FISHERY MANAGEMENT PLAN AND DRAFT ENVIRONMENTAL IMPACT STATEMENT

FOR THE

BLACK SEA BASS FISHERY

March 1995

Mid-Atlantic Fishery Management Council

in cooperation with

the Atlantic States Marine Fisheries Commission,

the National Marine Fisheries Service,

the New England Fishery Management Council,

and

the South Atlantic Fishery Management Council

Draft adopted by MAFMC: April 1994
Final adopted by MAFMC:
Final approved by NOAA:

21 November 1995

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

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: Draft Environmental Impact Statement (DEIS) and Fishery Management Plan for the Black Sea Bass Fishery (FMP)

LOCATION: The exclusive economic zone in the western Atlantic Ocean from Cape Hatteras, North Carolina, northward to the U.S.-Canadian border

SUMMARY: The draft FMP has objectives to reduce fishing mortality to assure that overfishing does not occur, reduce fishing mortality on immature black sea bass to increase spawning stock biomass, and improve yield from the fishery. Management measures contained in the draft FMP propose minimum fish sizes and commercial gear regulations in years 1 and 2. In years 3 to 5 target exploitation rates would be 48 percent, in years 6 and 7 it would be 37 percent, and in year 8 and subsequent years, the target exploitation rate would be based on F_{max} (about 23%). Measures include: (1) A minimum fish size, (2) minimum otter trawl mesh size and black sea bass pot specifications for the first 2 years, (3) ability to adjust minimum fish size annually on a framework basis, (4) operator permit requirements for commercial, party and charter boats, (5) vessel permits for party and charter boats, (6) vessel permits for commercial vessels under a moratorium, (7) dealer permit requirements, (8) reporting requirements for party and charter boats, commercial vessels, and dealers, (9) black sea bass pots or traps requirements, (10) size limitations for rollers used in roller rig trawl gear, and (11) process to develop special management zones around artificial reef areas.
An earlier version of this letter, dated January 25, 1996, contained several incorrect target exploitation rates. This letter to the public has the correct exploitation rates as contained in the DEIS/Draft FMP for the Black Sea Bass Fishery.

RESPONSIBLE OFFICIAL: Rolland A. Schmitten
Assistant Administrator for Fisheries
National Marine Fisheries Service
Silver Spring Metro Center #3
1315 East-West Highway
Silver Spring, Maryland 20910
Phone: 301-713-2239

A copy of the DEIS/FMP was enclosed for your information with the January 25, 1996, letter. Please send one copy of your comments to me in Room 5805, OPSP, U.S. Department of Commerce, Washington, D.C. 20230.

Sincerely,

Donna Wieting

Donna Wieting
Acting Director, Office of
Ecology and Conservation

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A Publication of the Mid-Atlantic Fishery Management Council pursuant to National Oceanic and Atmospheric Administration Award No. NA17FC0045-03

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2. SUMMARY

This Fishery Management Plan for the Black Sea Bass Fishery (FMP), prepared by the Mid-Atlantic Fishery Management Council (Council), is intended to manage the black sea bass (*Centropristis striata*) fishery pursuant to the Magnuson Fishery Conservation and Management Act of 1976, as amended (MFCMA). The management unit is black sea bass in US waters in the western Atlantic Ocean from Cape Hatteras, North Carolina northward to the US-Canadian border. The objectives of the FMP are to:

1. Reduce fishing mortality in the black sea bass fishery to assure that overfishing does not occur.

2. Reduce fishing mortality on immature black sea bass 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 for black sea bass is defined as fishing in excess of the F_{max} level. Based on current conditions in the fishery, F_{max} is 0.29 (an annual exploitation rate of 23%).

The recovery strategy calls for minimum fish sizes and commercial gear regulations in year 1 and 2. In years 3 to 5, target exploitation rates would be 48% for black sea bass. In years 6 and 7, the target exploitation rates would be 37% and in year 8 and subsequent years, the target exploitation rate would be based on F_{max}.

The Council has adopted the following management measures for this Amendment for purposes of public hearings:

YEARS 1 AND 2

1. A 9" total length (TL) minimum fish size in all fisheries. A maximum of a 5% tolerance by weight of undersized black sea bass would be allowed on vessels issued moratorium permits. Black sea bass less than 9" TL could not be sold.

2. The minimum otter trawl mesh size for vessels retaining more than 100 lbs of black sea bass would be 4.0" (stretch mesh inside measure).

3. Black sea bass pots would be required to have a minimum escape vent of 1 - 1/8" X 6" or 2.5" in diameter. The escape vent provision would be implemented at the start of the first calendar year following FMP approval so the fishermen would not be required to pull their pots and rebuild them in the middle of the season.

YEARS 3 AND SUBSEQUENT

1. A 10" total length (TL) minimum fish size in all fisheries which may be adjusted annually on a framework basis. A maximum of a 5% tolerance by weight of undersized black sea bass would be allowed on vessels issued moratorium permits. Black sea bass less than 10" TL could not be sold.

