4	3.1	2.8
Sharks (other than dogfish)	3.2	2.4	2.1	1.9
Bluefish	3.9	3.9	4.6	4.0
Atlantic mackerel	2.4	3.0	3.5	3.5
Summer flounder	3.2	1.9	3.6	1.5
Scup	1.4	1.7	2.2	2.0
Black sea bass	2.1	2.6	3.2	2.9
Hakes	1.4	1.6	2.3	2.5
Groundfish (cod, haddock, yellowtail)	3.0	2.6	3.0	2.4
Weakfish	3.1	1.7	3.3	1.7
Striped bass	3.7	2.5	3.5	1.7
Other: spot	4.6	3.9	4.7	3.4

Table 68. Party and Charter Boat Operating Experience in 1985 and 1989

	Charter 1985 (mean)	Party 1989 (mean)	1985 (mean)	1989 (mean)
Ave. number of trips per year	57.0	50.0	142.0	130.0
Ave. number of trips per day OR	1.0	1.0	1.3	1.4
Ave. number of days per trip	1.1	1.1	1.2	1.3
Ave. number days fishing per week	3.2	3.1	5.0	4.6
Ave. number of anglers per trip	5.2	5.1	20.9	19.5
Ave. trip price per customer ($)	121.8	149.5	26.2	29.2
Ave. number of fish Taken per customer	10.9	8.3	15.2	9.9
Ave. number of crew members	1.4	1.4	2.1	2.0
Ave. cost of fuel & supplies ($)	96.1	131.1	113.3	146.6

Table 70. US Flatfish Imports (excluding halibut), by Country, All Product Types, 1990

Country	Pounds (1000)	Value (1000 US$)	$/lb.	% of Weight	% of Value
Canada	45,994	77,882	1.69	52	48
Rep. of Korea	12,006	20,035	1.67	14	12
Argentina	8,489	18,021	2.12	10	11
Netherlands	7,401	20,191	2.73	8	12
Thailand	3,829	4,981	1.30	4	3
Mexico	2,102	2,729	1.30	2	2
New Zealand	1,890	4,381	2.32	2	3
Australia	1,432	3,503	2.45	2	2
Iceland	1,328	2,177	1.64	2	1
China	735	1,214	1.65	1	1
Chile	674	1,200	1.78	1	1
Uruguay	657	718	1.09	1	*
Belgium	434	1,764	4.07	*	1
Brazil	308	599	1.95	*	*
St.Pierre & Miquelon	205	426	2.08	*	*
Japan	184	470	2.55	*	*
Hong Kong	130	285	2.20	*	*
Peru	124	60	0.48	*	*
Taiwan	89	171	1.92	*	*
All Others	434	1,093	2.52	*	1
TOTAL	88,444	161,900	1.83	100	100

* = less than 0.5%. % may not add to 100 because of rounding.
Source: NMFS Import/Export Files.

Table 72. State Share (%) of Summer Flounder Commercial Landings, 1980-89 (pounds, excludes southern flounder landings) and Recreational Landings (MRFSS Types A & B1; numbers) by State, 1980-89, (%)

State	Commercial Share	Recreational Share
ME	0.0482	0.01
NH	0.0005	0.01
MA	6.9111	3.31
RI	15.8914	1.74
CT	0.9532	1.69
NY	7.7486	14.22
NJ	16.9473	43.06
DE	0.0180	2.77
MD	2.0662	3.76
VA	21.6001	22.55
NC	27.8155	6.87
Total	100.0000	99.99

Sources: Unpublished NMFS General Canvass data, except North Carolina landings have been adjusted by NCDMF personnel to exclude southern flounder landings.

Table 73. Input data used to simulate the summer flounder population using the GENMOD model.

von Bertalanffy Growth Parameters (MAFMC 1988)

$L\infty = 82.67$

$K = 0.1731$

$t_0 = -1.039$

(Note: maximum age is 15 and length is in centimeters)

Length-weight Relationship (MAFMC 1988)

$\log W = -5.5484 + 3.2263 (\log TL)$

(Note: length is in millimeters and weight is in grams)

Lengths at maturity for female flounder (G. Shepherd pers. comm.)

Length (inches)	% mature
9.1	38
13.2	72
16.6	90
19.4	97
21.7	99
23.6 and larger	100

Ricker Stock Recruitment (S-R) model (derived from Chang and Pacheco 1975)

$\alpha = 2.53$

$\beta = .0151$

Variance = 0.75

Table 74. The Estimated Percent of Successful Anglers Landing 1 to 42 Summer Flounder (MRFSS Type A fish) per Day, 1986-90 Combined.

Catch/ trip	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	5136	55.6	5136	55.6
2	1670	18.1	6806	73.7
3	951	10.3	7757	84.0
4	434	4.7	8191	88.7
5	355	3.8	8546	92.6
6	173	1.9	8719	94.4
7	122	1.3	8841	95.8
8	86	0.9	8927	96.7
9	52	0.6	8979	97.2
10	107	1.2	9086	98.4
11	12	0.1	9098	98.5
12	16	0.2	9114	98.7
13	24	0.3	9138	99.0
14	22	0.2	9160	99.2
15	20	0.2	9180	99.4
16	2	0.0	9182	99.4
17	3	0.0	9185	99.5
18	3	0.0	9188	99.5
19	4	0.0	9192	99.6
20	18	0.2	9210	99.8
21	2	0.0	9212	99.8
23	3	0.0	9215	99.8
25	1	0.0	9216	99.8
26	2	0.0	9218	99.8
27	3	0.0	9221	99.9
28	3	0.0	9224	99.9
29	1	0.0	9225	99.9
30	3	0.0	9228	99.9
33	1	0.0	9229	100.0
37	1	0.0	9230	100.0
40	2	0.0	9232	100.0
42	1	0.0	9233	100.0

Source: Unpublished NMFS MRFSS data.

Table 75. The Effect of Various Size and Possession Limits on 1986-90 Combined Summer Flounder Recreational Landings (MRFSS Type A fish). (The table contains the percent reduction in the Number of summer flounder killed by anglers. Reductions were calculated assuming a post-release mortality of 25% and are adjusted for the differential between impact of length limits relative to MRFSS type A fish and summer flounder measured by interviewers.)

Possession Limit	Size Limit (TL inches) No	12"	13"	14"	15"	16"
No	-	5.0	11.3	26.0	41.4	53.7
1	42.7	47.1	51.6	64.4	74.6	79.9
2	28.4	33.2	38.2	51.9	64.5	72.1
3	19.9	24.7	30.2	44.3	58.0	67.1
4	14.7	19.6	25.3	39.4	53.7	63.7
5	11.1	16.0	21.8	36.2	50.9	61.5
6	8.7	13.5	19.5	33.9	48.8	59.8
7	6.9	11.8	17.8	32.3	47.3	58.6
8	5.5	10.4	16.5	31.0	46.1	57.7
9	4.4	9.3	15.4	30.1	45.3	57.0
10	3.5	8.5	14.6	29.3	44.6	56.5
11	3.0	8.0	14.1	28.8	44.1	56.1
12	2.6	7.5	13.6	28.4	43.7	55.8
13	2.1	7.1	13.2	28.0	43.3	55.5
14	1.8	6.8	12.9	27.7	43.1	55.3
15	1.5	6.5	12.7	27.5	42.8	55.1
16	1.4	6.3	12.5	27.3	42.7	54.9
17	1.2	6.1	12.3	27.1	42.5	54.8
18	1.0	6.0	12.2	27.0	42.4	54.6
19	0.9	5.8	12.0	26.9	42.3	54.5
20	0.7	5.7	11.9	26.7	42.1	54.4

Source: Unpublished NMFS MRFSS data.

Table 76. Recreational Summer Flounder Landings Expressed as the Percent of Annual Total for Each Bimonthly Sampling Period, 1985-89.

Months	Coast	ME-CT	NY-DE	MD-NC
J-F	0.02	0.00	0.00	0.10
M-A	2.00	0.03	0.02	8.14
M-J	26.06	19.04	27.75	24.26
J-A	51.01	47.44	54.64	42.56
S-O	18.60	33.49	17.58	15.45
N-D	2.31	0.00	0.01	9.48

Source: Unpublished NMFS MRFSS data.

Table 77. The Percent Reduction in the Number of Summer Flounder Killed by Anglers with the Implementation of Various Fishing Seasons, 1985-89. (Reductions were calculated assuming a combined effort transference/hooking mortality rate of 33%.)

Fishing season	Coast	ME-CT	NY-DE	MD-NC
5/1 to 12/31	-	-	-	5.5
6/1 to 12/31	10.1	8.4	9.3	-
6/15 to 12/31	14.5	9.6	14.0	-
7/1 to 12/31	18.8	12.8	18.6	-
5/15 to 9/30	13.5	14.4	10.6	-

Source: Unpublished NMFS MRFSS data.

Table 78. Possession Limits and Seasons with a 14" TL Minimum Recreational Fish Size that Most Closely Approximate a 47% Reduction in Exploitation for the Summer Flounder Recreational Fishery.

Fishing season	Coast	ME-CT	NY-DE	MD-NC
No season	3	2	2	6
5/1 to 12/31	-	-	-	10
6/1 to 12/31	5	3	-	-
6/15 to 12/31	7	-	3	-
7/1 to 12/31	10	4	4	-
5/15 to 9/30	6	5	3	-

Source: Unpublished NMFS MRFSS data.

Table 79. Percent Reductions in Exploitation Associated with the Combination of Recreational Limits Presented in Table 78.

Fishing season	Coast	ME-CT	NY-DE	MD-NC
No season	44.3	47.5	41.9	46.0
5/1 to 12/31	-	-	-	46.7
6/1 to 12/31	46.3	46.8	-	-
6/15 to 12/3	46.8	-	47.9	-
7/1 to 12/31	48.1	48.5	47.9	-
5/15 to 9/30	47.4	46.9	44.5	-

Source: Unpublished NMFS MRFSS data.

Table 80. Commercial and Recreational Landings and Discards Associated with 5.5" and 6.0" Effective Mesh, 14" Minimum Recreational Fish Size, Historical Mean Recruitment, Alternative Minimum Commercial Fish Sizes, and Fully-recruited F = 0.53.

5.5" minimum diamond mesh

	Commercial					Recreational			
Min. Size	Catch (000s)	Landings (000s)	Discards (000s)	% Discards	Landings (000lbs)	Catch (000s)	Landings (000s)	Discards (000s)	Landings (000lbs)
0"	8743	8743	0	0	11788	10919	4370	6549	7491
10"	8744	8246	358	4	11715	10923	4370	6553	7491
11"	8746	7921	825	9	11559	10930	4370	6560	7491
12"	8749	7540	1209	14	11387	10937	4370	6567	7491
13"	8758	6821	1937	22	10957	10951	4376	6575	7498
14"	8774	5717	3057	35	10051	10970	4393	6577	7518

6.0" minimum diamond mesh

	Commercial					Recreational			
Min. Size	Catch (000s)	Landings (000s)	Discards (000s)	% Discards	Landings (000lbs)	Catch (000s)	Landings (000s)	Discards (000s)	Landings (000lbs)
0"	6542	6542	0	0	10073	11140	4510	6630	7683
10"	6542	6433	109	2	10049	11141	4510	6631	7683
11"	6542	6193	349	5	9967	11144	4510	6634	7683
12"	6544	5976	568	9	9870	11148	4510	6638	7685
13"	6547	5513	1034	16	9590	11158	4514	6644	7688
14"	6555	4808	1747	27	9012	11170	4525	6645	7703

Table 81. The Estimated Number of Summer Flounder Landed by Recreational Fishermen, Maine to North Carolina, 1980 to 1989.

1980	22,202,000
1981	9,333,000
1982	15,989,000
1983	26,540,000
1984	26,227,000
1985	15,110,000
1986	11,970,000
1987	8,674,000
1988	12,489,000
1989	1,822,000
Average	15,036,000

Source: Unpublished NMFS MRFSS data.

Table 82 Summer Flounder Mesh Selectivity Studies

Size	Study	Month	ICES Gauge Mesh Size Retention Ave	Dry	Wet	L50	SD	Selection Factor	Total Fluke	< 14" Number	%	> = 14" Number	%	Fluke lbs	Bycatch lbs
1.5"	NC (a)	Dec	-	-	-	-	-	-	188	85	45.2	103	54.8	272	515
	NC (b)	Dec	-	-	-	-	-	-	192	90	46.9	102	53.1	282	345
	NC (c)	Jan	-	-	-	-	-	-	93	64	68.8	29	31.2	111	1,833
	NC (d)	Jan	-	-	-	-	-	-	211	180	85.3	31	14.7	127	326
	NC (e)	Dec-Feb	-	-	-	-	-	-	174	82	47.1	92	52.9	254	4,979
	NC (f)	Jan-Feb	-	-	-	-	-	-	154	82	53.2	72	46.8	226	2,407
	NC (g)	Dec,Feb	-	-	-	-	-	-	182	85	46.7	97	53.3	269	891
	NC (h)	Nov-Dec	-	-	-	-	-	-	367	251	68.4	116	31.6	-	-
2.25"	LI S (a)	May	2.3	-	-	-	-	-	1,983	1,092	55.1	891	44.9	2,110	10,989
2.5"	LI M (a)	May	2.6	-	-	-	-	-	170	29	17.1	141	82.9	262	6,042
	LI M (b)	May	2.5	-	-	-	-	-	1,492	482	32.3	1,010	67.7	1,992	26,301
	LI S (b)	May	2.5	-	-	-	-	-	2,950	1,485	50.3	1,465	49.7	3,231	13,283
3.0"	NJ N	Sept	-	2.5	2.6	-	-	-	274	185	67.5	89	32.5	-	-
	NJ C	Sept	-	3.2	3.3	-	-	-	490	370	75.5	120	24.5	-	-
	NJ S	Sept	-	2.7	2.8	-	-	-	186	99	53.2	87	46.8	-	-
	NJ All	Sept	-	-	-	-	-	-	950	654	68.8	296	31.2	-	9,945*
	NC (a)	Dec	2.9	2.8	-	-	-	-	304	97	31.9	207	68.1	529	1,065
3.5"	NC (b)	Dec	3.8	3.8	-	-	-	-	292	164	56.2	128	43.8	337	349
4.0"	NC (c)	Jan	4.5	4.7	-	11.0	0.51	-	192	104	54.2	88	45.8	297	2,783
4.5"	NC (d)	Jan	5.0	5.2	-	12.8	0.35	-	107	52	48.6	55	51.4	138	303
	NC (h)	Nov-Dec	4.4	-	-	-	-	-	306	157	51.3	149	48.7	-	-
5.0"	NJ N	Sept	-	4.4	4.4	-	-	-	157	97	61.8	60	38.2	-	-
	NJ C	Sept	-	4.6	4.7	-	-	-	325	195	60.0	130	40.0	-	-
	NJ S	Sept	-	4.4	4.4	-	-	-	153	92	60.1	61	39.9	-	-
	NJ All	Sept	-	-	-	-	-	-	635	384	60.5	251	39.5	-	1,716*
	NC (e)	Dec-Feb	5.2	5.2	-	12.6	3.41	-	133	36	27.1	97	72.9	199	830
5.5"	NJ N	Sept	-	5.0	4.8	-	-	-	107	36	33.6	71	66.4	-	-
	NJ C	Sept	-	5.2	5.7	-	-	-	223	110	49.3	113	50.7	-	-
	NJ S	Sept	-	5.2	5.0	-	-	-	129	57	44.2	72	55.8	-	-
	NJ All	Sept	-	-	-	-	-	-	459	203	44.2	256	55.8	-	2,265*
	LI M (a)	May	5.8	-	-	14.7	0.24	2.52	136	6	4.4	130	95.6	223	2,741
	LI M (b)	May	5.7	-	-	14.9	0.10	2.62	671	53	7.9	618	92.1	1,125	6,045
	LI S (a)	May	5.6	-	-	12.8	0.08	2.29	1,872	760	40.6	1,112	59.4	2,255	8,823
	LI S (b)	May	5.6	-	-	13.6	0.08	2.45	1,542	460	29.8	1,082	70.2	1,974	7,011
	NC (f)	Jan-Feb	5.7	5.9	-	14.3	2.52	-	89	9	10.1	80	89.9	178	658
6.0"	NC (g)	Dec,Feb	6.3	6.2	-	16.9	2.40	-	96	15	15.6	81	84.4	235	400

* = fish, not lbs.
Note: All letter footnotes after the studies are used to match control and experimental sets.
Sources: Anderson, *et al.*, 1983; Gillikin, *et al.*, 1981; Gillikin, 1982; and New Jersey, 1985.

Table 83. Summer Flounder Retention Level by Mesh Size

Retention Percent	Mesh Size 4.5"	5.0"	5.5"	Mesh Selection Factors*	Adjusted R^2
10%	8.4	9.3	10.2	1.86	0.27
25%	9.8	10.9	12.0	2.18	0.45
50%	11.1	12.3	13.5	2.46	0.88
75%	11.6	12.9	14.2	2.58	0.81
90%	11.8	13.2	14.5	2.63	0.81

Note: The mesh selection factor is the calculated ratio between the retention percent and the mesh size (i.e., 2.46 is 13.5" divided by 5.5"). Overall mesh selection factors were developed by pooling all appropriate data from the previous studies and was derived as the best estimate of the slope, through linear regression techniques.
* All R^2 values were significant.
Source: Pooling of all data from Anderson *et al.*, 1983; Gillikin *et al.*, 1981; Gillikin, 1982; and New Jersey, 1985.

Table 84. State Laws for Summer Flounder: ME to NC.

Maine

Size limits:	13" possession restriction. It is also illegal to possess groundfish (including summer flounder) aboard any vessel rigged for groundfishing that has its head or tail removed and is less than the legal size limit.
Gear restrictions:	5.5" minimum mesh size for trawls, Scottish seines, bottom tending gillnets and bottom tending seines. Regulations exist regarding the placement of stop seines and fish weirs. Additional Gear/season restrictions for specific locations are detailed in Department regulations.
Area closures:	Groundfish (summer flounder) spawning closure in Booth Bay and Sheepscot Bay from May 1 to June 30.
Seasons:	See above.
Licenses:	A Commercial license is required for the harvest, transport, and sale of fish that are not for personal use: $20 for individual, resident operators; $53 for resident operator with crew; $200 for nonresident operator and crew. No license is required for fish Taken with hook and line for personal use. There is no recreational license, except for Atlantic Salmon.
Other:	Nonresidents are required by law to report all groundfish (summer flounder) catches.

New Hampshire

Size limits:	13" possession restriction.
Gear restrictions:	Mobile fishing Gear may not be used in State waters between April 16 and Dec 14. Use of trawls and drag seines are prohibited in Piscataqua River or its tributaries north of the Portsmouth Memorial Bridge.
Area closures:	See above
Seasons:	None specific to summer flounder.
Licenses:	Resident Commercial saltwater fishing license: $26; no sport fishing license. Residents are not required to have a license to sell fish caught by hook and line, but a $200 minimum license fee is required for nonresidents.

Massachusetts

Size limits:	14"
Gear restrictions:	Minimum mesh sizes for mobile trawl gear: * North of Cape Cod: - 5.5" required year round. Permitted small mesh exemptions are allowed for underutilized species (e.g., dogfish and ocean pout) with no bycatch of regulated species. * South of Cape Cod: 5.5" required Nov. 1 - April 14; 3.5" required June 16 - Oct. 31; and no minimum required April 15 - June 15 (squid season).

* East of Cape Cod: 5.5" required year round.

Gillnets may not exceed 2,400 feet; mesh size of gillnets must be greater than 6" stretched measure.

Area closures: Buzzards Bay is closed to trawling year round. State waters from Nauset Light around Monomoy west to Succonessett Point, Mashpee are closed to trawling from May 1 - Oct. 31. All waters south of Cape Cod banned to gillnetting April 1 - Nov. 15. (See Mass. regulations for additional closures.)

Seasons: See above

Licenses: Commercial fishing licenses: Vessel license ranges from $130 to $260, depending on length; license for individuals = $65 each. There is no sport license for fish caught for personal use. A license to sell fish caught with hook and line is $35, and applies to any individual selling fish

Rhode Island

Size limits: 14" possession restriction.

Gear restrictions: Trawling is prohibited in the upper portion of Narragansett Bay from Nov 1 - July 1; 5" cod end minimum mesh size in a portion of central Narragansett Bay from Nov 1 - Feb 28. Numerous specific gillnet regulations by geographic location and season; trap and fyke net regulations regarding leaders, distance from shore, distance between traps, etc.

Area closures: Numerous restrictions on the location of traps off the Island of Rhode Island, the Sakonnet River, and in Narragansett Bay. Cannot set, haul, and/or maintain a seine within 0.5 mile of the seaward entrance of several ponds/rivers; significant portion of the State is closed to various forms of netting.

Seasons: Fish traps must be out of the water Jan 1 - end of Feb.

Licenses: Multipurpose Commercial licenses allow for harvest and sale of fish: $150, with additional fees for specific Gear types. There is no sport license to fish for personal use.

Connecticut

Size limits: 14" possession restriction.

Gear restrictions: Cod end minimum mesh size of 4.5" in trawls from Nov 15 - May 14, and 3" from Aug 1 - Nov 14. Gillnet minimum mesh size 3"; Pound, trap, fyke, and weir minimum mesh: 2".

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

Seasons: None except as noted above

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

use fishing with trawls and other specific Gear will require a Commercial license.

New York

Size limits: 14" possession restriction.

Gear restrictions: No minimum mesh size for trawls at the present time.

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

Seasons: None

Licenses: A Commercial license is required for the harvest and sale of fish: Resident: $100, Nonresident: $1,000. (The nonresident harvest license may only be purchased in January.) A nonresident license which allows landing only: $250. There is no sport license for fish caught for personal use.

New Jersey

Size limits: 13" possession restriction.

Gear restrictions: Trawls fishing for summer flounder must have a 4.5" minimum mesh size in the cod end. (A summer flounder trip is defined as one in which 20% of the weight of the catch is comprised of summer flounder.) Gillnets may not exceed 2,400 ft in length from Feb 1 - May 15, and may not exceed 1,200 ft from May 15 - Dec 15.

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

Seasons: Gillnets cannot be fished from Dec 16 - Feb 1.

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

Delaware

Size limits: 13" possession restriction.

Gear restrictions: Trawls, purse seines, power operated seines, and runaround gillnets are prohibited. A single gillnet cannot exceed 200 yards in length; a series of connected gillnets cannot exceed 500 yards; a fyke net cannot exceed 72" in diameter; fish traps may not exceed 125 cubic ft and must have an escape panel. There is a moratorium on issuance of new Commercial (> 200 ft) gillnet permits until the number of fishermen falls below 30.

Area closures: Areas within a 0.5 mile sector at the mouths of all major tributaries to the Delaware River and Bay are closed to all fixed Gears; numerous specific areas closed to Commercial fishing.

Seasons: From April 1 - May 10, Commercial fishermen cannot set over 1,000 yards of fixed gillnet from one vessel; from May 10 to Sept 30, Commercial fishermen cannot set over 1,000 yards of drifting gillnet from one vessel; drift gillnets cannot be set from 2,400 hours Friday - 1,600 hours Sunday during this period; specific seasonal closures for gillnets in certain areas.

Licenses: Commercial food fishing license is required for the harvest and sale of fish: Residents: $150; Nonresidents: $1,500. Additional fees are levied for the use of specific Gear types. There is no sport license for fish caught for personal use.

Maryland

Size limits: 13" possession restriction, with a 5% tolerance (by number) for Commercial fishermen only.

Gear restrictions: Trawls prohibited within one mile of the coastline, and in Chesapeake Bay. Use of monofilament gillnets prohibited, except in coastal bays and the Atlantic Ocean; several specific gillnet restrictions exist for Chesapeake Bay; minimum mesh sizes for pound nets, haul seines, and fyke nets are 1.5"; purse seines prohibited.

Area closures: There are numerous specific locations where trawl, gill, seine and/or other net Gear are restricted.

Seasons: None

Licenses: A tidal fish license is required to catch, buy, or sell fish from tidal waters for Commercial purposes: Resident: $35, Nonresident: $100. Additional fees are levied to validate the license for individual Gear types; for example: nets, seines, trawls, and pots used in the ocean: $100, hook and line: $25. There is a mandatory 2 year waiting period for any Commercial fishing Gear license. Chesapeake sport fishing license: $5.

Virginia

Size limits: 13" possession restriction, with a 10% (or 2 fish, whichever is greater) enforcement tolerance.

Possession limits: Summer flounder = 10 fish per day. (A voluntary 6 fish per day limit is encouraged, as well as not making use of the 2 undersized fish tolerance.)

Gear restrictions: Trawls and encircling gillnets are prohibited in Virginia waters. Minimum mesh sizes: pound nets: 2"; haul seines over 200 yards: 3"; gill nets = 2-7/8". The gill net limit increases to 3" on 1/1/92.

Area closures: Fish trout lines cannot be set on the sea side of the eastern shore.

Seasons: Haul seining in the Chesapeake Bay or its tributaries is prohibited on Sundays. (This prohibition will be rescinded as of 7/1/90.)

Licenses: Commercial licenses are required for specific fishing Gears, with the fee dependent on the Gear type. There is no sport fishing license, and no license is required to sell hook and line caught fish.

Other: Virginia has developed a State management plan for summer flounder. It proposes: a zero tolerance on undersize fish for all Gears except pound nets; special licenses for seafood sellers and Commercial hook and line fishermen; and limited and delayed entry programs. It also requests the Mid-Atlantic Council to adopt: a 5.5 minimum mesh size for trawls when targeting summer flounder; individual State quotas for summer flounder; and to request that North Carolina either prohibit trawling in the northern portion of its waters from November - February, or establish a 5.5" minimum mesh size during that same period.

North Carolina

Size limits: 13" possession restriction.

Gear restrictions: A 5.5" minimum mesh requirement was issued for the cod ends of trawls used in the Atlantic Ocean within 3 miles of the beach from the NC/VA State line to Beaufort Inlet. This requirement extends from 1 November 1990 to 30 April 1991, and must be reissued to take effect in subsequent years.

Trawl nets may not be used in internal, coastal fishing waters for finfish, however an unlimited quantity of legal size flounder may be retained as a bycatch in the trawl fisheries for crab and shrimp. (Non-flounder bycatch is limited to 1,000 pounds per trip). Purse seines are prohibited except for menhaden and Atlantic thread herring; no net may be towed by more than one vessel except in long haul (seine) fishing operations.

Area closures: Numerous specific Gear restrictions by geographic area. Trawls are prohibited within one half mile of the beach between the Virginia line and Oregon Inlet. Trawling is prohibited in designated nursery areas.

Seasons: Several specific seasonal restrictions pertaining to gillnets. The Fishery Director may, by Proclamation, establish fishing Gear specifications for trawls in the territorial sea to protect small flounder from Oct 1 - April 30.

Licenses: A Commercial license is required for vessels, with fees dependent on vessel length (nonresidents have an additional $200 surcharge). An inland sport fishing license is necessary for some portions of tidal waters. A license is required to sell fish caught by hook and line, but there is a $500 exemption per 12 month period.

Other: North Carolina is considering revising trawl regulations in internal, coastal waters as follows: limit finfish bycatch to 200 lbs (including flounder) in the crab and shrimp fisheries; require a 5" - 5.5" minimum mesh from Nov 1 - March 31 in several key river systems (Paplico, Pungo Bay, Neuse, and New River), or alternatively, close them to trawling during this period.

Sources: All personal communication: ME - Honey, NH - Nelson, MA - McKiernan, RI - Sisson, CT - Simpson, NY - Zawacki, NJ - Scarlett, DE - Cole, MD - Speir, VA - Varnell, and NC - McCoy.

Table 85. The Impact of Mesh and Minimum Size Regulations on Commercial Trawl Landings of Summer Flounder Based on NEFC Weighout Data, 1985-1989 Combined. (The percent discarded (D) and the percent reduction (PR) in number of fish killed by Commercial fishermen were derived using selectivity curves. The percent reductions assume an 80% mortality of discards and 25% mortality of fish escaping from the net.)

	Mesh Size (inches)									
Min Size	4.0		4.5		5.0		5.5		6.0	
(TL inches)	D	PR	D	PR	D	PR	D	PR	D	PR
None	-	*	-	1	-	5	-	14	-	21
11	*	*	*	1	*	5	*	14	*	21
12	1	*	1	2	1	5	*	14	*	21
13	8	2	8	3	6	6	4	14	3	22
14	22	5	22	6	19	8	15	17	11	24
15	44	9	44	10	41	13	37	21	29	27
16	58	12	57	13	55	16	51	24	44	30

* = <1.0%
Note: Mesh sizes are inside stretch measurements.

Table 86. The Impact of Mesh and Minimum Size Regulations on North Carolina Commercial Trawl Landings of Summer Flounder, 1985-89 Combined. (The percent discarded (D) and the percent reduction (PR) in number of fish killed by Commercial fishermen were derived using selectivity curves. The percent reductions assume an 80% mortality of discards and 25% mortality of fish escaping from the net.)

	Mesh Size (inches)									
Min Size	4.0		4.5		5.0		5.5		6.0	
(TL inches)	D	PR	D	PR	D	PR	D	PR	D	PR
None	-	2	-	6	-	15	-	26	-	38
11	6	3	4	7	2	15	1	27	1	38
12	15	5	11	8	7	16	4	27	3	39
13	37	9	34	13	27	20	20	30	14	41
14	53	12	50	16	44	24	35	33	26	44
15	71	16	69	20	65	28	57	38	48	48
16	79	18	78	22	75	30	70	40	62	51

Note: Mesh sizes are inside stretch measurements.

Table 87. Results of Experimental Trawls Conducted off North Carolina

Date	Number of Nets	Type of Net (ft)	No. of Tows	Tow Times (min)	Total Time for Day (hours)	Turtles Caught
12/11/90	2	70' standard	6	90	18	2 Lk
12/17/90	1	72' standard	3	30		None
	1	72' standard	3	60		1 Cc
	1	72' standard	6	90	13.5	1 Cc, 1 Lk
	1	72' w/Jones TED	3	30		None
	1	72' w/Jones TED	3	60		None
	1	72' w/TED w/funnel	6	90	13.5	None
12/19/90	1	72' standard	3	60		None
	1	72' standard	1	45		None
	1	72' standard	3	90	8.25	1 Cc
12/19/90	1	72' w/super shooter	3	60		None
	1	72' w/super shooter	1	45		None
	1	72' w/super shooter	3	90	8.25	1 Lk
12/29/90	1	50' standard	3	70	3.5	1 Cc
01/10/91	1	78' standard	4	90	6	None

Note: Lk = *Lepidochelys kempi* (Kemp's ridley turtle), Cc = *Caretta caretta* (loggerhead turtle).
Source: North Carolina Division of Marine Fisheries, unpublished data.

Table 88. Cetaceans and Turtles Found in Survey Area

Scientific name	Common name	Est. Minimum Number in Study Area	Endan-gered	Threat-ened
LARGE WHALES				
Balaenoptera physalus	fin whale	1,102	X	
Megaptera novaeangliae	humpback whale	684	X	
Balaenoptera acutorostrata	minke whale	162		
Physeter catodon	sperm whale	300	X	
Eubalaena glacialis	right whale	29	X	
Balaenoptera borealis	sei whale	109	X	
Orcinus orca	killer whale	unk		
SMALL WHALES				
Tursiops truncatus	bottlenose dolphin	6,254		
Globicephala spp.	pilot whales	11,448		
Lagenorhynchus acutus	Atl. white-sided dolphin	24,287		
Phocoena phocoena	harbor porpoise	2,946		
Grampus griseus	grampus (Risso's) dolphin	10,220		
Delphinus delphis	saddleback dolphin	17,606		
Stenella spp.	spotted dolphin	22,376		
Stenella coeruleoalba	striped dolphin	unk		
Lagenorhynchus albirostris	white-beaked dolphin	unk		
Ziphius cavirostris	Cuvier's beaked dolphin	unk		
Stenella longirostris	spinner dolphin	unk		
Steno bredanensis	rough-toothed dolphin	unk		
Delphinapteras leucas	beluga	unk		
Mesoplodon spp.	beaked whales	unk		
TURTLES				
Caretta caretta	logggerhead turtle	4,017		X
Dermochelys coriacea	leatherback turtle	636	X	
Lepidochelys kempi	Kemp's ridley turtle	unk	X	
Chelonia mydas	green turtle	unk		X

Source: University of Rhode Island 1982.

Table 89. Average Number of Days on the Fishing Grounds for North Carolina Vessels Participating in the Winter Trawl Fishery for Summer Flounder, 1980-89

Month	Deepwater	Inshore	Total Fishery
Jan	18	18	18
Feb	16	16	16
Mar	14	16	15
Apr	18	12	16
Sep	-	3	3
Oct	-	10	10
Nov	-	18	18
Dec	19	18	19

Source: Monaghan pers. comm.

Table 90. The Effect of Various Possession Limits and a 14"TL Minimum Size on 1986-90 Combined Summer Flounder Recreational Landings (MRFSS Type A fish). (The table contains the percent reduction in the number of summer flounder killed by anglers. Reductions were calculated assuming a post-release mortality of 25% and are adjusted for the differential between impact of a 14" length limit relative to MRFSS type A fish and summer flounder measured by interviewers.)

	Coast	ME-CT	NY-DE	MD-NC
NO	26.0	15.6	17.9	37.4
1	64.4	58.2	56.0	75.0
2	51.9	47.5	41.9	64.7
3	44.3	40.4	33.9	57.3
4	39.4	35.7	29.3	52.7
5	36.2	32.5	26.4	48.6
6	33.9	29.9	24.3	46.0
7	32.3	27.9	22.9	44.3
8	31.0	26.2	21.6	43.0
9	30.1	24.7	20.8	42.0
10	29.3	23.3	20.2	41.2

Source: Unpublished NMFS MRFSS data.

TABLE 91: EXPERIMENTAL AND OBSERVED TRAWLS IN THE SUMMER FLOUNDER FISHERY

Season	Species	% of Total	Observed Mortality	Hours Fished	Turtle Catch/ Hour Fished
Winter 1990-1991 December - January Nearshore Ocracoke Inlet	4 *Caretta caretta* 3 *Lepidochelys kempi*	57 43	0 0	49.25 net hrs (25 tows)	0.14 turtles/hr
Winter 1991-1992 November-February Cape Charles, south	50 *Caretta caretta* 30 *Lepidochelys kempi* 2 *Chelonia mydas* 1 *Eretmochelys imbricata*	60 36 2 1	5 (1*) 1* 1	2,840 net hrs (1,236 tows)	0.03 turtles/hr
Winter 1991-1992 Cape Charles, north	None	-	0	560 net hrs (200 tows)	0 turtles/hr

* dead prior to observer tow.

Source: Unpublished data, NMFS Beaufort Lab, and North Carolina Division of Marine Fisheries.

Table 92. Estimated Number and Density of Sea Turtles on the Surface of North Carolina Nearshore Waters

Survey	Time (EST) at Beginning of Survey	Number of Turtles Sighted Within Area Surveyed	Area Surveyed (km^2)	Est. No. of Turtles on Surface: Number	Est. No. of Turtles on Surface: Std. Error of Mean	Est. Density of Turtles on Surface: Turtles/ 100 km^2	Est. Density of Turtles on Surface: Std. Error of Mean
BEACH TO 3 MILES OFFSHORE							
NC/VA line to Currituck Bridge (287 km^2)							
15 Nov 1991	11:54	-	65	-	-	-	-
Currituck Bridge to Oregon Inlet (223 km^2)							
15 Nov 1991	14.19	-	49	-	-	-	-
Oregon Inlet to Cape Hatteras Pt. (348 km^2)							
19 Nov 1991	10:47	-	79	-	-	-	-
Cape Hatteras Pt. to Ocracoke Inlet (266 km^2)							
19 Nov 1991	14:16	-	66	-	-	-	-
12 Dec 1991	10:41	3	136	1.95	1.69	0.73	0.55
Ocracoke Inlet to Cape Lookout Pt. (404 km^2)							
14 Nov 1991	10:47	11	95	25.60	10.98	6.34	2.55
BEACH TO 12 MILES OFFSHORE							
Oregon Inlet to Cape Hatteras Pt. (1,711 km^2)							
8 Dec 1991	9:58	17	196	140.02	45.28	8.18	2.57
30 Jan 1992	12:06	11	193	79.87	32.90	4.67	1.90
3 Mar 1992	10:27	22	195	140.06	55.93	8.19	3.18
Cape Hatteras Pt. to Ocracoke Inlet (1,016 km^2)							
7 Dec 1991	10:43	3	113	26.91	19.36	2.65	1.82
4 Feb 1992	9:58	6	228	13.40	6.19	1.32	0.58
22 Feb 1992	10:29	42	221	110.31	50.73	10.85	4.88
9 Mar 1992	10:23	12	245	33.13	14.52	3.26	1.38
Ocracoke Inlet to 5 mi south of Drum Inlet (1,779 km^2)							
8 Jan 1992	11:53	24	206	181.18	28.63	10.18	1.58
Ocracoke Inlet to Cape Lookout Pt. (2,381 km^2)							
21 Feb 1992	10:13	14	276	120.56	24.93	5.06	1.02

Source: North Carolina Division of Marine Fisheries and NMFS unpublished data.