2. Black sea bass pots would be required to have a minimum escape vent of 1 - 1/4" X 6" or 2.75" in diameter.

3. The minimum mesh size for vessels retaining more than 100 lbs of black sea bass would be 4.5" (stretch mesh inside measure). The minimum mesh size may be adjusted annually on a framework basis.

4. Prior to year three and annually thereafter, the Council, working through a Monitoring Committee, would evaluate the success of the FMP relative to the overfishing reduction goal and propose adjustments to the management system. Beginning with year three, additional measures would be implemented by the Regional Director based on the recommendations of the Council. Additional management measures could be any or all of the following:

a. Commercial: A coastwide commercial quota with Federal permit holders being prohibited from landing (selling) after the quota had been landed. Quota overruns would be deducted from the subsequent year. All states would need to prohibit black sea bass sales following federal sales prohibition.

b. Recreational: A coastwide possession limit, season, and recreational harvest limit. Landings in excess of the limit would be deducted from the harvest limit for the subsequent year.

FOR ALL YEARS

1. Operator permits for commercial and party and charter boats.

2. Vessel permits for party and charter boats.

3. Vessel permits for commercial vessels (permits to sell) under a moratorium on entry of additional vessels into the fishery. Vessels with documented landings of black sea bass for sale between 26 January 1988 and 26 January 1993 qualify for a moratorium permit to land and sell black sea bass under this moratorium program.

4. Dealer permits (permits to purchase).

5. Permitted vessels may only sell to permitted dealers and permitted dealers may only buy from permitted vessels.

6. Party and charter boat, commercial vessel, and dealer reports.

7. The hinges and fasteners of one panel or door in black sea bass pots or traps must be made of one of the following degradable materials:

a. untreated hemp, jute, or cotton string of 3/16" (4.8 mm) diameter of smaller;

b. magnesium alloy, timed float releases (pop-up devices) or similar magnesium alloy fasteners; or

c. ungalvanized or uncoated iron wire of 0.062" (1.6 mm) diameter or smaller.

8. A maximum size of 18" diameter for rollers used in roller rig trawl gear.

9. Special management zones around artificial reef areas.

Alternatives Considered but not Adopted

1. Take no action at this time.

2. Seasonal closures for the commercial fishery.

3. Bimonthly commercial quotas with possible trip limits established by the NMFS Regional Director to reduce the length of closures.

4. State by state commercial quotas with possible trip limits established by the states to reduce the length of closure.

5. Individual transferrable quotas.

6. Seasonal dependent minimum sizes in the commercial fishery: A 10" TL minimum size from Oct. 1 - April 30 and a 9" TL minimum size for the rest of the year.

7. A threshold requirement to qualify for a moratorium permit.

8. Separate management measures for party/charter boat fishermen.

9. A 9" TL minimum fish size and a 3.5" minimum square mesh size in the otter trawl fishery when the vessel has 100 pounds or more of black sea bass on board.

The preferred alternative is described and evaluated in section 9. The alternatives considered but not adopted are described and evaluated in Appendix 1.

3. TABLE OF CONTENTS

APPENDICES

4. INTRODUCTION

4.1. DEVELOPMENT OF THE PLAN

The Council began the development of a fishery management plan (FMP) for black sea bass in 1978. Although preliminary work was done to support the development of an FMP, a plan was not completed.

In January 1990, the Council began the development of a fishery management plan for black sea bass as an amendment to the Summer Flounder FMP. However, the development of a black sea bass plan was delayed through a series of amendments to the Summer Flounder FMP and work on a separate Black Sea Bass FMP was not resumed until 1993.

4.2. PROBLEMS FOR RESOLUTION

4.2.1. Black Sea Bass are Overexploited

Commercial landings of black sea bass have declined dramatically from the peak landings of 22 million pounds reported in the 1950's. In fact, commercial landings in 1992 were about 3.0 million pounds, slightly less than the 1983-1992 average of 3.6 million pounds. In addition, recreational landings were 3.2 million pounds in 1992, lower than the 1983-1992 average of 5.0 million pounds.

Landings-per-unit-effort (LPUE) from the Mid-Atlantic trawl fishery has been used as an index of abundance for black sea bass. Standardized LPUE, defined as metric tons per days fished for trips landing more than 25% black sea bass, peaked at 11.3 in 1984, and then declined to a low of 1.6 in 1992. Standardized LPUE increased slightly to 3.2 in 1993 (NEFSC 1995).

The NEFSC has conducted a spring and autumn offshore survey for a number of species, including black sea bass, since 1972. The spring offshore survey has been used as index for black sea bass recruits (fish longer than 20 cm SL) and the autumn inshore survey data as an index of pre-recruits (fish less than 11 cm SL). The spring recruit index was generally high in the late 1970's, ranging from 2.0 to 6.09 fish per tow. The spring index declined from 6.09 fish per tow in 1977 to a low of 0.2 per tow in 1982. More recently the spring index was 0.87 in 1993 and declined to 0.28 in 1994 (NEFSC 1995). The fall pre-recruit indices show a similar trend (i.e., relatively low recent values compared to the mid-1970's).

Analyses conducted by the NEFSC indicate a strong correlation between the fall pre-recruit index and commercial catch per unit effort in the trawl fishery (NEFSC 1993). The index for pre-recruits indicated that above average year classes were produced in 1977, 1982, and 1986. Recruitment for 1992 and 1993, based on this index, was well below average (NEFSC 1995). Recruitment was above average in 1994 (Shepherd, pers. comm.).

Based on current conditions in the fishery, yield per recruit analysis indicates that F_{max} for black sea bass is 0.29 (NEFSC 1995). Based on the results of a virtual population analysis, the fishing mortality rate was 1.05 in 1993 (an annual exploitation rate of 60%) . This, coupled with the above information, that is, the decline in landings, reduced LPUE, and low survey indices, indicates that black sea bass are overexploited.

4.2.2. Mixed Species Fishery

The Mid-Atlantic mixed species trawl fishery relies principally on summer flounder, *Loligo* squid, scup, and whiting, but also harvests significant quantities of black sea bass, 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 these species as they make annual migrations from south to north and from offshore to inshore waters. 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 by larger vessels. Although the majority of landings are taken by otter trawls, black sea bass are landed by many other types of fishing gear: midwater trawls, pots and traps, pound nets and hand lines. 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.

The occurrence of black sea bass 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.

The Council has included no measures in this FMP at this time to specifically address the mixed trawl fishery problem, although the Council considered the implications of the mixed trawl fishery when developing the proposed measures. The Council is working to develop a mixed trawl fishery management strategy and the framework management measures put in place through this FMP could be used to implement the measures developed through this process.

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 1990). 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 black sea bass, 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 black sea bass fishery.

4.2.4. Lack of Uniform Management

The highly migratory nature of black sea bass complicate the development of management strategies since fishing activities in the EEZ or waters of a few states could adversely impact the stocks. The SAFMC Snapper/Grouper FMP contains a 8" TL minimum size limit for black sea bass in the South Atlantic EEZ, but no regulations for black sea bass exist for the New England or Mid-Atlantic EEZ. In addition, although several states have minimum size limits for black sea bass, no unified approach currently exists to protect this valuable species in state waters.

4.2.5. Inconsistent and Inadequate Enforcement

There is a lack of uniform regulations affecting the black sea bass 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 led to confusion and 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 are insufficient to encourage conformity to state and federal laws. Permit sanctions combined with fines are likely to be a more effective deterrent than fines alone.

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. Lack of Data

National Standard 2 states that "measures shall be based upon the best scientific information available." Although recreational and commercial catch data for black sea bass 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.

4.2.7. Habitat Degradation

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

4.3. MANAGEMENT OBJECTIVES

The objectives of the FMP are to:

1. Reduce fishing mortality in the black sea bass fishery to assure that overfishing does not occur.

2. Reduce fishing mortality on immature black sea bass to increase spawning stock biomass.

3. Improve the yield from the fisheries.

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 black sea bass (*Centropristis striata*) in US waters in the western Atlantic Ocean from Cape Hatteras, North Carolina northward to the US-Canadian border.

5. DESCRIPTION OF THE STOCK

5.1. SPECIES DESCRIPTION AND DISTRIBUTION

Black sea bass is a continental shelf species that is common in Atlantic coastal waters from Cape Cod, Massachusetts to Cape Canaveral, Florida (Kendall 1977). Black sea bass and *Centropristis striata* are the common and scientific names for the species (American Fisheries Society 1980). Black sea bass are also known as black fish, tally-wag, hannahill, black-will, black-Harry, black perch, black bass, bluefish, and rock bass (Kendall 1977). Black sea bass may attain ages as great as 15 years but rarely exceed lengths of 20 inches (NEFSC 1993). Black sea bass are characterized by a robust body, large head and moderately pointed snout. In general, they are smoky gray, dark brown, or blueish black in color. A complete generic description of the species can be found in Miller (1959).

Black sea bass undertake seasonal migrations north of Cape Hatteras, North Carolina probably in response to changes in temperature. Black sea bass move inshore and north in summer and offshore and south in winter (Musick and Mercer 1977). South of Cape Hatteras, black sea bass are non-migratory, year round residents (Cupka et al. 1973, Kendall 1977).

Black sea bass are distributed primarily in the southern offshore portion of the Mid-Atlantic Bight during

winter in depths of 240 to 540 feet (Musick and Mercer 1977). Larger and older fish move offshore sooner and winter in deeper water than do younger fish (Kendall 1977). Black sea bass prefer water temperatures of at least 48°F during the winter months.

Black sea bass move to the waters of the Mid-Atlantic Bight as water temperatures warm in the spring, generally beginning inshore migrations in April. During the summer months, black sea bass are most abundant in depths of less than 120 ft (Musik and Mercer 1977). In the fall, black sea bass move out of Mid-Atlantic estuaries as temperatures fall below 57°F and migrate offshore to intermediate depths by November (Musik and Mercer 1977).