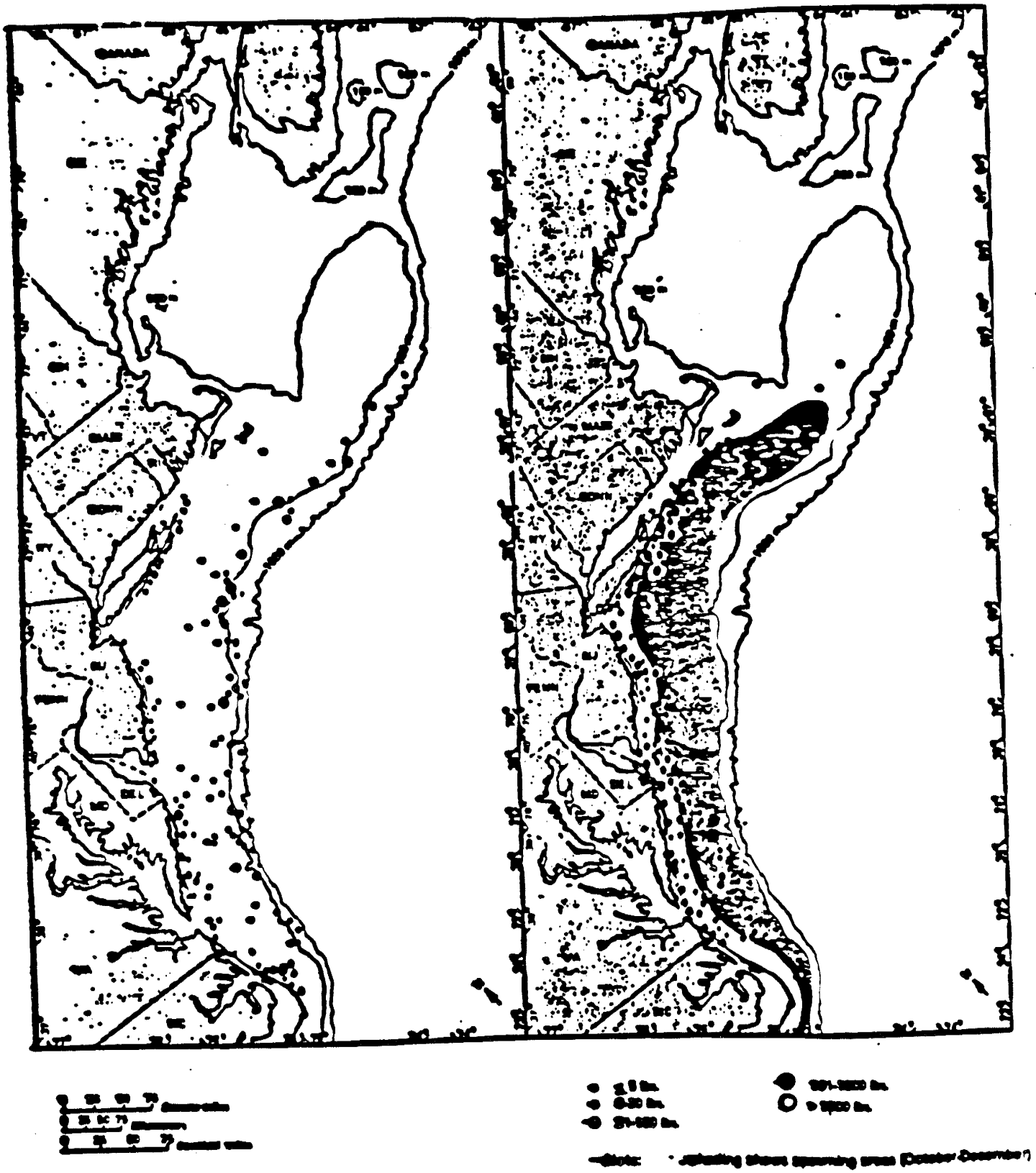


Figure 1. Seasonal Distribution of Summer Flounder Based Upon NEFC Surveys, 1973 and 1974. Spawning Areas Indicated by Shading. Left side is Spring Distribution and Right side is Autumn Distribution.
Source: Grosslein and Azarovitz, 1982.

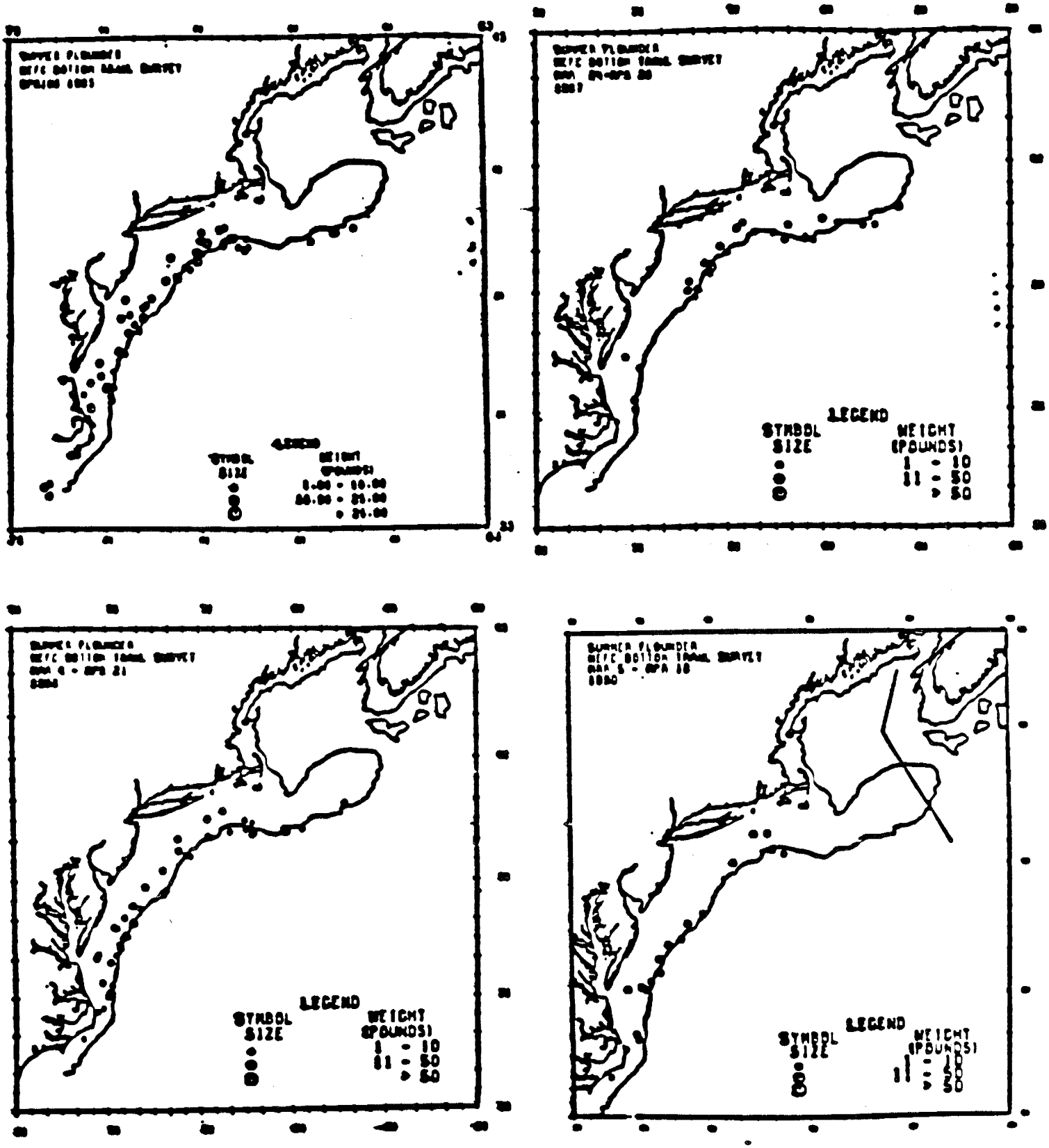
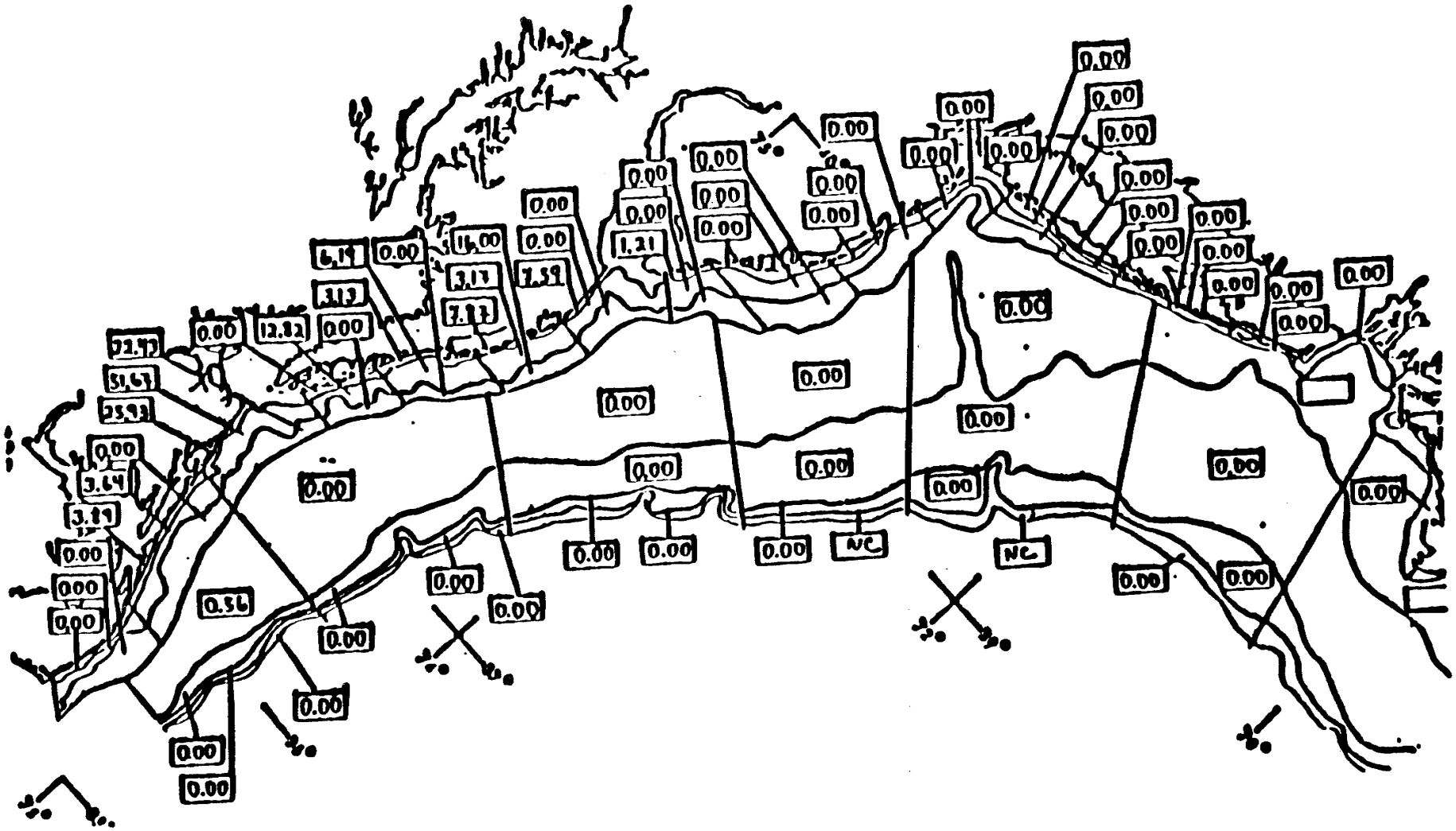


Figure 2. Summer Flounder Catch (lbs) Per Tow in NEFC Bottom Trawl Surveys, 1985, 1987, 1988 and 1990.

Source: unpub. prelim. NMFS data.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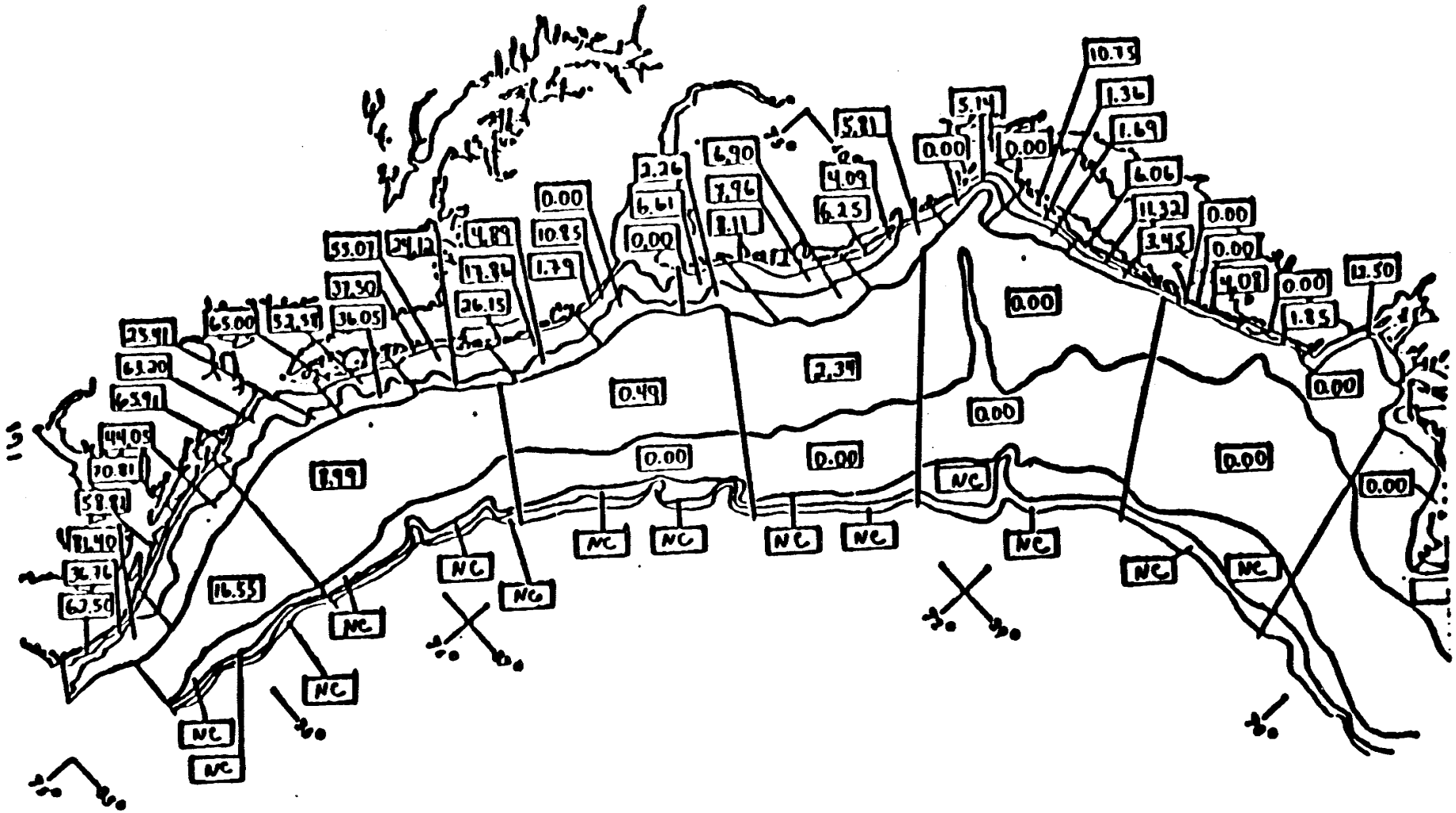


Figure 4. Percentage of Young of the Year Summer Flounder Caught by NEFC Trawl Survey During the Autumn, 1967-1979.

Source: Azarovitz et al., 1980.

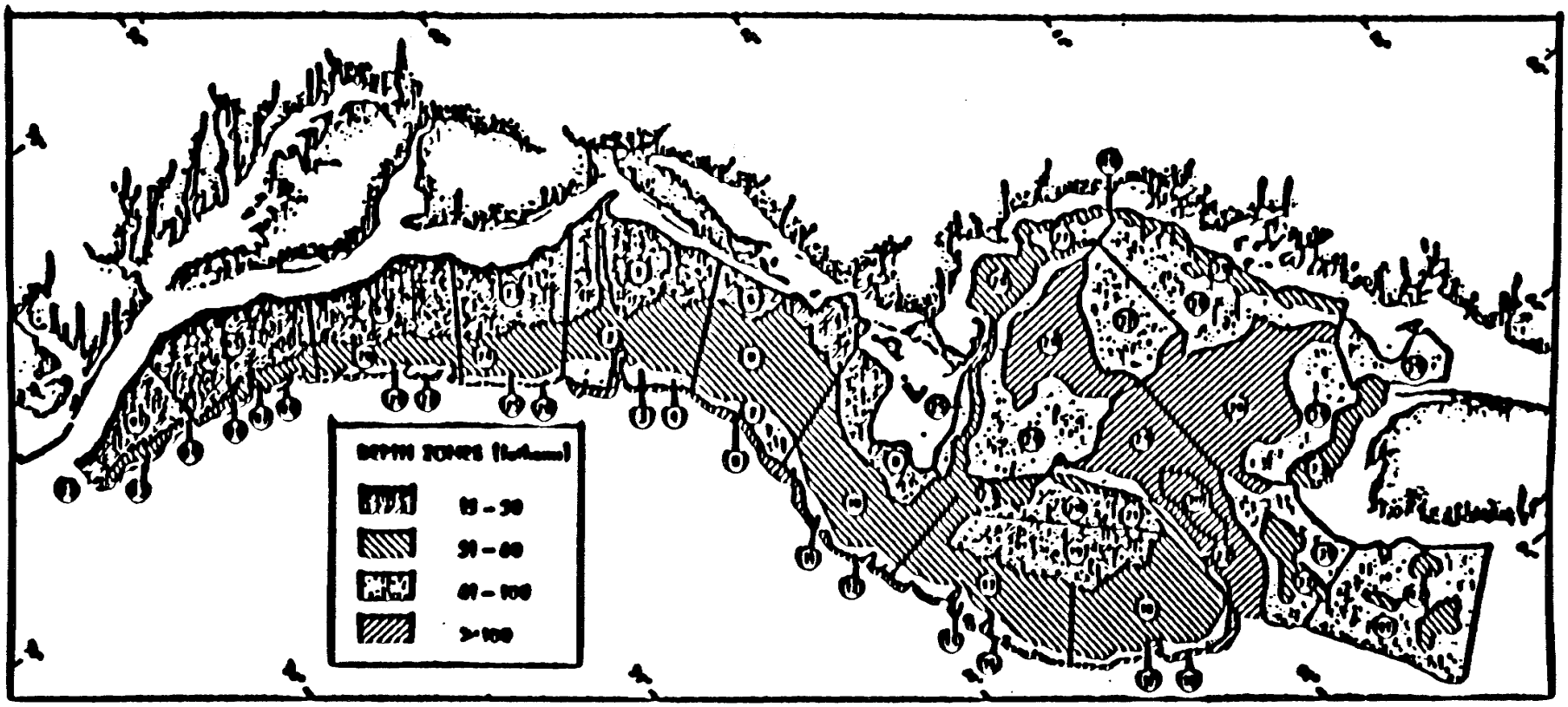


Figure 5. Northwest Atlantic NEFC Trawl Survey Strata.

Source: Clark, 1978.

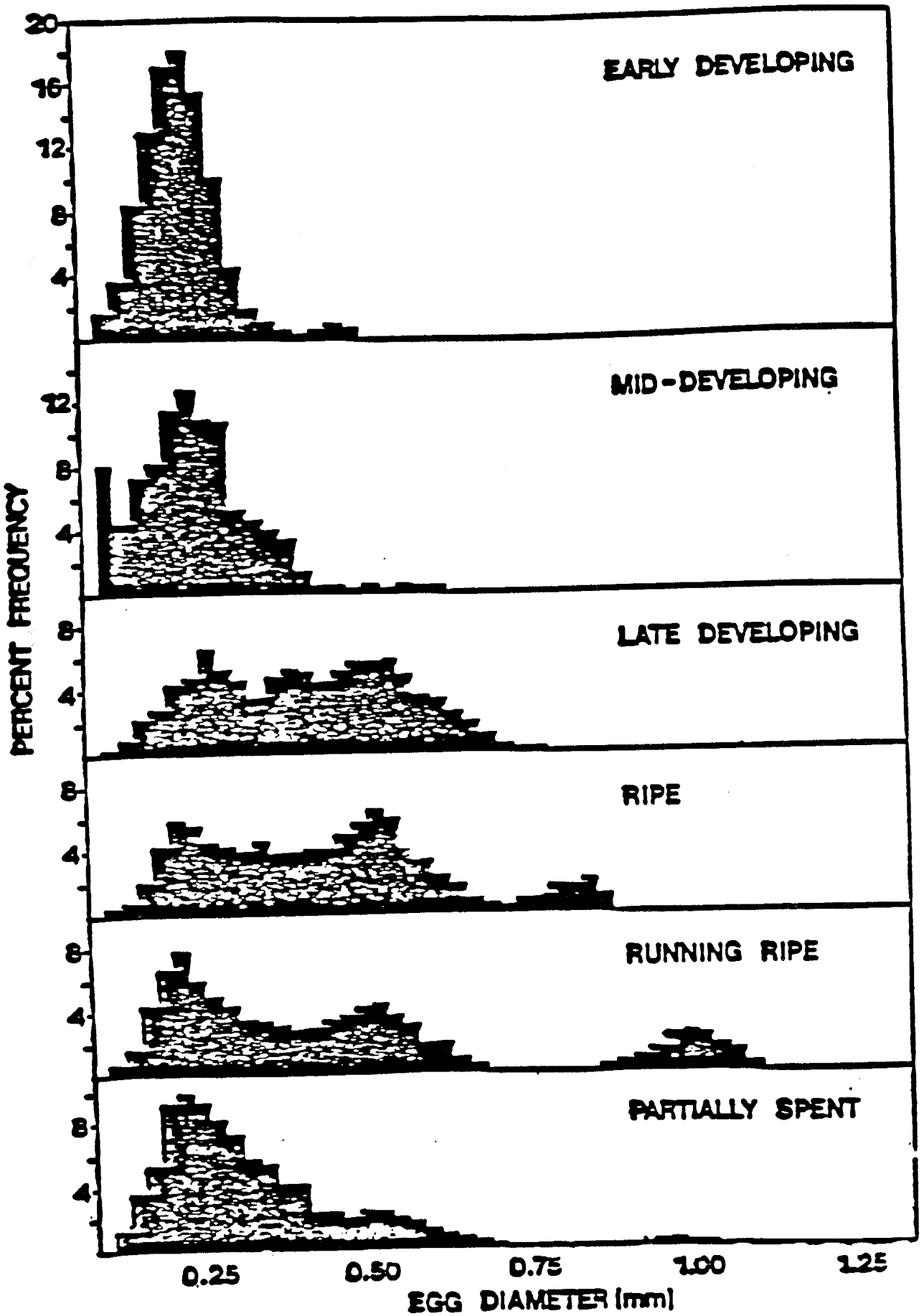


Figure 6. Egg Diameter Frequencies of Summer Flounder.

Source: Morse, 1981.

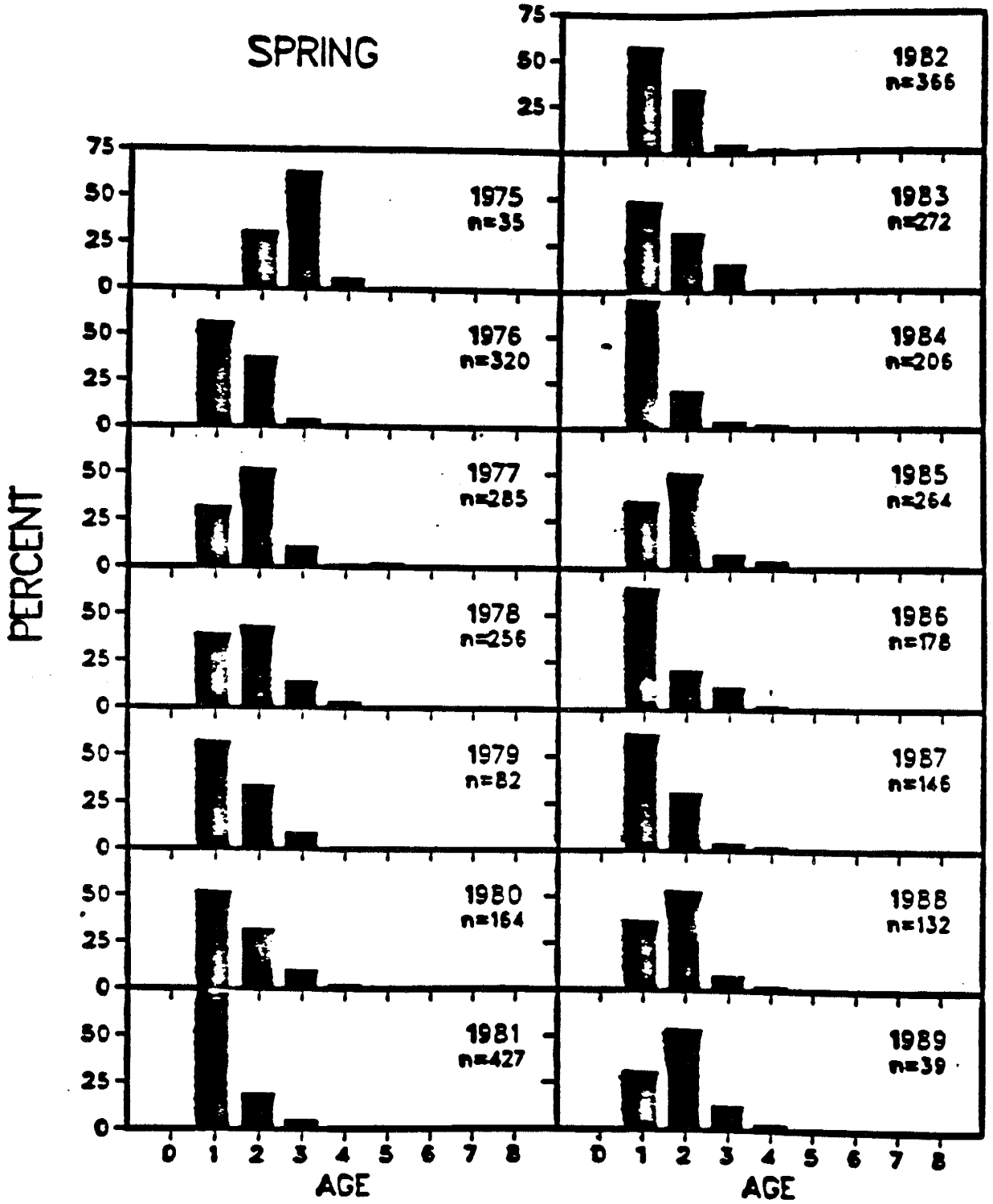


Figure 7. Age composition (percent) of NEFC Spring bottom trawl survey samples of summer flounder during 1975-1989.

Source: Almeida pers. comm.

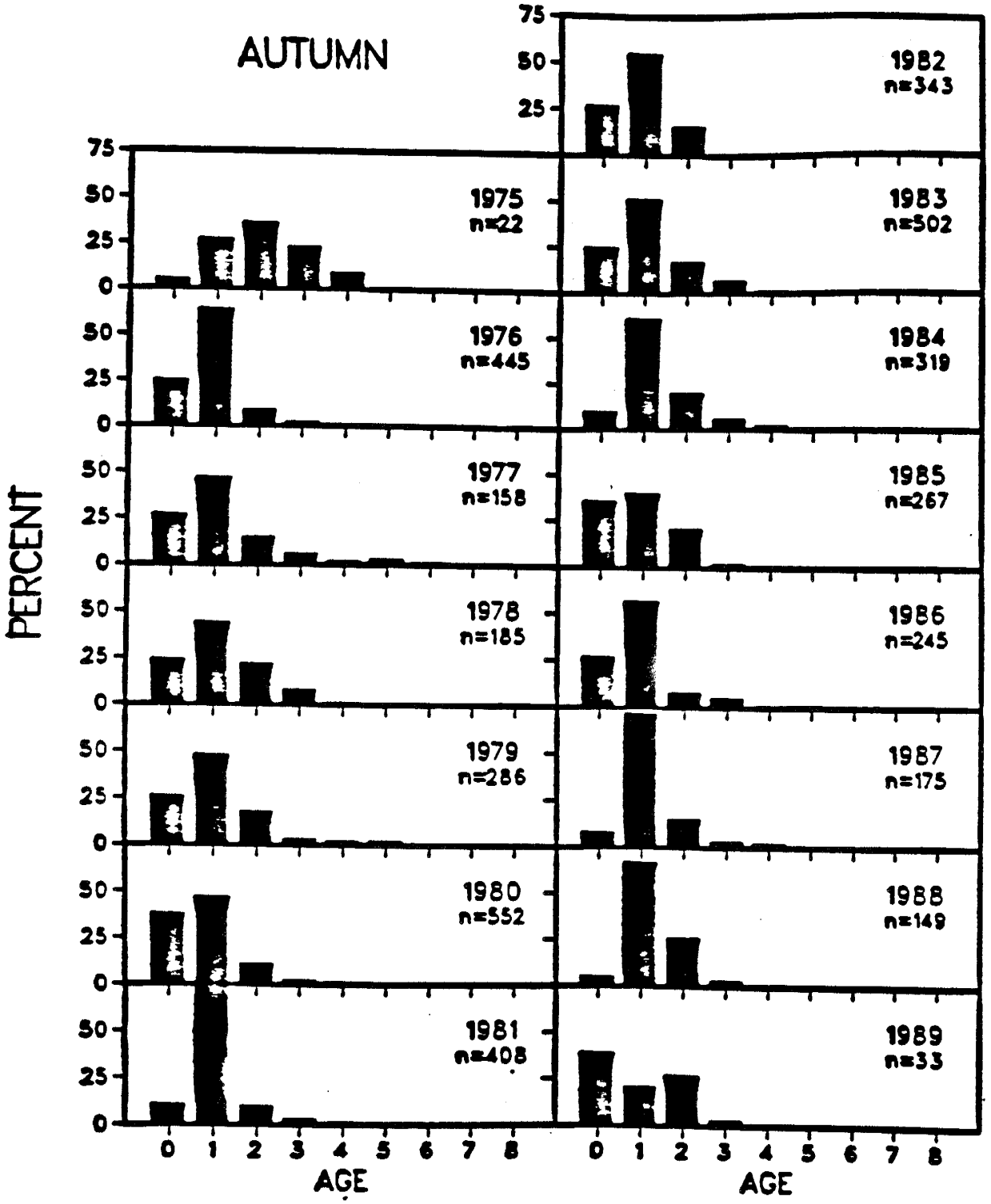


Figure 8. Age composition (percent) of NEFC Autumn bottom trawl survey samples of summer flounder during 1975-1989.

Source: Almeida pers. comm.

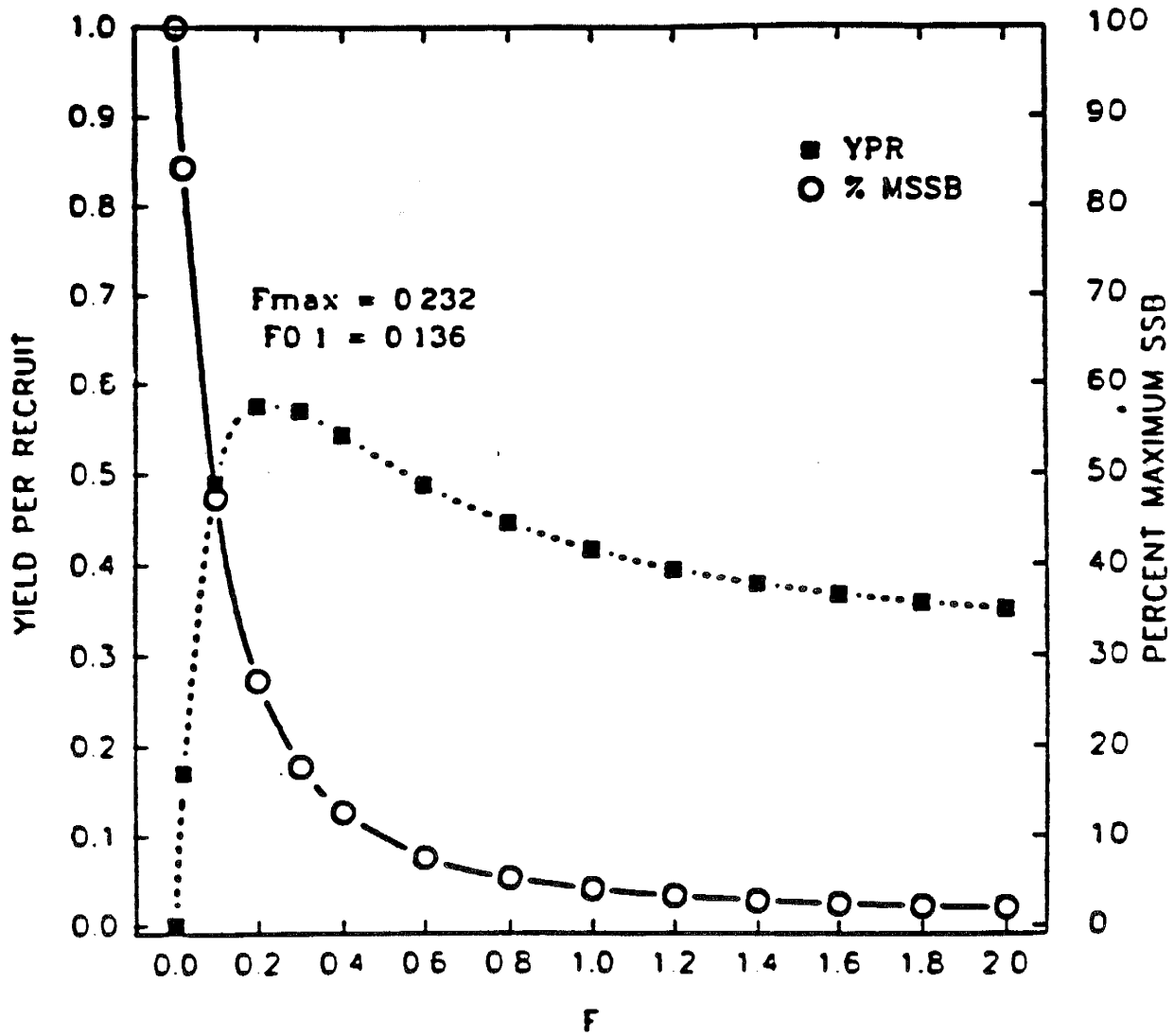


Figure 9. Results of revised yield per recruit analysis for summer flounder 1990.

Source: USDC 1990b

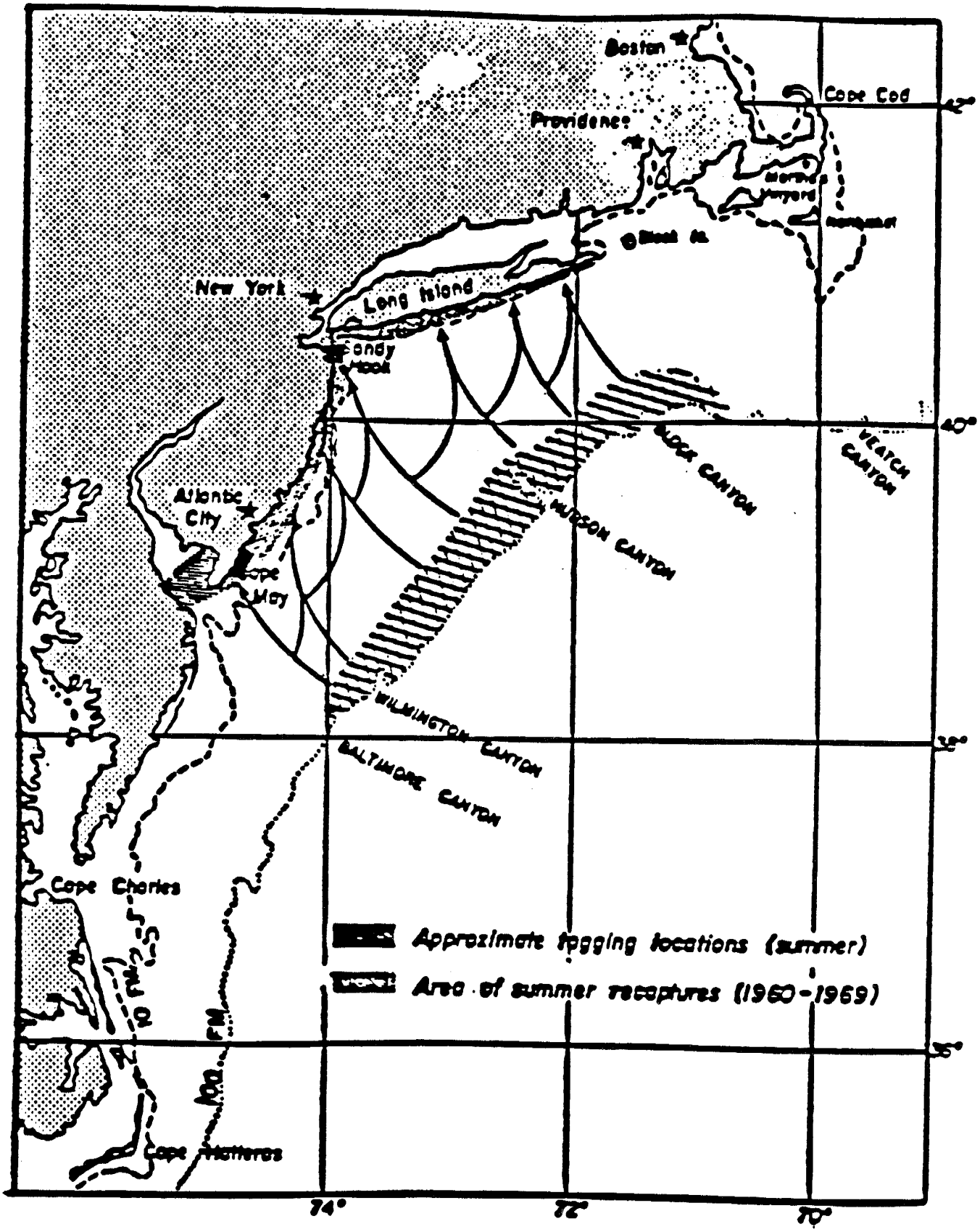
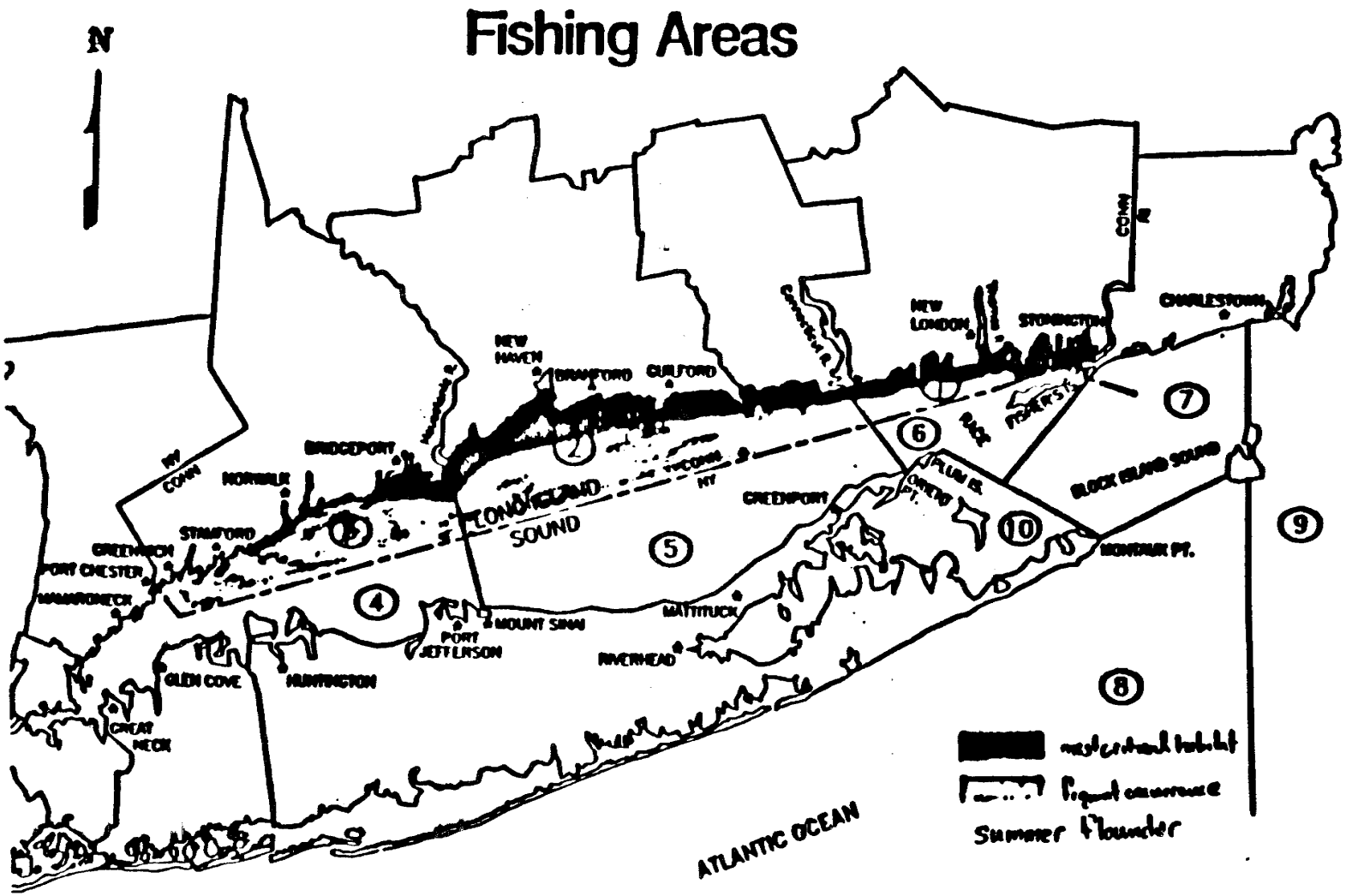


Figure 10. Summer Flounder Inshore Movements and Summer Flounder Distribution from Tagging Study by Murawski (1970). Source: Freeman, pers. comm.