Based on tagging data and other information, two populations of black sea bass are believed to occur along the Atlantic coast with a separation at Cape Hatteras, NC (Mercer 1978). Shepherd (1991) conducted detailed morphometric and meristic analyses on black sea bass collected from Massachusetts, New Jersey, and Virginia and concluded that black sea bass north of Cape Hatteras formed a unit stock.

5.2. ABUNDANCE AND PRESENT CONDITION

Landings-per-unit-effort (LPUE) from the Mid-Atlantic trawl fishery has been used as an index of abundance for black sea bass. Standardized LPUE, defined as metric tons per days fished for trips landing more than 25% black sea bass, peaked at 11.3 in 1984, and then declined to a low of 1.6 in 1992 . Standardized LPUE increased slightly to 3.2 in 1993 (NEFSC 1995).

The NEFSC has conducted a spring and autumn offshore survey for a number of species, including black sea bass, since 1972. The spring offshore survey has been used as an index for black sea bass recruits (fish longer than 20 cm SL) and the autumn inshore survey data as an index of pre-recruits (fish less than 11 cm SL). The index for larger fish declined from a high of 6.09 fish per tow in 1977 to a low of 0.20 per tow in 1982 (Table 1). However, the 1992 value of 1.99 is slightly above the 1972 to 1994 average of 1.54. The spring recruit index declined to 0.87 in 1993 and 0.28 in 1994 (NEFSC 1995).

Analysis conducted by the NEFSC indicates a strong correlation between the pre-recruit index and commercial catch per unit effort in the trawl fishery (NEFSC 1993). The index for pre-recruits indicates that above average year classes were produced in 1977, 1982, and 1986 (Table 1). Recruitment for 1992 and 1993, based on this index, was well below average. Recruitment was above average in 1994 (Shepherd, pers. comm.).

5.3. ECOLOGICAL RELATIONSHIPS AND STOCK CHARACTERISTICS

5.3.1. Spawning and Early Life History

Studies on age at maturity indicate that most black sea bass reach sexual maturity between ages 1 and 4 with 50% mature by age 2 (NEFSC 1993). The length at which 50% of the black sea bass are sexually mature is about 7.5 inches TL (NEFSC 1993).

Unlike most fish, black sea bass are protogynous hermaphrodites. This means that most black sea bass function first as females, then undergo sexual succession and become functional males. Cochran and Greir (1991) identified the hormonal changes that regulated this sexual succession or transformation in black sea bass.

In general, sex ratios favor females at smaller sizes and younger ages and males at larger sizes and older ages. Based on a compilation of several studies, the probability that a female black sea bass will undergo sexual transformation was greatest between 7 and 10 inches TL (Shepherd pers. comm.) (Table 2).

Black sea bass spawn in the Mid-Atlantic Bight primarily between Chesapeake Bay and Montauk, Long Island. Spawning occurs in the open ocean at depths of 60 to 140 ft. Spawning begins in June off Chesapeake Bay and later in the summer off southern New England (Musik and Mercer 1977).

Black sea bass produce colorless, buoyant eggs that are spherical and approximately 0.9-1.0 mm in diameter. Mercer (1978) derived fecundity relationships for 25 black sea bass collected in the Mid-Atlantic. The relationship between total fecundity (F - thousands of eggs) and total weight (W - grams) was:

$$F = -587.684 + 348.053 (\log W)$$

Fertilized black sea bass eggs hatch in approximately 75 hours at a temperature of 61°F. Wilson (1891) described the embryonic development of black sea bass and Kendall (1972) described black sea bass larvae.

5.3.2. Age and Growth

Mercer (1978) aged 2905 black sea bass collected from commercial fisheries and trawl surveys in the Mid-Atlantic from 1973 to 1975. She found that back-calculated mean lengths almost doubled between ages 1 and 2 and then the rate of growth declined steadily thereafter (Table 3). She did not age any black sea bass older than 9 and larger, older fish were not well represented in the samples. Mercer (1978) also found significant differences in growth rates between male and female black sea bass.

Length-age data (all sexes combined) was fit to the von Bertalanffy growth equation. This equation, which relates age to length, is:

$$L_t = 469 (1-e^{-0.182(t-0.1056)})$$

where L_t is mean standard length (mm) at age t.

Most scientific publications report lengths of black sea bass in standard lengths. The standard length is the length of the fish from the tip of the snout to the posterior end of the hypural bone. However, most state regulations and the regulations pertaining to size in this FMP are in total length. Total length, the length along the mid-line of the fish from the tip of the snout to the tip of the tail, can be derived from standard length using the following formula (G. Shepherd pers. comm.):

$$TL = 1.42076 (SL) - 30.5$$

where length is measured in millimeters.

5.3.3. Length-Weight Relationship

Mercer (1978) developed length-weight relationships for black sea bass collected from the Mid-Atlantic Bight. Based on a sample of 2016 fish, the derived equation was:

$$\log w = -4.9825 + 3.1798 (\log l)$$

where weight (w) is in grams and length (l) is standard length in millimeters. Mercer (1978) also found significant differences between sexes with males heavier than females of the same length.