Fishing Areas
N
NEW HAVEN
BRANFORD
GUILFORD
NEW LONDON
STONINGTON
CHARLESTOWN
CONN
NY
BRIDGEPORT
NORWALK
STAMFORD
GREENWICH
PORT CHESTER
MAMARONECK
LONG ISLAND SOUND
GREENPORT
MONTAUK PT.
BLOCK ISLAND SOUND
MATTITUCK
MOUNT SINAI
PORT JEFFERSON
RIVERHEAD
GLEN COVE
HUNTINGTON
GREAT NECK
ATLANTIC OCEAN
1
2
3
4
5
6
7
8
9
10
most critical habitat
Figure 11. Summer Flounder Habitat in Connecticut
Source: Simpson pers. comm.

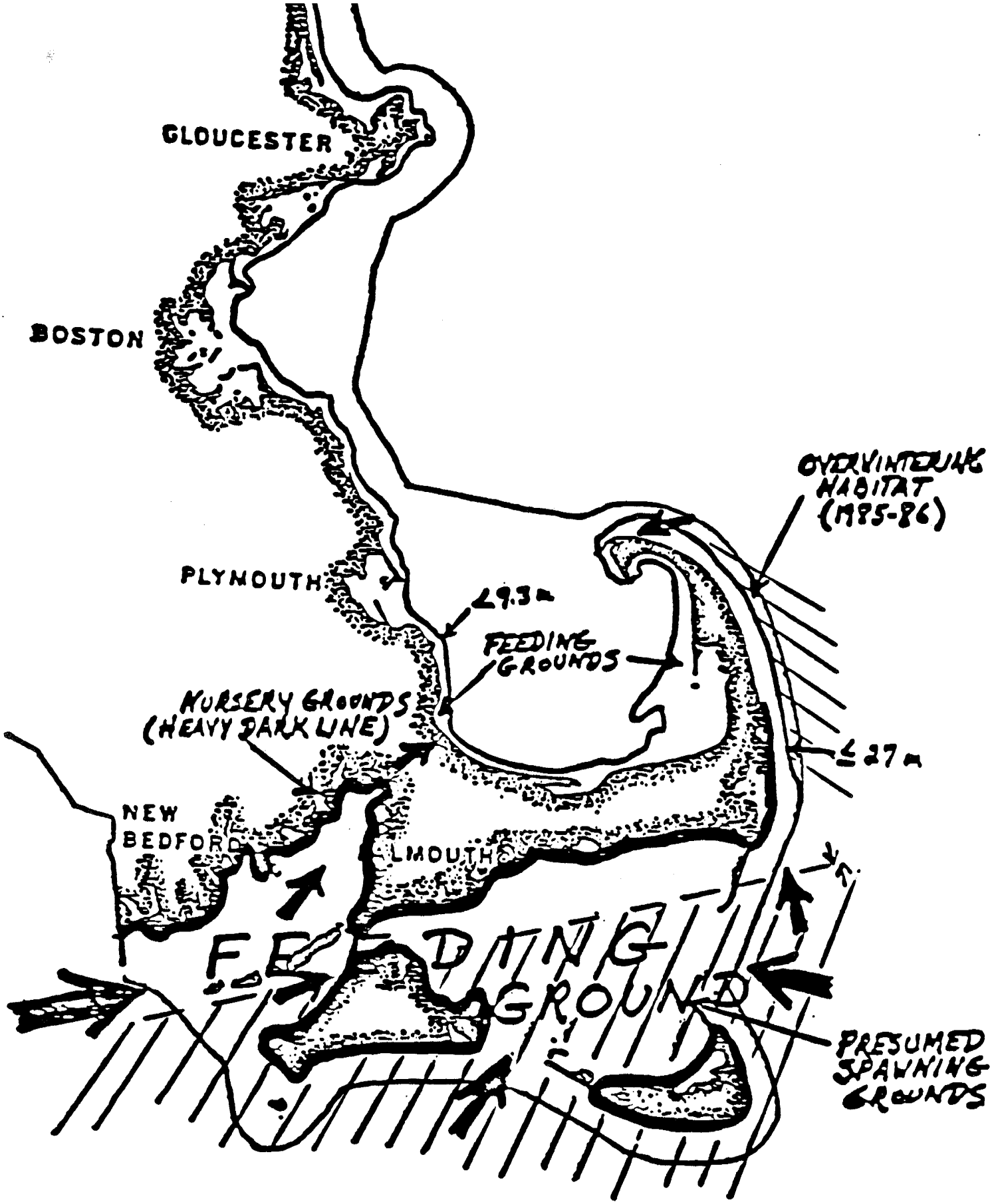


Figure 12. Summer Flounder Habitat in Massachusetts.
Source: Howe, pers. comm.

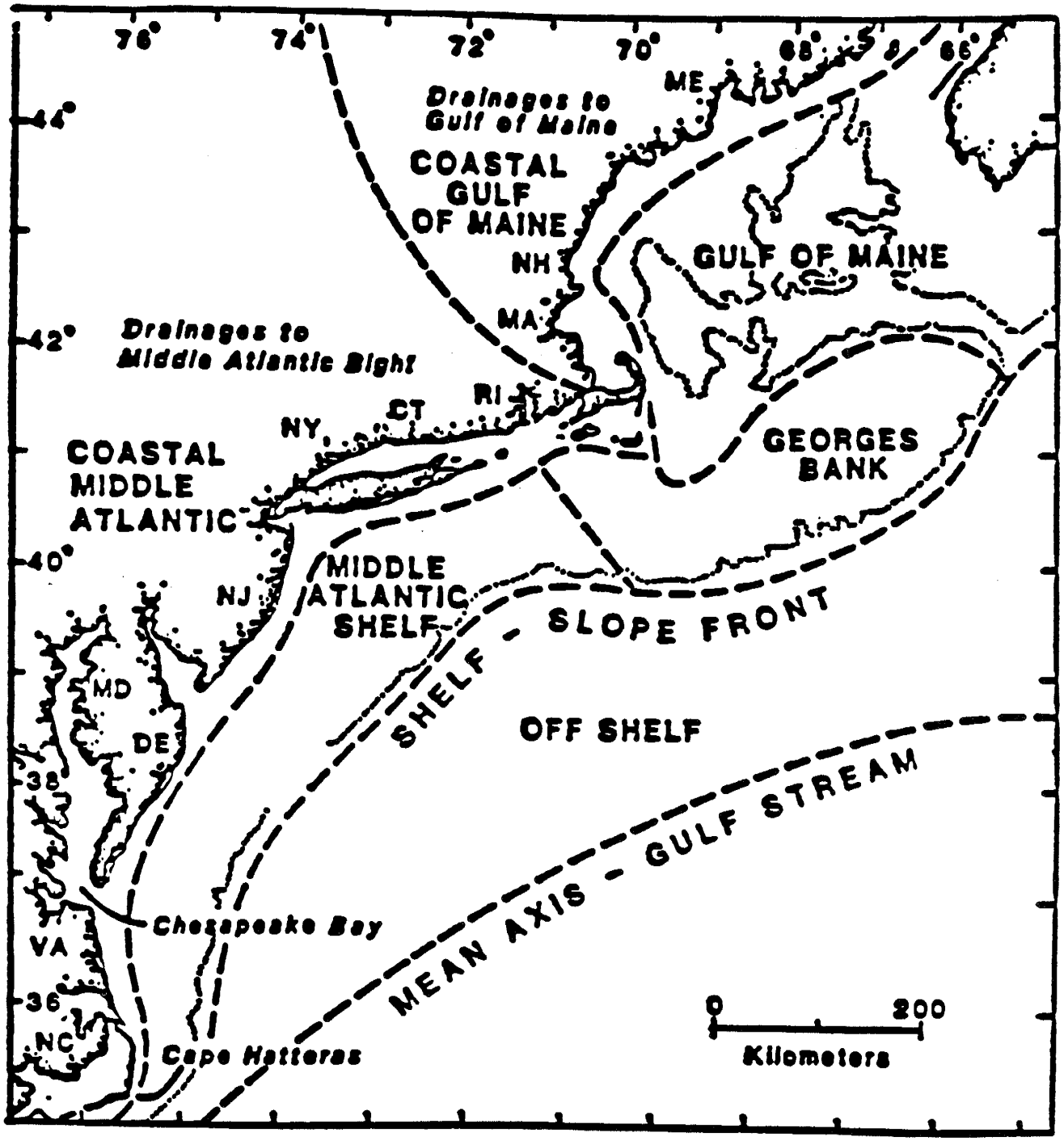


Figure 13. Northeast Regional Action Plan (RAP) Water Management Units.

Source: USDC, 1985 b

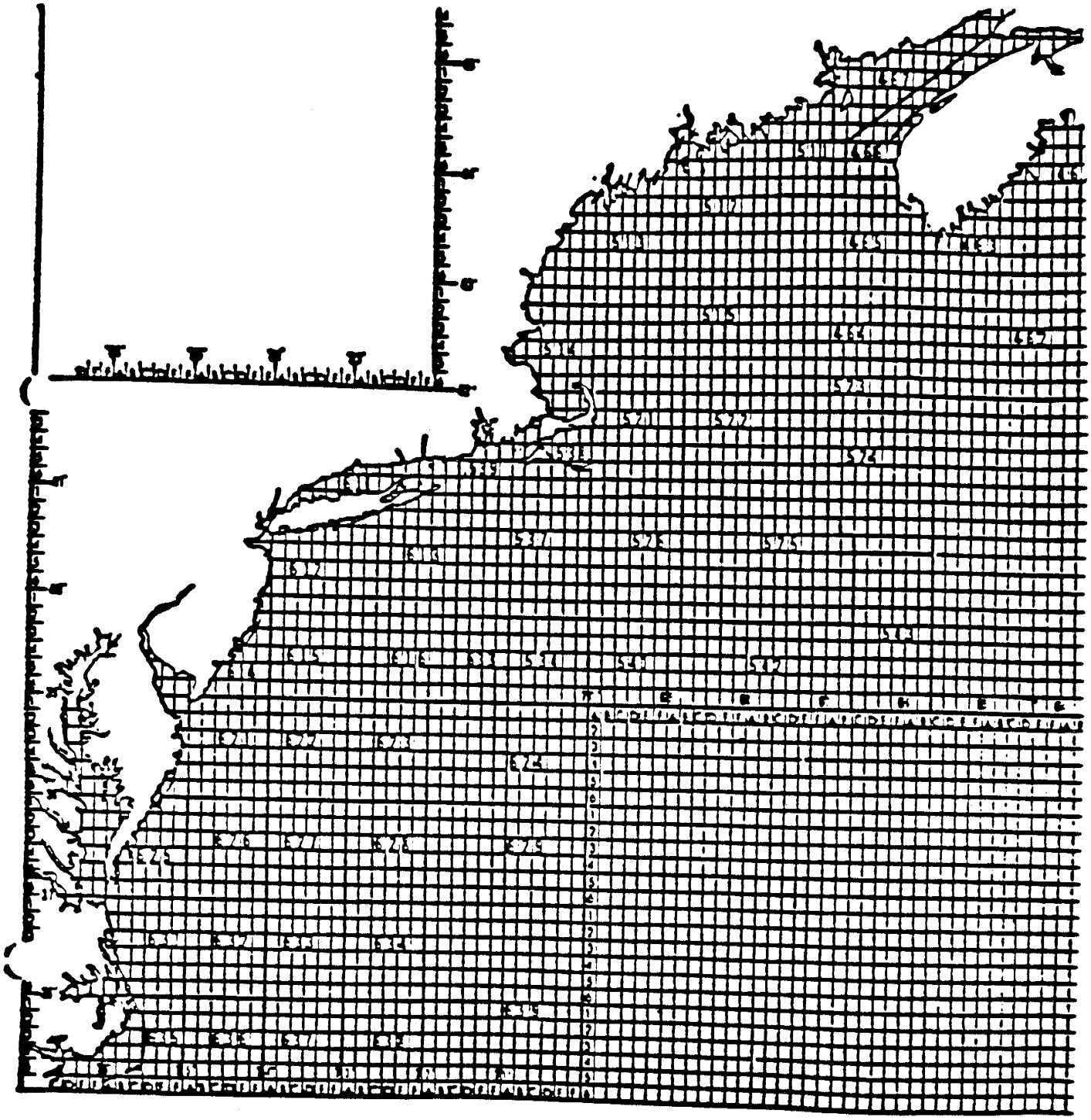


Figure 14. Northwest Atlantic Statistical Reporting Area.

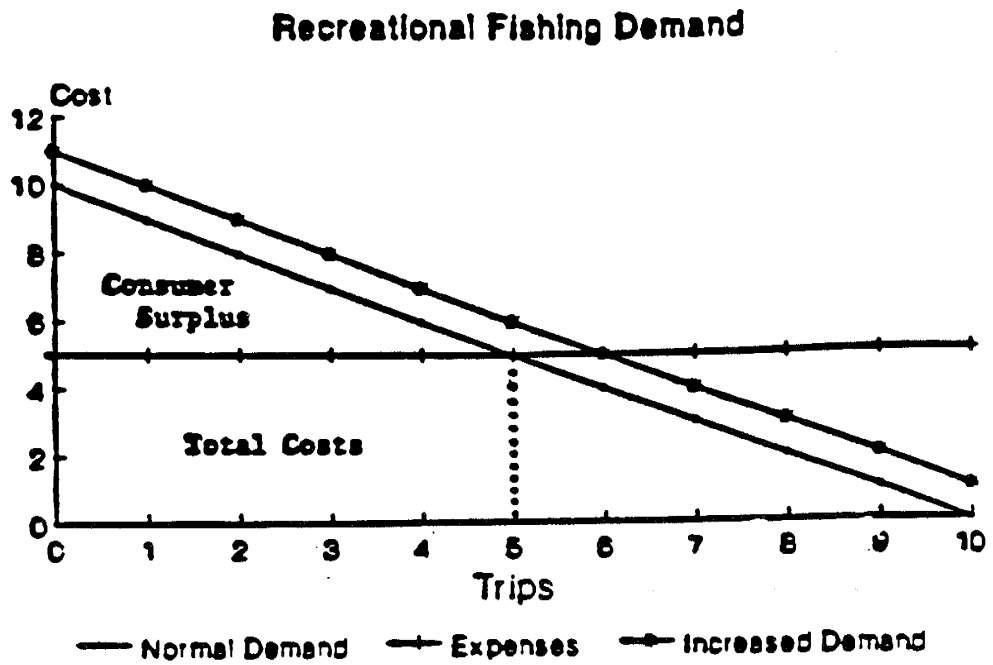


Figure 15. Theoretical Expenditures and Consumer Surplus Associated with Recreational Fishing

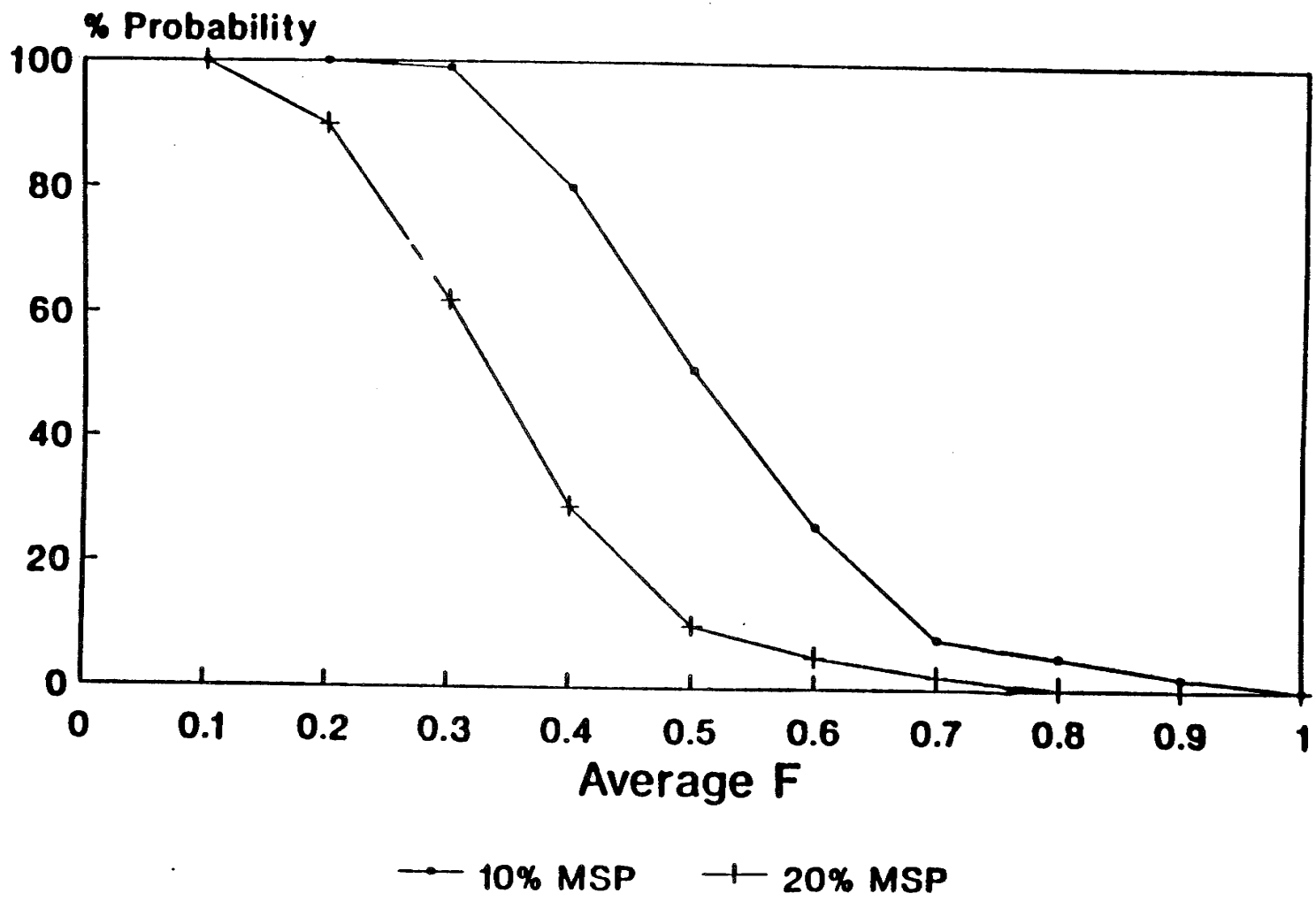


Figure 16. The Probability Associated with Reaching a 10% or 20% Maximum Spawning Potential (MSP) in 5 Years for Various Levels of F.