5.3.4. Mortality

The instantaneous natural mortality rate (M) is defined as annual losses experienced by black sea bass from all natural and anthropogenic factors except commercial and recreational fishing. The NEFSC assumed an M of 0.2 for black sea bass in the most recent stock assessment (NEFSC 1995).

Because they lacked age-length data, the ASMFC Black Sea Bass Technical Committee used length frequency data from commercial fisheries to derive estimates of fishing mortality rates. Estimates ranged from 0.35 to 0.7 depending on the fishery sampled and the year the length samples were obtained. Based

on that analysis, they concluded that current fishing mortality rates on black sea bass were 0.6 or higher.

More recently, the NEFSC used an age-based virtual population analysis to estimate stock sizes and fishing mortality rates for the northern population of black sea bass. Average fishing mortality rates for fully recruited age classes (ages 3-6) were high throughout the time period 1984-1993, exceeding 1.0 in every year (Table 4). NEFSC (1995) estimated F in 1993 to be 1.05 (an annual exploitation rate of 60%).

5.3.5. Food and Feeding

Black sea bass are opportunistic bottom feeders that eat crustaceans, fish, molluscs, echinoderms, and plants (Hildebrand and Schroeder 1928, Miller 1959, Cupka et al. 1973, Link 1980, Steimle and Ogren 1982). The primary diet items for adult black sea bass are crabs and fish whereas young black sea bass eat shrimp, isopods, and amphipods (Kendall 1973). Food consumption varies seasonally in association with spawning activity. Feeding slows during the spawning season (Cupka et al. 1973) and is heaviest in the 6-month period following spawning (Hoff 1970).

5.3.6. Predators and Competitors

Specific predators of black sea bass have not been identified in detailed food habits studies. However, it is probable that black sea bass are eaten by large piscivores (e.g., bluefish) whose range overlaps that of black sea bass (Kendall 1977).

Black sea bass share common food resources and habitat preferences with a number of fish that comprise the hard bottom reef fish community of the Mid Atlantic Bight (Ekluund and Targett 1991).

5.3.7. Parasites, Diseases, Injuries and Abnormalities

Several different kinds of acanthocephalans, cestodes, and nemotodes have been found encysted in black sea bass digestive tracts (Linton 1901). Cupka et al. (1973) found that black sea bass collected from South Carolina waters were generally free of external parasites.

5.4. MAXIMUM SUSTAINABLE YIELD

Maximum sustainable yield has not been estimated for black sea bass.

5.5. PROBABLE FUTURE CONDITION

If recruitment is below average in 1995 and/or 1996, spawning stock biomass will continue to decline. In fact, because the fishery tends to reduce incoming year classes rapidly (NEFSC 1993), even the production of a good year class will not increase stock biomass without the implementation of an effective management strategy to reduce fishing mortality on both small and large fish.

6. DESCRIPTION OF HABITAT

6.1. DISTRIBUTION OF THE SPECIES, HABITAT REQUIREMENTS, AND HABITATS OF BLACK SEA BASS

6.1.1. Distribution of Black Sea Bass and Habitat Requirements

Black sea bass inhabit the Atlantic coastal waters, commonly from Cape Cod to Cape Canaveral (section 5.1). Occasionally black sea bass occur in the Gulf of Maine and as far south as Miami or occasionally to the Florida Keys (Miller 1959). Black sea bass move inshore and north in summer and offshore and south in winter in the Mid-Atlantic Bight (Musick and Mercer 1977). In the South Atlantic Bight they are year round residents and do not undertake seasonal migrations. The mid-Atlantic and south Atlantic stocks of this species are considered distinct (Shepherd 1991) and there is probably little overlap in habitat use by the two populations (Steimle pers. comm.).

Black sea bass are distributed primarily in the southern offshore portion of the Mid-Atlantic Bight during winter in depths of 240 to 540 feet (Musick and Mercer 1977). Larger and older fish move offshore sooner and winter in deeper water than do young of year specimens (Kendall 1977, Musick and Mercer 1977). Black sea bass prefer water temperatures of at least 48° F, and move to the waters of the Mid-Atlantic Bight beginning in April. During the summer months, sea bass are most abundant in depths of less than 120 ft (Musick and Mercer 1977). The movement of black sea bass out of mid-Atlantic estuaries may occur as temperatures fall below 57° F (Musick and Mercer 1977). South of Cape Hatteras, where they reside in an area year round, they prefer depths of from 30 to 350 ft with most between 60 and 180 ft. Larger specimens are found mainly in the deeper water (Cupka *et al.* 1973).

Location of spawning has been inferred from the distribution of ripe females and small larvae (Kendall 1977). In the Mid-Atlantic Bight, black sea bass spawn primarily between Chesapeake Bay and Montauk, Long Island in the open ocean in depths of 60 to 140 ft. Spawning occurs earlier in the year in the southern part of their range with spawning beginning in June off Chesapeake Bay and later in the summer off southern New England (Musick and Mercer 1977). Spawning extends from January to June in the south Atlantic region, peaking from March to May (Cupka *et al.* 1973, Mercer 1978, Link 1980, and Wenner *et al.* 1986).