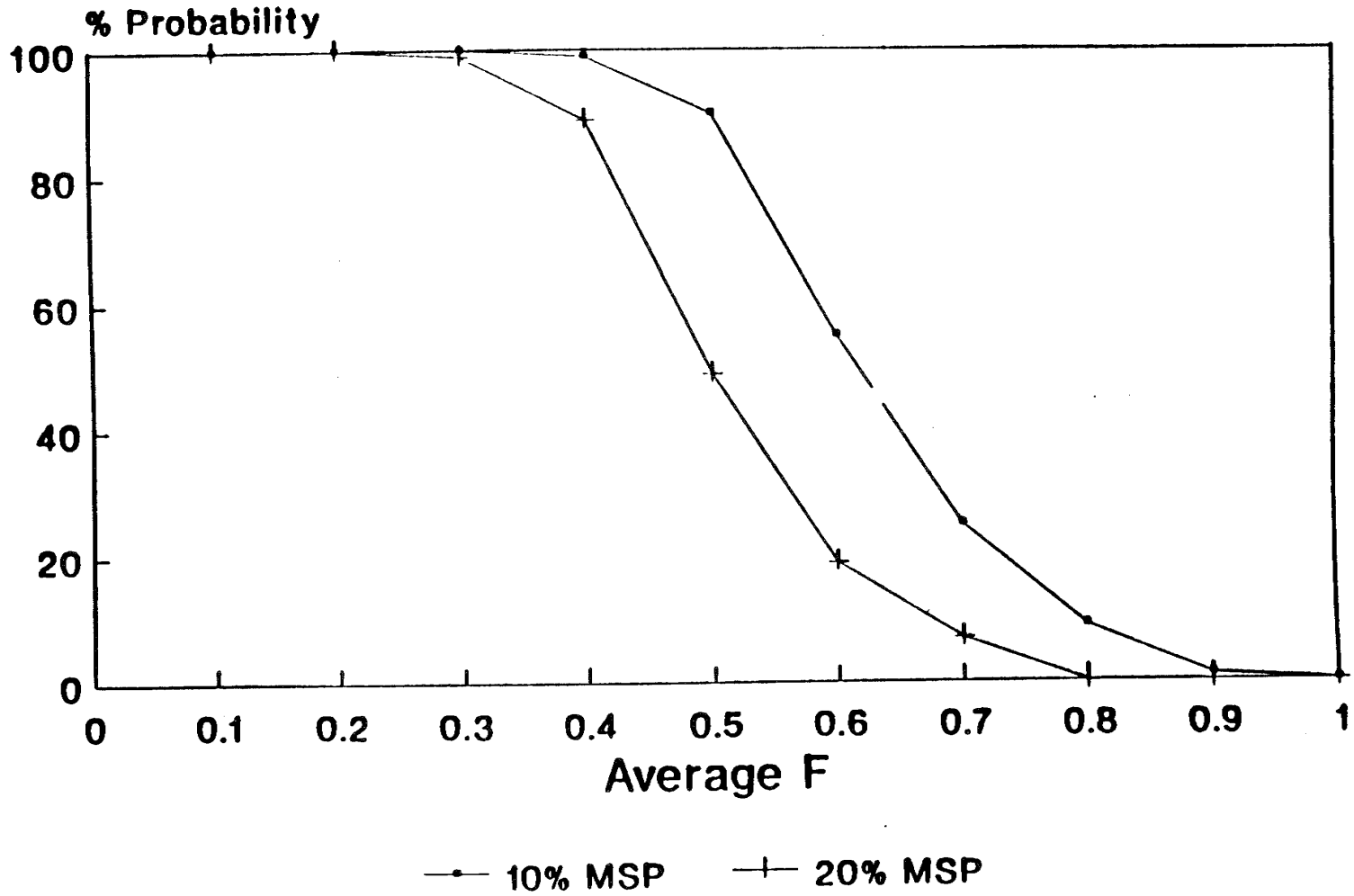


Figure 17. The Probability associated with Reaching a 10% or 20% Maximum Spawning Potential (MSP) in 10 Years for Various Levels of F.

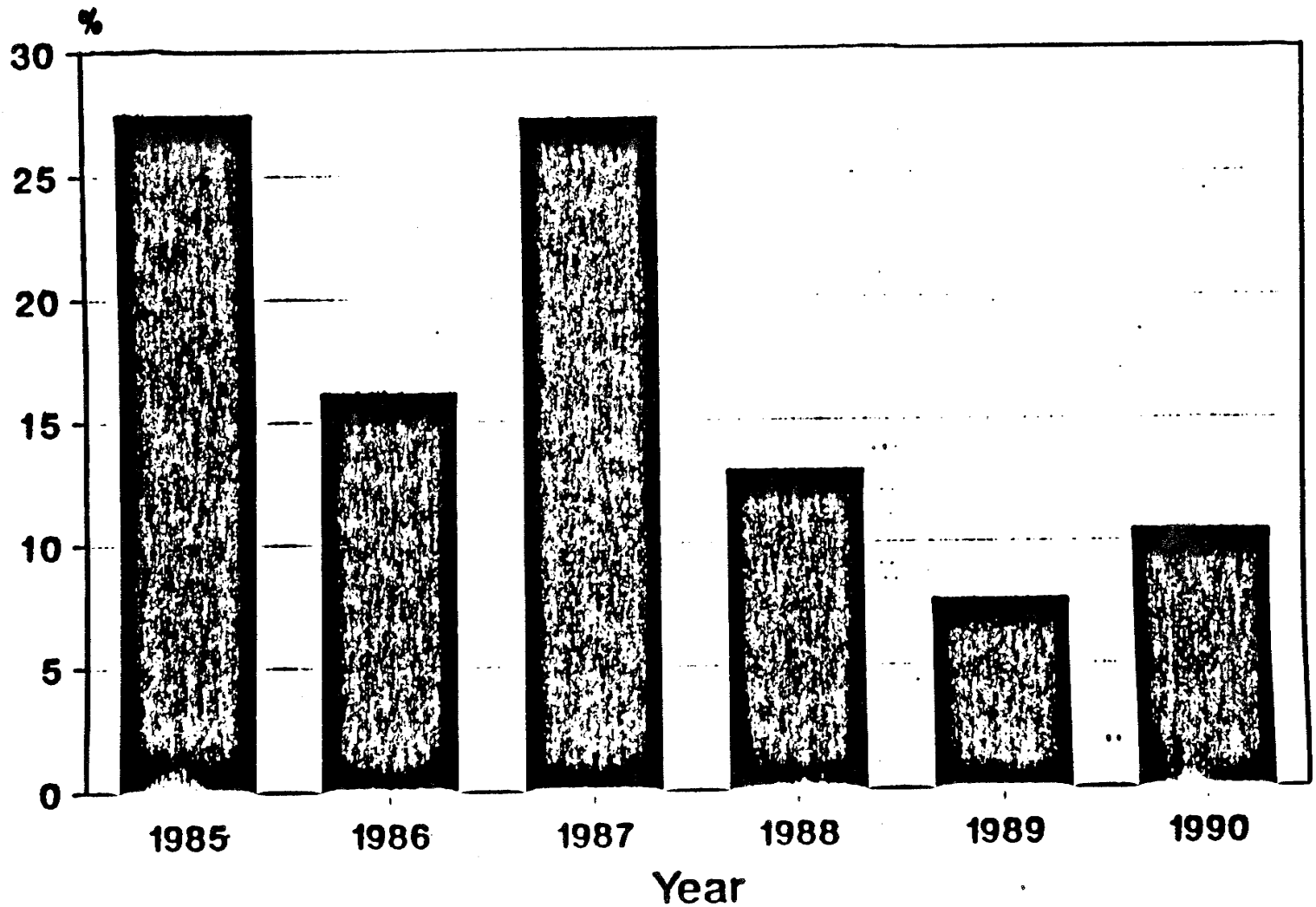


Figure 18. The Amount of Summer Flounder (% of total) less than 13" TL Landed by Recreational Anglers, 1985 to 1990.

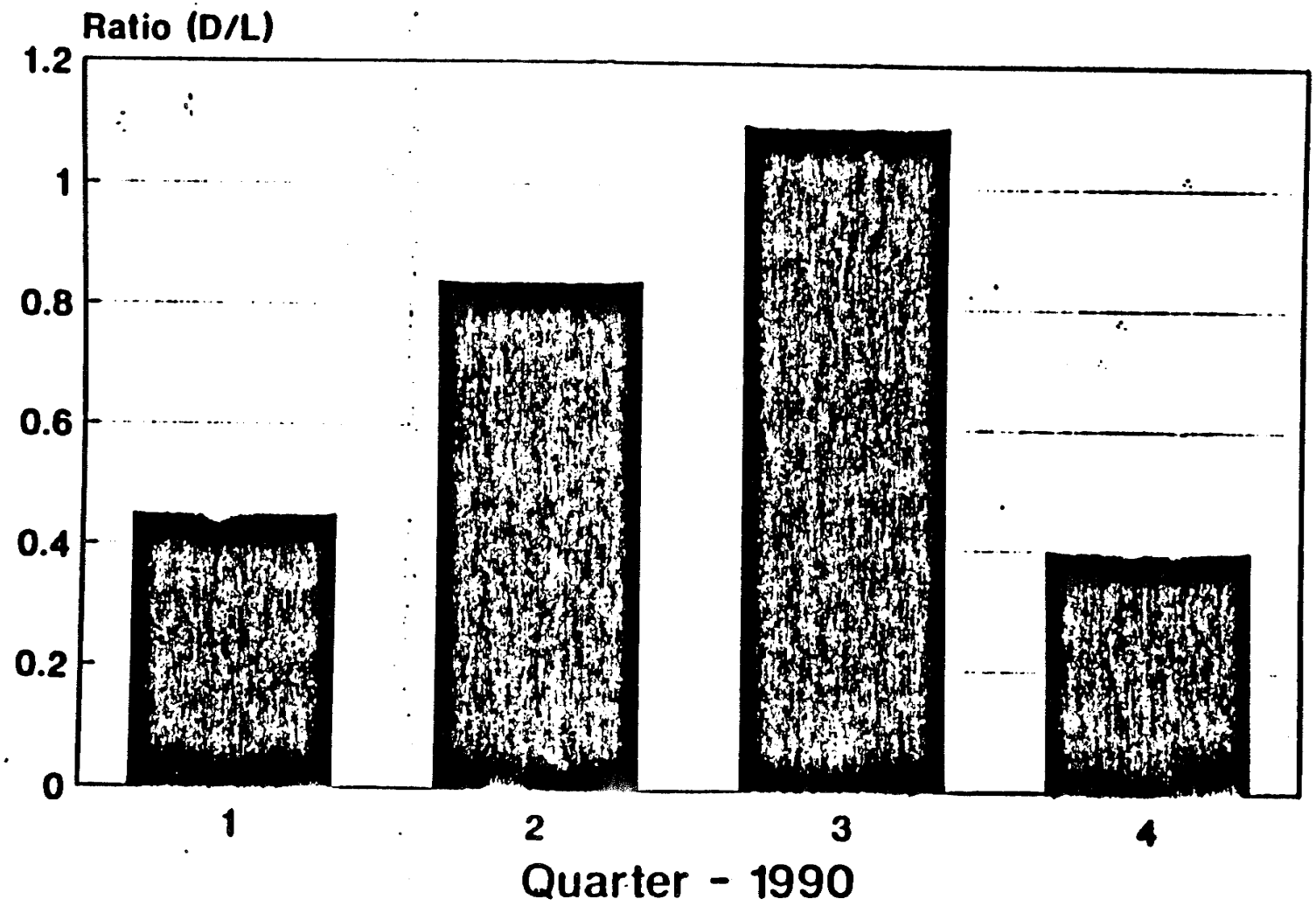


Figure 19. The Ratio of Discarded to Landed Summer Flounder in Each Annual Quarter, 1990.

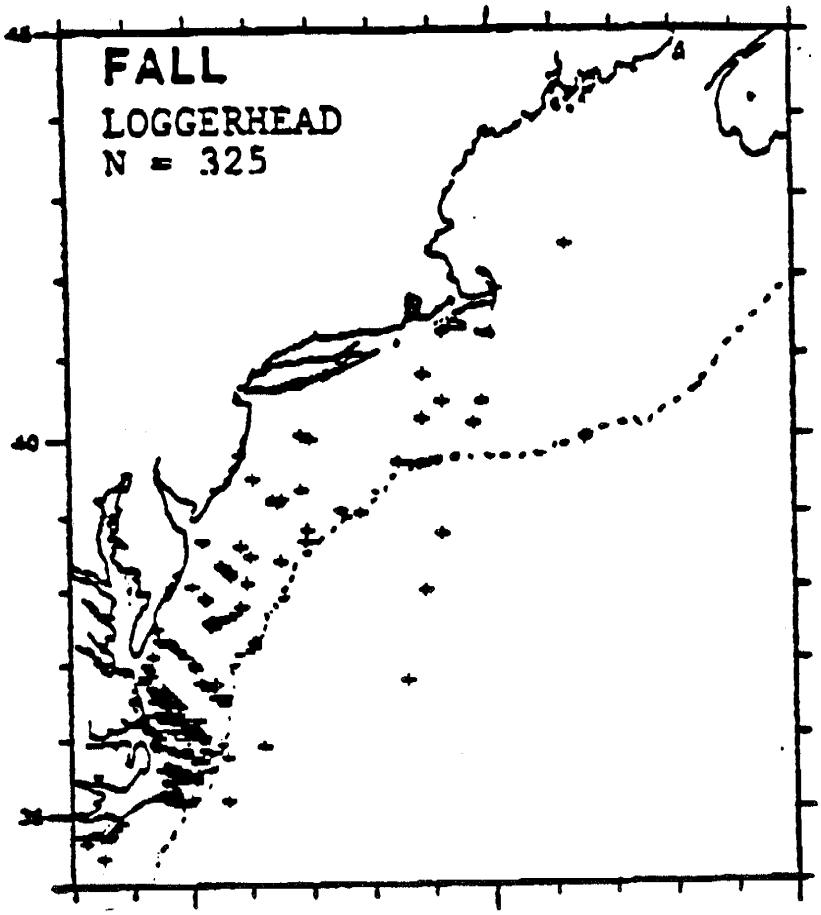


FIGURE 20. Fall (Sept.22-Dec.21) distribution of loggerhead sea turtles. From CeTAP, 1982.

FIGURE 21. Fishing grounds of North Carolina winter (Oct.-Jan.) trawl fishery. From Ross, 1991.

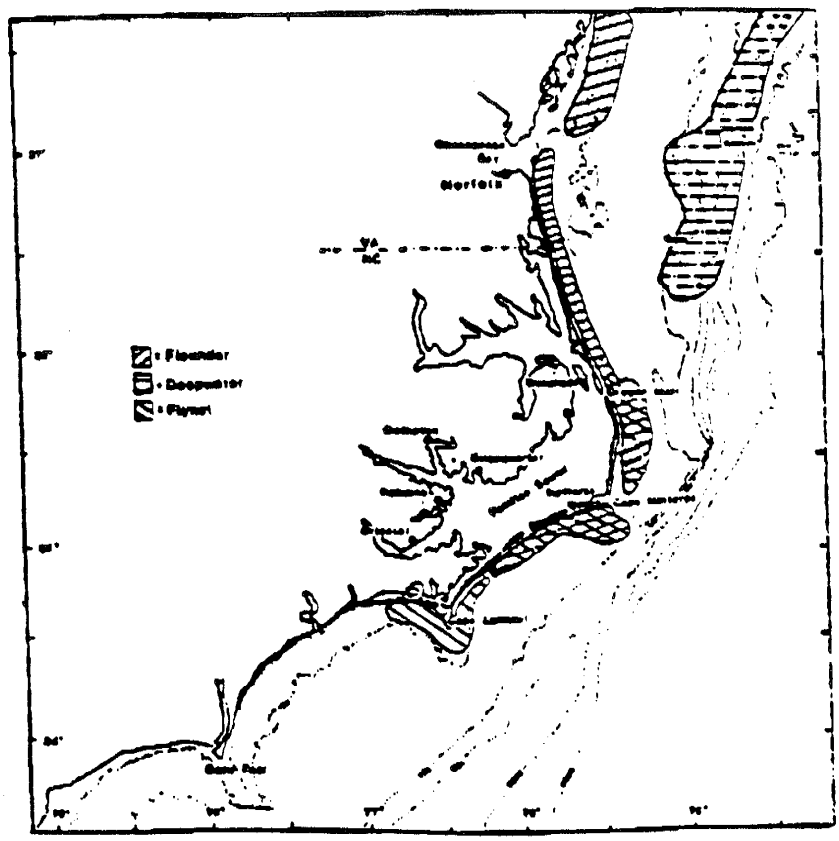
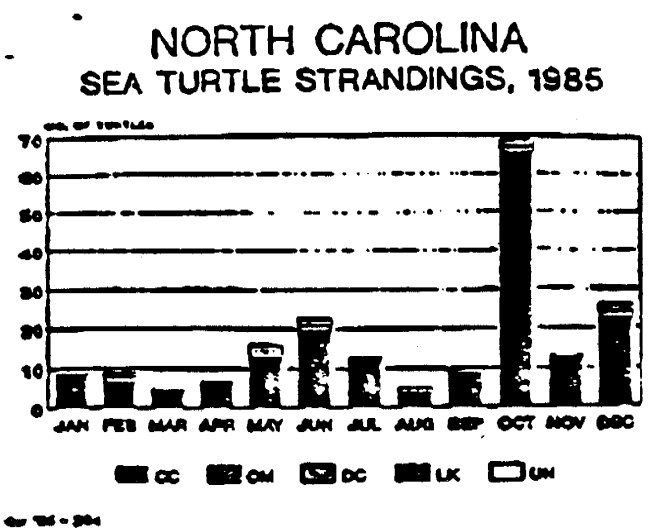
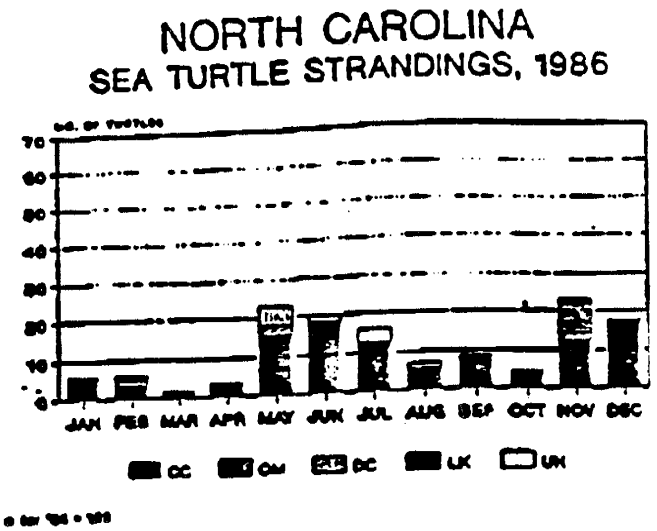
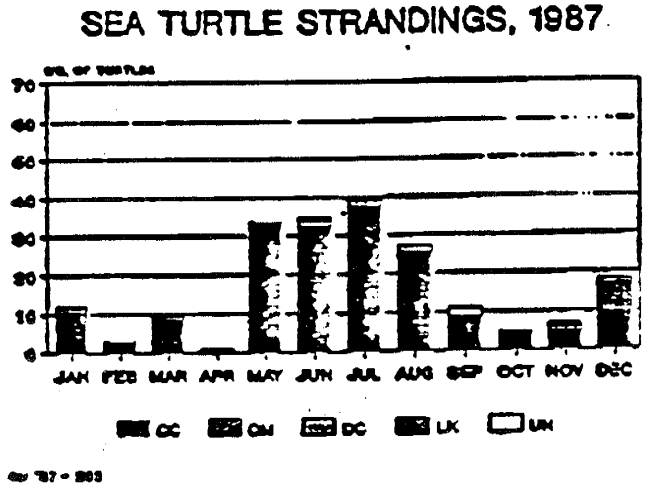
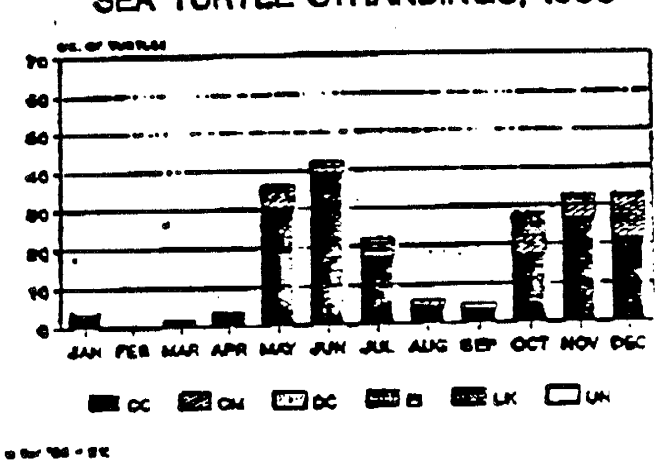


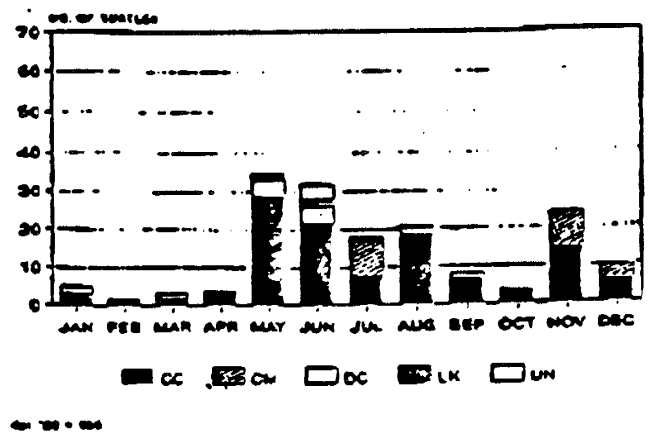
Figure 22.
From NMFS, SEFC. STSSN Database

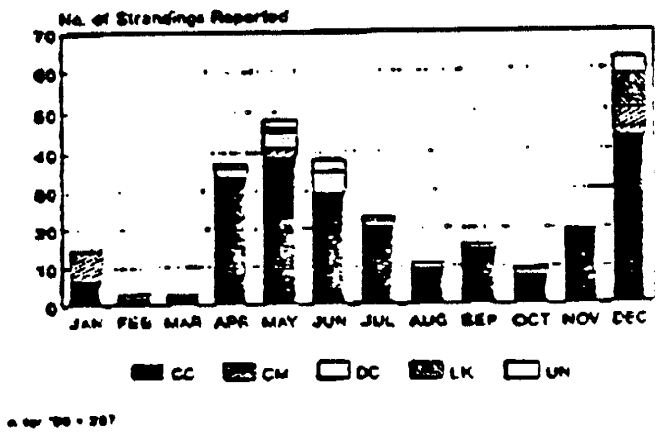












CC=Caretta caretta CM=Chelonia mydas DC=Dermochelys coriacea EI=Eretmochelys imbricata LK=Lepidochelys kempi UN=Unidentified

ABBREVIATIONS AND DEFINITIONS OF TERMS

Act (MFCMA) - the Magnuson Fishery Conservation and Management Act of 1976, as amended, 16 USC 1801 et seq.

adjusted dollars - dollars standardized to a base year based on the Consumer Price Index.

ASMFC (Commission) - Atlantic States Marine Fisheries Commission.

Biological Opinion - the document that states the National Marine Fisheries Serivce's opinion as to whether or not the Federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat.

CFR - Code of Federal Regulations.

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

Committee - the Summer Flounder FMP Review and Monitoring Committee. The Committee is made up of staff representatives of the Mid-Atlantic, New England, and South Atlantic Fishery Management Councils, the Commission, the Northeast Regional Office of NMFS, the Northeast Fisheries Center, and the Southeast Fisheries Center. The MAFMC Executive Director or his designee chairs the Committee.

Council (MAFMC) - the Mid-Atlantic Fishery Management Council.

CPI - Consumer Price Index; a comparative ratio of a certain group of goods across time.

CPUE - catch per unit of effort.

Domestic Annual Harvest (DAH) - the capacity of US fishermen, both commercial and recreational, to harvest and their intent to use that capacity.

Domestic Annual Processing (DAP) - the capacity of US processors to process, including freezing, and their intent to use that capacity.

Exclusive Economic Zone (EEZ) - the zone contiguous to the territorial sea of the US, the inner boundary of which is a line coterminous with the seaward boundary of each of the coastal States and the outer boundary of which is a line drawn in such a manner that each point on it is 200 nautical miles from the baseline from which the territorial sea is measured.

Fishing for summer flounder - any activity, other than scientific research vessel activity, which involves: (a) the catching, taking, or harvesting of 100 pounds of summer flounder or more per trip; (b) any other activity which can reasonably be expected to result in the catching, taking, or harvesting of 100 pounds of summer flounder or more per trip; or (c) any operations at sea in support of, or in preparation for, any activity described in paragraphs (a) or (b) of this definition.

Fishing mortality rate - the part of the total mortality rate (which also includes natural mortality) applying to a fish population that is caused by man's harvesting. Fishing mortality is usually expressed as an instantaneous rate (F), and can range from 0 for no fishing to very high values such as 1.5 or 2.0. The corresponding annual fishing mortality rate (A) is easily computed but not frequently used. Values of A that would correspond to the F values of 1.5 and 2.0 would be 78% and 86%, meaning that there would be only 22% and 14% of the fish alive (without any natural mortality) at the end of the year that were alive at the beginning of the year. Fishing mortality rates are estimated using a variety of techniques, depending on the available data for a species or stock.

Fishing mortality rate reduction strategy - reducing fishing mortality on summer flounder to 0.53 in the first

year of FMP implementation and maintaining it at that level through year 3. In year 4 and subsequent years, the target fishing mortality rate will be F_{max} (0.23).

$F_{0.1}$ - the rate of fishing mortality for a given method of fishing at which the increase in yield per recruit for a small increase in fishing mortality results in only 10% increase in yield per recruit for the same increase in fishing mortality from a virgin fishery.

F_{max} - a calculated instantaneous fishing mortality rate that is defined as "the rate of fishing mortality for a given method of fishing that maximizes the harvest in weight taken from a single year class of fish over its entire life span".

F_{rep} is the fishing mortality rate that results in a year class replacing the spawning biomass of its parents on average.

FMP - fishery management plan.

FR - *Federal Register*.

GRT - gross registered ton.

ICES gauge - International Council for the Exploration of the Seas (ICES) longitudinal mesh gauge set a 4 kg pressure; as used in mesh selectivity studies.

internal waters - marine waters landward of the territorial sea.

Jeopardy Opinion - a biological opinion that concludes that continuation of the action is likely to jeopardize the continued existence of a population of endangered species. "Jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers or distribution of that species.

L_{50} - length at which 50% of the fish are mature.

M (natural mortality) - instantaneous rate of death attributable to all causes except fishing.

MSY - maximum sustainable yield. The largest average catch of yield that can continuously be taken from a stock under existing environmental conditions, while maintaining the stock size.

MRFSS - Marine Recreational Fishery Statistics Surveys, 1979 - 1988.

NEFC - the Northeast Fisheries Center of the NMFS.

NMFS - the National Marine Fisheries Service of NOAA.

NOAA - the National Oceanic and Atmospheric Administration of the US Dept. of Commerce.

OY - Optimum Yield.

Regional Director (RD) - the Regional Director, Northeast Region, NMFS.

recruitment - the addition of fish to the fishable population due to migration or to growth. Recruits are usually fish from one year class that have just grown large enough to be retained by the fishing gear.

Sea Turtle Conservation Area - Federal waters out to 10 miles from Cape Charles, Virginia, to the southern border of North Carolina,

Secretary - the Secretary of Commerce, or his designee.

serial spawners - species which have egg batches that are continuously matured and shed during a protracted spawning season.

Spawning stock biomass per recruit (SSB/R) - measures the average or expected contribution of any one young fish to the spawning stock biomass over it lifetime. A useful reference point is the level of SSB/R that would be obtained if there were no fishing. This is a maximum value for SSB/R which can be compared to levels of SSB/R calculated for different fishing levels.

state waters - internal waters and the Territorial Sea.

stock assessment - the biological assessment of the status of the resources. This analysis provides the official estimates of stock size, spawning stock size, fishing mortalities, recruitment, and other parameters used in this Plan. The data from these assessments shall constitute the "best scientific information currently available" as required by the Act.

summer flounder - the species *Paralichthys dentatus*.

Territorial Sea - marine waters from the shoreline to 3 miles seaward.

take means to catch and retain on board either in the hold lose or in boxes. It does not include fish from the most recent tow on deck and not yet sorted.

TL - total length.

Total Allowable Level of Foreign Fishing (TALFF) - that portion of the Optimum Yield made available for foreign fishing.

USDC - US Department of Commerce.

year-class - the fish spawned or hatched in a given year.

Yield per recruit - the theoretical yield that would be obtained from a group of fish of one age if they were harvested according to a certain exploitation pattern over the life span of the fish. From this type of analysis, certain critical fishing mortality rates are estimated that are used as biological reference points for management, such as F_{max} and $F_{0.1}$.

Z - instantaneous rate of total mortality; the ratio of numbers of deaths per unit of time to population abundance during that time.

N. RESPONSES TO COMMENTS ON DEIS

The Council received five letters commenting on the FEIS. The letters are printed at the end of this section of the FEIS. Comments to the significant issues raised in the letters follow:

East Coast Fisheries Foundation, Inc.

1. Short comment period

Clearly the comment period on the DEIS was short, but the issues and alternatives in the DEIS were in the public hearing version of Amendment 2 which was mailed to approximately 400 individuals prior to the public hearings held between 29 July and 7 August 1991 (Fairhaven, MA, Galilee RI, Lyme, CT, Riverhead, NY, Brooklyn, NY, Wall, NJ, Cape May, NJ, Salisbury, MD, Norfolk, VA, Manteo, NC, and Morehead City, NC), with a comment period that expired on 31 August 1991. This was followed by a second series of 3 hearings on the turtle issue held 30 September - 2 October in Morehead City and Manteo, NC, and Norfolk, VA.

2. No analysis of economic impact of one mesh on board.

The one mesh on board provision was removed following the public review of Amendment 2 in August 1991.

3. No economic or social impact study of moratorium.

Amendment 2 and the DEIS address the moratorium criteria set forth in the Magnuson Act.

3. (There are two 3s in the letter) Exempted fishery creates safety problem.

There is no requirement that vessels enter the exempted fishery program and no requirement that they fish offshore in bad weather. The exempted fishery off New England and New York was included in the management program to allow fishermen (primarily in the squid fishery) to fish offshore during the winter with smaller nets and keep any summer flounder larger than the minimum size limit they catch.

4. Income requirement for a permit.

The income requirement was an alternative considered for Amendment 2. It was not adopted in the final version of Amendment 2.

5. The exempted fishery line disregards NMFS sea sampling data.

Sea sampling data were used to evaluate the impacts of the exempted fishery line. This was the best data set to determine whether the fishermen's claims that only larger summer flounder were caught in the offshore winter fishery in the northeast were valid. In general, the data show that the farther offshore the fishing occurs, the larger are the

summer flounder.

6. Exempted fishery adds pressure on summer flounder.

The exempted fishery allows participants in the squid fishery to retain summer flounder that would otherwise be discarded (most likely dead). These fish count against the quota, so the mortality target will not be exceeded through the exempted fishery.

7. Moratorium on commercial but not recreational fishery is discriminatory.

The moratorium is intended to assist the States in managing their quota programs by stabilizing the number of operating units that may operate in the commercial fishery as well as allowing fishermen to benefit from stock rebuilding rather than have the benefits dissipated over new entrants. Much of the party and charter boat fishery takes place in State waters, and thus a Federal moratorium would not have the benefits to the fishermen or to the management process that the commercial moratorium does.

8. The recreational fishery is not required to reduce effort similar to the commercial fishery.

The author believes that the possession limit will not have an impact on the recreational fishing industry because anglers will be allowed to land more fish. The intent of the limit is not to ensure that every angler catches the proposed possession limit but to constrain those individuals who would have landed many more than the proposed limit, i.e., the anglers that landed 10, 15, 25 or even 40 fish per trip in the past could now land only 6 fish. The proportion of anglers that landed no fish or 1 to 5 fish would remain the same.

The possession limit was not calculated (and should not be calculated) based on a average catch but on landing frequencies from 1986 to 1990. In addition, other restrictions will be placed on the recreational fishing industry in combination with the possession limit, i.e., a size limit and a season. Based on data collected for the years 1986 to 1990, the percent reduction in exploitation associated with a 6 fish possession limit and a 14" TL minimum size would have been approximately 34%. A closed season from October 1 to May 14 would result in an additional reduction of about 13%. The total reduction would be identical to that proposed for the commercial fishery (47%).

Finally, recreational landings will be compared to annual target harvest levels established through the FMP Monitoring Committee process to determine if modifications to the recreational possession limit, size limit, and season are required for the following year. For example, if the plan would have been in effect for 1992, the coastwide commercial quota would have been 11 million pounds and the recreational fishery would have had a target of 4.5 million fish or 7.5 million pounds.

9. 100 lb bycatch limit is wasteful.

Clearly, fishermen using small mesh nets will discard summer flounder in excess of whatever the bycatch limit is, be it no summer flounder or 500 pounds. The mixed trawl fishery will continue to exist and some summer flounder will be taken in the small mesh

fisheries. It is considered more desirable to allow some quantity to be retained and reported rather than all of them being discarded dead with only estimates of the discards.

10. State quota system rewards States that failed to manage in the past.

The State quota system was developed through great effort involving representatives of all of the States in the fishery. At issue were the data sets and time periods to be used. The hearing draft allocation was based on NMFS General Canvass data for 1980-1989. Following hearings and during development of the final version of Amendment 2, alternative data sets and time periods were discussed, primarily to deal with the issue of the imposition of State regulations at various times. It was agreed by all that there was no direct way of adjusting any of the data directly to account for State regulatory changes. The result of the final review was that the North Carolina Division of Marine Fisheries submitted State data for the summer flounder catch in that State, while NMFS General Canvass data would continue to be used for the balance of the States. This action was taken because the NMFS General Canvass data did not separate summer flounder from southern flounder, thereby slightly inflating the North Carolina data relative to the other States.

11. Data in cost benefit analysis deficient and there is no real cost benefit analysis.

The Magnuson Act requires the fishery management plans be based on "the best scientific information available" [section 301(a)(2)]. It is not necessary to defer management until additional data are collected. The Council and NMFS recognize the limited data available to do a cost-benefit study and has included reporting requirements in Amendment 2 to allow better analyses in future amendments.

Joseph E. O'Hara, Jr.

Gear research has indicated that most fish escape from the cod end of the net. Thus, the minimum mesh size in the first year and subsequent years would apply only to the cod end. Implementation of 5.5" mesh regulation will reduce the amount of discards and escape mortality relative to the mesh size currently used in the fishery, that is, an effective mesh size of 4.0" or less. The benefits of this reduced mortality will accrue in both the first and subsequent years.

The probability that the 20% MSP will be attained in 5 or 10 years will not change with changes in mesh size regulations. These probabilities were calculated based on reductions in overall mortality each year for 5 and 10 years. Coastwide commercial quotas, which will be calculated each year and also account for discards in the commercial fishery, will be used to control commercial mortality.

Center for Marine Conservation

The turtle discussion in the FEIS has been modified from the discussion in the DEIS to incorporate data from the 1991-1992 fishery.

While certain measures are included in Amendment 2 to address the summer flounder -

turtle problem under the Magnuson Act, it must be recognized that NMFS has the authority under the Endangered Species Act to impose regulations in addition to those imposed under the Magnuson Act.

Minerals Management Service

The Council will work with NMFS and MMS to include the latest MMS planning and leasing schedule in Amendment 3, which is currently being developed.

Environmental Protection Agency

Updated information, including data on the 1991-1992 fishery, is included in the turtle discussion in the FEIS (sections E.2.b.7 and G.4 and Tables 91 and 92).

The Amendment and EIS (EIS section E.2.b.4) discuss administrative, enforcement,and information costs. It is assumed that the governmental costs will be funded through the normal Federal budget and appropriation process. However, data on the cost of the sea turtle monitoring program were not included in the EIS. NMFS and North Carolina personnel were contacted and supplied the data that follow.

The estimated total cost to NMFS for the observers that were deployed for sampling the winter time summer flounder fishery off of Virginia and North Carolina was $125,000 (Christenson pers. comm.). This cost included both sea time and stand by time when the observers were unable to get out on fishing vessels. The North Carolina Division of Marine Fisheries also spent considerable time and money during the past two winter fishing seasons in their evaluation of this fishery/sea turtle interaction. Monaghan (pers. comm.) estimates the State of North Carolina spent $155,000 on this problem during last winter fishing season. The majority of the NMFS efforts came from the NEFSC and the observer budget for the New England Stock Depletion fund which has been a line item in the Congressional budget for the past four years.