Extensive sampling offshore in the Mid-Atlantic resulted in small catches of larvae from June to November from North Carolina (the southern extent of the sampling) to New Jersey. Seasonally, there was some indication of northward progression of larval occurrences (Kendall 1972).

Juvenile black sea bass occur in saline areas of estuaries along the coast from Florida to Massachusetts. Musick and Mercer (1977) identified high salinity sections of estuaries in the Mid-Atlantic Bight as nursery grounds for young of year and yearling black sea bass. Juveniles enter these areas from July to September. In South Carolina estuaries, juveniles were found from July to November in salinities of 8.8 to 37.8 ppt. and at temperatures of 42° to 87° F (Cupka *et al.* 1973). Juveniles apparently move inshore after early larval development offshore and become demersal at total lengths of between 0.5 to 1 inch (Kendall 1972). They are associated with hard bottom such as oyster beds (Kendall 1977 and Arve 1960) or artificial reefs.

Able *et al.* (in press) described the early life history of black sea bass in the Mid-Atlantic Bight and a New Jersey estuary. In New Jersey coastal waters, larvae first appear in July but occur through October-November. By fall, individuals had generally moved from New Jersey, and other estuaries, and were found on the inner continental shelf from southern Massachusetts to Cape Hatteras. During the winter, they were concentrated in the southern portion of the Mid-Atlantic Bight from New Jersey and south, especially at the edge of the continental shelf. In New Jersey, they moved back into estuaries in early spring, at the same approximate maximum sizes as in the previous fall. Yearlings also migrate offshore in the fall, overwinter on the continental shelf and then return to estuaries the following spring. They reach relatively small sizes by 12 months of age, in part, because of little or no growth during the winter. Able *et al.* (in press) reported that during the summer, benthic juveniles on the inner shelf were collected or observed primarily in accumulations of surf clam *Spisula solidissima* valves or smaller pieces of shell and occasionally in burrows in exposed clay. While in the estuary they were collected from areas with structured habitats such as shell accumulations in marsh creeks, peat banks and a dredged boat basin. In summary, the accumulated data suggest that black sea bass utilize both estuarine and inner continental shelf habitats as nurseries during the first summer, and that these nurseries are of similar quality based on similar growth rates.

Black sea bass is one of the most abundant species of the fish community on natural hard bottom reef areas in the Mid-Atlantic Bight (Eklund and Targett 1991). These authors sampled the black sea bass trap fishery off the coast of Maryland and northern Virginia and found that black sea bass comprised over 96% of the catch overall. The other abundant species were: spotted hake, tautog, red hake, conger eel, scup and ocean pout. The catches of each species fluctuated through time, apparently as a result of seasonal migration patterns. Most species appeared to migrate inshore in the spring and offshore in the autumn. The fish community on hard bottom areas in the Mid-Atlantic Bight differed considerably from that reported from South Atlantic Bight reef areas as well as from smooth bottom areas on the Mid-Atlantic Bight

continental shelf. The above described natural hard bottom fish assemblage corresponds well with that characterized by Steimle (in press) for structure-oriented reef-fish.

6.1.2. Habitats of Black Sea Bass

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

The Council, attempting to coordinate and obtain the best information available, requested each state from North Carolina to Maine to identify the critical black sea bass habitat under their jurisdiction. The following paragraphs are paraphrased from the responses of the states' black sea bass experts.

Young of the year black sea bass are commonly caught in North Carolina estuarine waters from Oregon Inlet to Cape Fear from March through October (J. Ross pers. comm.). They are most common along the eastern portion of Pamlico Sound behind the barrier islands, in Core Sound, and along the intercoastal waterway from Cape Lookout to Cape Fear. Black sea bass are found in relatively high salinity waters, but have been caught in salinities as low as 9‰. They occur over grass flats, in channels, around bridges and pilings and generally over sandy bottoms (Ross pers. comm.). Black sea bass are also common in near shore ocean waters off North Carolina, with largest concentrations found over rocky bottoms and around the numerous wrecks and artificial reefs. Younger fish are more prevalent near shore, but larger fish are also common during the summer months.

Black sea bass are abundant in Virginia's Territorial Sea, seaside bays and Lower Chesapeake Bay during spring, summer, and fall months (Figure 1). Juveniles move into Chesapeake Bay waters in March and April at about 2.3 inches total length. Trawl surveys continue to catch sea bass until December, but the number of fish encountered diminishes after September (Bonzek *et al.* 1991, 1992, and 1993). Juvenile sea bass in the Chesapeake Bay move to deeper water during the colder months, but some may remain inshore year-round, especially during mild winters. By the time they have reached a length of about ten inches, most sea bass have permanently left inshore waters for coastal and ocean habitats (Boyd pers. comm.). Black sea bass are rarely encountered in salinities less than 12 ppt. and are most common at salinities above 18 ppt. (Musick and Mercer 1977). Juveniles concentrate in deeper grass flats and sponge communities, adults generally are found over rough, hard bottom. This species' preference for structured habitat makes oyster beds, wharves, channels, wrecks and pilings favored habitat. Virginia's Artificial Reef Program provides additional suitable habitat for black sea bass, with four Atlantic Ocean reef sites and seven Chesapeake Bay reef sites. A three year study of two Chesapeake Bay reef sites and one Atlantic Ocean reef site identified the black sea bass as the most abundant reef fish (Boyd pers. comm.).

Young sea bass have frequently been encountered during the coastal bay trawl survey in Maryland, primarily during the late summer and early fall. They are also caught in commercial crab pots throughout the summer. Sea bass in the Chesapeake are known to frequent wrecks and other structures as far north as Rock Hall. Beyond this, little is known of their habitat and movements (Casey pers. comm.). Maryland's Reef Program provides policy and guidelines for rebuilding and restoring reefs. Maryland has seven sites between one and 18 miles offshore that provide additional habitat for black sea bass (Butowski pers. comm.).

The entire ocean coast and both coastal bays provide ideal habitat for both juvenile and adult black sea bass in Delaware (Cole pers. comm.). Although Delaware's trawl survey does not effectively sample black sea bass, a distribution map (Figure 2) was based on both trawl data and anecdotal information collected from recreational fishermen and indicated that the vast majority of the Delaware estuary below the C and D Canal is used by black sea bass for feeding and nursery.

Black sea bass migrate from offshore, overwintering grounds to inshore coastal waters of New Jersey in May (Scarlett pers. comm.). Important summering and nursery areas include inshore ocean waters at depths less than 120 ft and estuaries from Sandy Hook Bay to Delaware Bay. Spawning occurs in near shore coastal waters at depths from 18 to 48 ft. Able *et al.* (in press) stated that larvae first appear in

July but occur through October-November in New Jersey.

The critical habitat for black sea bass in New York waters is similar to that defined below for Connecticut waters by Simpson (Mason pers. comm.). Structured bottom habitat is important for black sea bass.

Black sea bass occur in low numbers from at least April through November in trawl survey catches (Figure 3) from Long Island Sound (Simpson pers. comm.). Young-of-year are taken on hard substrate (sand/shell/cobble) nearshore including harbors and estuaries where salinities are above 20 ppt. The largest concentrations of sea bass taken in the trawl survey occur on sand and transitional (mixed sand/mud) substrates, typically in depths greater than 60 feet. Simpson (pers. comm.) reports that black sea bass in Long Island Sound feed principally on amphipods and small crabs, but also on mysids, copepods, and hydroids. Commercial catches of sea bass appears to be concentrated in the central portion of Long Island Sound, where depths are generally greater than 60 ft and the bottom types are sand and transitional (Simpson pers. comm.). Recreational catches are sparse. The few black sea bass taken are caught incidentally in the summer flounder or scup fisheries.

Juvenile black sea bass have been collected frequently during both the Coastal Fishery Resource Assessment Trawl Survey (Lynch 1994) and the Juvenile Fish Survey (Powell 1992) during the spring, but primarily in the fall. Black sea bass have been found to be distributed over eel grass beds (Powell 1992) and over sandy, hard and rocky bottom types, usually in association with submerged rock piles, obstructions and ledges (Lynch 1994). Little is known of their habitat and movements in Rhode Island waters (Gray pers. comm.).

Black sea bass, age 2 and older, migrate north to inshore Massachusetts waters in early May. The spring Massachusetts recreational and commercial fisheries for black sea bass are highly concentrated in May through June in shoal (less than 30 ft) waters within the northern portion of Nantucket Sound (Figure 4). Although spawning occurs elsewhere in Nantucket Sound, concentrated activity occurs north of a line from Point Gammon east to Succonesset Point. Within this spawning area, fish usually aggregate on sand bottom broken by ledge. Spawning occurs along the southern Massachusetts coast from the middle of May through July as inferred from the distribution of ripe females, eggs, and larvae in Nantucket Sound and Buzzards Bay. Collings *et al.* (1981) collected black sea bass late stage eggs in upper Buzzards Bay from early June through late July. Eggs were collected in water temperatures of 63° to 73° F with highest concentrations around 65° F. After spawning adult black sea bass disperse to ledges and rocks in deeper water. South of Cape Cod, adults remain in the sounds and bays until at least November (Currier pers. comm.). Shoal grounds in Buzzards Bay, Vineyard Sound, and Nantucket Sound are critical nursery areas for 0 age group black sea bass (Currier pers. comm.). Black sea bass are less common in Cape Cod Bay. Larvae were collected in low densities during July and August (Scherer 1984) but were considered, in terms of their reproductive range, stragglers from more southern waters. Collette and Hartel (1988) report black sea bass taken in Massachusetts Bay from areas north of Boston (Nahant, Salem Harbor, and Beverly) and south of Boston (Cohasett Narrows) at the turn of the century.

Black sea bass are taken only rarely in the New Hampshire recreational fishery, hence there are no habitat studies available (Grout pers. comm.).

Black sea bass are nearly absent in Maine waters (Langton pers. comm.).

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

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

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

The ELMR program is an important step in developing an information base to bridge the gap between site-specific estuarine problems and regional management strategies. Filling this gap is more important now than ever, as it is clear that the cumulative effects of small changes in many estuaries may have a total systemic effect throughout large segments of the Nation's estuaries and coastal ocean. Although the knowledge available to conserve and protect estuaries continues to be limited, the ELMR data base will allow comparisons among species, groups of species, specific life stages and times of year within an estuary, and geographic regions. The estuaries evaluated for the Mid-Atlantic are presented in Figure 5.

The spatial distribution and relative abundance of black sea bass was evaluated for the Mid-Atlantic (Table 5). The ELMR programs in the South Atlantic and the North Atlantic did not delineate black sea bass. The monthly temporal distribution of black sea bass in the Mid-Atlantic (south of Cape Cod) is identified in Tables 6 and 7.

Besides using highly structured habitats ("hard bottom" or vegetated), juvenile black sea bass have been recently reported to be common at the mouths of small salt marsh creeks in New Jersey (Hales and Able 1994). Hales and Able (1994) also report that these young of year stay within a limited area after they settle within their estuarine "nursery" area. This habitat fidelity can be significant to survival and health if it means they are hesitant moving from a settlement area during some period of stress (Steimle pers. comm.).

The diets of adult sea bass strongly suggest that their habitat needs must include surrounding "non-reef" habitats where they commonly feed, especially on small rock crabs, sand shrimp, razor clams, and similar open-bottom prey (Steimle pers. comm. from observations from several collections of black sea bass from artificial reefs). Steimle and Figley (in press) note that the only specific reef-associated prey, found in the stomachs of 265 adult sea bass collected from two artificial reefs off souther New Jersey, were a few juvenile cunner. This suggests to the authors that black sea bass may use reefs for shelter or other reasons but are not dependent on the epifauna colonizing reef habitats for food. The shelter offered by the reef habitat can support feeding, however, by reducing the black sea bass's exposure to predation while feeding on crabs near the reef. This suggests that the availability of off-reef forage is an important consideration when planning the use of artificial reefs as part of any management strategy for black sea bass (Steimle and Figley in press).

During seasonal migrations, black sea bass habitat needs should be similar to scup, summer flounder, northern sea robin and spotted hake, a species assemblage in which they are closely associated from trawl catch data (Musick and Mercer 1977).

According to Steimle (pers. comm.) researchers at the University of Connecticut (Mark Dixon, Peter Auster and Lance Stewart) believe that empty hinged clam shells (e.g. surf clams or ocean quahogs) in beds or patches may provide essential habitat for juvenile black sea bass after they leave the estuaries in the fall

and have to survive until the spring on the basically flat sand bottom of the coastal and offshore Mid-Atlantic Bight. The recognition, definition and protection of these possibly critical juvenile "wintering grounds" needs further exploration.

As identified by many of the states, black sea bass use artificial habitat as well as natural structures. A preferred alternative in this plan calls for the establishment of a process for implementing Special Management Zones (SMZs) in order to regulate black sea bass harvest around artificial reefs. The concept is that the permit holder for an artificial reef established in federal waters would petition the Mid-Atlantic Fishery Management Council for SMZ designation based on site specific factors. The process is to be based on that established in the South Atlantic Fishery Management Council's Snapper/Grouper Fishery Management Plan, and as recommended by the ASMFC Artificial Reef Committee. Many artificial reefs, including those constructed by State governments, are located in the EEZ. If management measures are needed to control fishing on and around those artificial reefs, they must be developed through an FMP. Providing a process through which the Council can develop these measures on a case by case basis is an efficient way of achieving this control.

In June of 1995 the Council adopted the following five policy statements regarding artificial reefs:

1). Each new EEZ artificial reef site proposal must have a stated conservation and management objective.

2). The MAFMC endorses the National Artificial Reef Plan (1985) and encourages staff to work with ASMFC, NMFS, and the States in the updating of plan.

3). Only materials identified and acceptable in either the National Artificial Reef Plan (1985) or the Reef Material Criteria Handbook (1992) or revisions thereof should be used for the creation of artificial reefs.

4). No fishery management regulations may be implemented for any artificial reef in the EEZ without concurrence by the MAFMC.

5). The Council will attempt to facilitate communication on the siting of any new artificial reef in the EEZ with various user groups of the proposed site.

These five policy statements should help facilitate Federal, State, and local activities in the Mid-Atlantic and can only be beneficial to the ocean and coastal habitats.

Artificial reefs are being constructed in the Atlantic and Gulf of Mexico for several reasons, including to address a presumed habitat limitation for black sea bass and other reef-fish (Steimle pers. comm.). Besides harvest regulation, recent theories on factors that limit the maintenance of reef-fish populations put more emphasis on juvenile recruitment than on adult habitat limitation (Bohnsack 1989). This suggests that the habitat needs of