EAST COAST FISHERIES FOUNDATION, INC.

April 10, 1992 VIA FAX

Dr. William W. Fox
Assistant Administrator for Fisheries
National Marine Fisheries Service
Silver Spring Metro Center #1
1335 East-West Highway
Silver Spring MD 20910

Dear Dr. Fox:

The following are comments in response to the Draft Environmental Impact Statement for Amendment #2 to the FMP for Summer Flounder:

1. The shortening of the comment period from 30 days to 15 is a clear abuse of process, and truncates the necessary public input for an effective management plan which will find the support of the industry.

2. The is no analysis of the economic impact of the one-mesh-on-board requirement. Such a profound disruption of traditional fishing methods clearly requires far greater study. This is especially true because the requirement impacts virtually all other fisheries in the region.

3. There is no economic or social impact study of the imposition of a moratorium in the fishery. While fishery management plans have seldom paid more than cursory attention to social impacts, there is a clear requirement to do so. The DEIS for summer flounder fails in this regard. At the very least, there needs to be a thorough study on the changes in traditional family structures when individuals are closed out of an accustomed fishery. There are, of course, a host of other issues consequent to the imposition of an exclusionary system, such as alternative income opportunities in rural communities for those individuals excluded from future participation in the fishery.

3. There is a significant vessel safety consideration in requiring vessels to stay offshore when weather conditions are such that prudent fishermen would choose to fish closer to the beach. The Exemption Program currently in effect creates an administrative compulsion to fish under dangerous conditions.

4. The income requirement for a permit is an untested management mechanism and bears little relation to resource conservation or management. As with the imposition of the moratorium, the social and economic impact on fishing communities, where the fluke fishery may be an important component of a multi-source income, must be fully analyzed. The "minimum standard" for participation in the fishery is completely arbitrary.

5. The line delimiting the Exemption area bears no relation to the incidence of immature fluke or discard mortality, and serves no conservation purpose. The line clearly disregards the best scientific information available, NMFS' own sea-sampling data.

6. Ironically, the requirement to commit to a directed fluke fishery demanded by the line and the Exemption program actually increases effort in the fishery, since a vessel enrolled in the Exemption program may not pursue other fisheries. The administrative capriciousness of the program has the opposite of its intended effect by forcing vessels to remain in the fluke fishery when other fisheries might be more attractive—and take pressure off the fluke.

7. The imposition of a moratorium on the commercial fishery and none on the recreational sector is patently discriminatory.

8. The effective increase in effort permitted to the sport fishery (computing the average recreational catch with the bag limit specified in the DEIS) does not correspond with the plan's intention to reduce effort. If the commercial fishery is to have it's effort dramtically reduced, the recreational fishery, whether charter boat or individual, should be required to share in the effort reduction program.

9. The 100-pound bycatch limit is a revisting of a senseless regime which promotes discarding, highgrading, and misreporting. Vessels will discard smaller and less valuable fluke to keep larger ones. Vessels will discard sometimes significant amounts of legal-size fluke when they have reached their bycatch limit. Both these situations are further unfortunate examples of administrative actions which inadvertently produce the opposite of the intended result and harm the resource.

10. The state quota system rewards those states that had less restrictive conservation measures than other states during the period 1980-1989. A smaller minimum size requirement results in greater historic landings and a greater current quota than a state which had stricter conservation measures in place. To reward past failure to implement conservation with greater future allocations is repellent.

11. Although Section E.2.b is entitled "Cost/Benefit Analysis," there seems to be little more than a recitation of statistics relating to the fishery. Those statistics are acknowledged in the DEIS itself to be severely lacking. For a plan to go forward when the "number of plants handling summer flounder is unknown," and the "information on the total number of vessels actually landing summer flounder...is difficult to assemble," is irresponsible. It is also clear that the recitation of current estimated statistics does not constitute a cost/benefit analysis. In fact, it appears that, despite several readings of the DEIS, there actually is no cost/benfit analysis.

These are a few of the many issues which have not been adequately addressed in the DEIS for the Summer Flounder fishery. The DEIS appears to be wholly insufficient, given the lack of data; the failure to address significant issues relating to vessel safety; the arbitrary and discriminatory imposition of a moratorium on only one sector of the industry; the lack of sufficient cost/benfit analysis; the total lack of social impact analysis; the failure to co-ordinate the plan with the best scientific information available; and the failure to assess the impact of the plan on other fisheries.

I look forward to working with you to creating an FMP for the Summer Flounder fishery which incorporates the concerns noted above.

Sincerely yours,

James D. O'Malley

James D. O'Malley
Executive Director

JOM/se

Cc: J. Bryson
D. Cottingham
D. Marshall

here Bill
chris please draft response

1919 Marlin Drive
Ocean City, Maryland
21842

RECEIVED
APR 10 1992
MD. ATLANTIC FISHERY COUNCIL

April 8, 1992

Mr. John C, Bryson, Executive Director
Mid-Atlantic Fishery Management Council
Room 2115 Federal Building
300 South New Street
Dover, DE 19901-6790

Re: Ammendment 2 to the Fishery Management Plan (FMP) for the summer flounder fishery

Dear Mr. Bryson:

You clearly have net your objective of minimizing costs to the fishing industry. It is irresponsible to remove the requirement that the minimum mesh size apply through the entire net after the first year of FMP implementation. The elimination of this requirement is equivilent to "no action". Discard mortality and deaths due to encounters with the smaller mesh will increase in the second and succeeding years. This exacerbates your dead-fish strategy. (See enclosed earlier comments) The probability of reaching a 20% maximum spawning potential has to change when you removed the extension of the minimum net mesh throughout the entire net. The only way to achieve the same result is to substantially reduce the quota each year.

The best thing that has happened to the summer flounder is the fishing restrictions to save the turtles. The fox is guarding the henhouse. Commercial fisherman/politics should play no part in establishing strategies for saving an overfished species.

Please send me a copy of the appendices.

Sincerely,

Joseph E. O'Hara, Jr.

cc: Honorable Wayne T. Gilchrest
Office of Ecology and Environmental Conservation
National Marine Fisheries
Maryland Department of Natural Resources

Joseph O'Hara
1919 Marlin Drive
Ocean City, MD 21842

August 16, 1991

Mr. John C. Bryson
Executive Director
Mid-Atlantic Fishery
Management Council
Room 2115 Federal Building
300 South New Street
Dover, Delaware 19901

REF: SUMMER FLOUNDER FISHERY MANAGEMENT PLAN (FMP)

Dear Mr. Bryson:

I voiced my opposition to the preferred alternative at the hearing held in Salisbury, Maryland on August 1, 1991.

The first objective of the FMP is to reduce fishing mortality in the summer flounder fishery. The commercial and recreational management strategies proposed in the preferred alternative should be labeled dead-fish strategies. Over 22% of the commercial catch is discarded and 17.7% of the catch die after being discarded (Table 80). In addition, there is a 25% mortality of fish escaping from the net (Table 38).

A recreational fisherman would have to catch 16 plus fish to take home six 14" keepers, (Tables 7 & 10). Over 15.6% of the total recreational catch would die after release. The recreational fisherman will kill 2.5 released fish to keep 6.

The preferred alternative is too little - too late! It is heavily weighted toward protecting the commercial fisherman instead of the summer flounder. I realize it is a political compromize. Greed destroyed our western grasslands and forests. I hope you won't let this happen to our fisheries.

I support the following:

Seasonal closure during the peak spawning season (October 1 - December 31).

6.0" (Diamond Mesh) minimum net mesh size throughout the entire net.

No minimum commercial fish size limit.

State-by-state quotas.

A 3 fish recreational possessional limit.

A recreational fishing season from 15th May through 30th September.

No minimum recreational size limit.

The other provisions of the preferred alternative.

What is the preferred management strategy to increase stock? Every fishery management expert would answer - "Close the fishery during the spawning season". Fishing effort would increase when the fishery is open, but the state quotas would limit mortality. Virginia and North Carolina fisherman would have to target other species during the spawning season. The summer flounder is a national resource. No state has a claim on national resources. We are trying to save summer flounder, not fisherman. Thirty five percent of commercial landings occur during the peak spawning season (Table 23). Closure is the only management strategy that will bring this fishery back to a safe level in a reasonable period of time.

A 6" (diamond mesh) minimum mesh size throughout the net will reduce mortality of fish escaping the net. The argument that this would impose an economic burden is very weak. The total depreciated value of 5.5" mesh is approximately $45,000 (90 North Carolina vessels at $500 each). It would cost each vessel $800 in interest to have the same mesh size throughout the net in 1992 ($8,000 @ 10% interest). The 6" mesh, significantly reduces mortality on immature summer flounder (Table 80).

Commercial fisherman should keep their entire catch. State quotas would control mortality. It is senseless to discard fish when the mortality rate is 8 out of 10. I suspect it is really 10 out of 10. When the discards stay on board, they take the place of live breeding fish. Anyone caught double netting, throwing away small fish or other violations should lose their permit. The captain and crew should be fined.

In a quota system, the catch should count against the state where the vessel is docked (home port). Maryland's quota could be used up very quickly if Virgina, Delaware or New Jersey boats unload their catch in Ocean City.

A 3 possession limit, without size limits, will reduce the number of summer flounder killed by anglers. I hope the Council is not making decisions based on Table 44. This Table is a myth. You would be lucky to catch six 14" flounder all season in Ocean City, Maryland. I have been fishing for flounder for the last 24 years. There has

never been an abundance of 14" or larger flounder in Maryland waters. I question the validity of all the tables concerning recreational landings. The Council needs a valid current measure of recreational fishing activity. If you had an accurate measurement of the current summer flounder population, the projection for release kills would exceedd 14" keepers. If 1 out of every 5 fish were a 14" keeper, you kill 6 to keep 6. I believe the 14" keepers are less than 10% of the fishery in our area.

I attended a recent Maryland Department of Natural Resources (DNR) Meeting concerning summer flounder. Only one of the recreational fisherman reported catching a 14 inch flounder. An employee of the DNR is tagging flounder in our area. He is probably the best source on the condition of the fishery in this area.

If the angler keeps all their fish, without a size limit, there will be more mature breeding fish to spawn. Table 75 should take spawning into consideration.

I hope the council will seriously consider my recommendaitons. Please send me a copy of the final draft. I would like to be on your mailing list for documents pertaining to the summer flounder fishery.

Sincerely,

Joseph E. O'Hara, Jr.

Joseph E. O'Hara, Jr.

CC: Honorable Wayne T. Gilchrest
National Marine Fisheries Service
Maryland Department of Natural Resources

Center for Marine Conservation

April 10, 1992

RECEIVED
APR 13 1992
MID-ATLANTIC FISHERY COUNCIL

John Bryson, Executive Director
Mid-Atlantic Fishery Managment Council
Room 2115 Federal Building
300 South New Street
Dover, Delaware 19901-6790

Re: Draft Environmental Impact Statement for Amendment 2 of the Summer Flounder Management Plan

Dear Mr. Bryson:

I am writing to submit comments by the Center for Marine Conservation on the above-mentioned draft environmental Impact Statement. Please note that our comments apply only to those sections of the plan relating to the conservation of endangered and threatened species, namely sea turtles.

In general, we endorse the proposed action, which authorizes the State of North Carolina (NC) and the Regional Director of the National Marine Fisheries Service (NMFS) to monitor for sea turtle presence and to institute measures, including but not limited to, limiting tow times to 60 minutes, requiring the use of Turtle Excluder Devices (TEDs) with bars spaced no greater than 6" apart or other devices, or closing the area to trawlers, to minimize take of sea turtles.

We do however, recommend that the proposed action be modified somewhat to take into account new information not available at the time of the writing of the plan. In specific, during the 1991-92 fishing season NC and NMFS observers and overflights documented the presence of sea turtles, and take of sea turtles in the summer flounder fishery, off the Outer Banks and in the Cape Hatteras Bight in much larger quantities than previously suspected. (Presentation by Dr. Ford A. Cross, Director, NMFS Beaufort Laboratory to the 12th Annual Sea Turtle Workshop, Jekyll Island, Georgia, Friday, 28 February, 1992). Turtles were present throughout the winter, including throughout the month of February, in waters as cold as 8° C and much warmer waters in eddies from the Gulf Stream. Equally astonishing were the overall catch rate of 2.9 turtles per hundred hours of trawling, similar to that of the shrimp industry, and the fact that fully one third of the turtles caught were the critically endangered Kemp's ridley sea turtle. Finally, six of 83 turtles caught were dead and 20 percent of the turtles caught alive needed resuscitation.

Given this new information we recommend that the authorization to institute mitigating measures not be restricted to the 15 October - 15 January window mentioned in the EIS, but instead be extended throughout the fishing season. In addition, should

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limited tow times be required, we recommend that the 40 minute tow time recommended by the National Academy of Sciences Sea Turtle Review Panel (Magnuson 1990) for summer conditions be required because of the presence of warm water eddies from the Gulf Stream. In addition, we note that where limited tow times have been tried in the shrimp fishery, enforcement was virtually impossible; therefor we recommend that tow times only be used in conjunction with mandatory observers. Finally, it is our understanding from NMFS gear technology specialists that slight modifications of standard TEDs with 4 inch bar spacing have been tested in the area and appear to work while successfully retaining the target flounder species. Since there is reason to believe that small Kemp's ridley turtles may slip between bars with 6 inch spacing we would encourage the rapid completion of testing on these modified TEDs and subsequent requirement for their use.

Thank you for the opportunity to comment on this plan.

Sincerely,

Deborah Crouse

Deborah Crouse, Ph.D.
Director
Species Recovery Program

United States Department of the Interior

MINERALS MANAGEMENT SERVICE
WASHINGTON, D.C. 20240

APR 10 1992

Mr. John C. Bryson, Executive Director
Mid-Atlantic Fishery Management Council
Room 2115 Federal Building
300 South New Street
Dover, Delaware 19901-6790

Dear Mr. Bryson:

Minerals Management Service (MMS) staff have reviewed the draft Environmental Impact Statement (EIS) on Amendment 2 to the Fishery Management Plan for the Summer Flounder Fishery. We offer for the consideration of the Mid-Atlantic Fishery Management Council (FMC) the following comments and suggested changes to correct misinformation in the EIS.

Page 83 of the document reports that the National Marine Fisheries Service (NMFS) considers "OCS oil and gas development" to be a medium priority issue and threat to living marine resources. This belief is reflected also in table 17 on page 117, where "OCS Oil and Gas Development" is ranked 7th of 11 "Major Threats to Living Marine Resources and Habitats in the Northeast." Including these NMFS opinions/conclusions in the draft EIS suggests that the FMC accepts them as continuing "truths" when such acceptance is not justified.

While these may have been valid NMFS' opinions when the Department of Commerce source document was published in 1985, they are no longer warranted. Actual activities have not proceeded as NMFS perceived them in 1985. No leasing or other oil and gas-related activities have occurred in the North-, Mid-, and South-Atlantic Outer Continental Shelf (OCS) Oil and Gas Lease Planning Areas for several years. The only potential activity is the one <u>gas exploration</u> well proposed by Mobil Oil Corporation offshore North Carolina; State opposition to this proposal is currently under appeal. Please note that this Mobil exploration, if conducted and successful, is expected to discover only gas, which if spilled would pose little or no risk to fish and their habitat. Because of its low likelihood, real or potential <u>oil development</u> off the Atlantic coastal states poses even less threat to resources or habitats in the Northeast. Whatever oil-related threat there may be is from oil that is transported into the area in tankers and barges. Risks associated with transported oil should not be confused with those from "OCS oil and gas development." We recommend that your table 17 on page 117 be revised to include potential oil spills from tankers and to clearly differentiate between spills due to OCS activities and tanker discharges.

Additionally, the citations in question seem to attribute all potential or conceivable oil and gas development to the OCS, which is almost universally considered to comprise waters under Federal jurisdiction. Such attribution is incorrect because offshore oil and gas deposits are as likely to occur in waters under state jurisdiction as they are in Federal waters.

If the continuing validity of NMFS' observations in 1985 cannot be demonstrated or the information updated, the references to "OCS oil and gas development" should be deleted. Alternatively, the text and table should be qualified to show what the alleged threats really are and that those visualized in 1985 no longer exist.

We hope these comments will be helpful in preparing the final EIS. Thank you for the opportunity to review and comment on the draft EIS.

Sincerely,

John T. Goll
Chief, Environmental Policy and
Programs Division

cc: David Cottingham
Director, Office of Ecology
and Environmental Conservation
National Oceanic and Atmospheric Administration
Room 6222, CS/EC
U.S. Department of Commerce
Washington, D.C. 20230

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

APR 10 1992

OFFICE OF ENFORCEMENT

Mr. John C. Bryson
Executive Director
Mid-Atlantic Fishery Management Council
Room 2115 Federal Building
300 South New Street
Dover, DE 19901-6790

Dear Mr. Bryson:

In accordance with Section 309 of the Clean Air Act and the National Environmental Policy Act (NEPA), the U.S. Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) "Amendment 2 to the Fishery Management Plan for the Summer Flounder Fishery."

The proposed plan will reduce mortality in the summer flounder fishery and on immature summer flounder; it will increase spawning stock biomass and improve the yield from the fishery. Additionally, the document describes compatible management regulations between state and federal jurisdictions, uniform enforcement of regulations, and the minimization of regulations to achieve the management objections stated above.

EPA has reviewed the DEIS and is supportive of the proposed management measures designed to prevent overfishing of the summer flounder. However, our comments focus on two areas: a concern about marine turtles and the written presentation of the DEIS.

We support the authority Amendment 2 gives to the Regional Director to invoke mitigation measures with regard to the protection of federally-listed threatened and endangered marine turtles. These measures include reduced tow times, closure of the fishery off Virginia and North Carolina, placing observers on fishing boats, and the use of turtle excluder devices. The DEIS states that summer flounder/turtle mitigating measures were implemented during most of the 1991-1992 fall and winter fishery season but does not discuss whether the mitigating measures were effective in reducing sea turtle mortality. This information should be incorporated into the final environmental impact statement (FEIS).

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The FEIS should incorporate additional information on the proposed monitoring and management plan implementation process, including information on its budgetary requirements and funding sources. Such discussion is necessary to ensure that monitoring and enforcement phases will effectively provide adequate protection for both the flounder and marine turtles.

As a comment for improving the FEIS, we recommend that NOAA prepare a short, simply written summary for the project and its need. This summary could then replace statistical terms, scientific nomenclature and jargon with commonly used terminology and more readily facilitate easy review by the public of the FEIS.

Based on our review of the DEIS and in accordance with our national EIS rating criteria, we have classified this DEIS as category EC-2, Environmental Concerns - Insufficient Information (See enclosed "Summary of Rating Definitions and Follow-Up Action"). The EPA review has identified potential environmental impacts requiring additional information to be included in the FEIS.

Thank you for the opportunity to review the DEIS. Should you have any further questions regarding our comments, please contact me at (260-5053) or have your staff contact Ms. Susan Hamilton, of my staff, at 260-5052.

Sincerely,

Richard E. Sanderson
Director
Office of Federal Activities

Enclosure

SUMMARY OF RATING DEFINITIONS AND FOLLOW-UP ACTIONS

Environmental Impact of the Action

LO--Lack of Objections
The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC--Environmental Concerns
The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO--Environmental Objections
The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU--Environmentally Unsatisfactory
The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

Category 1--Adequate
EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2--Insufficient Information
The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3--Inadequate
EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment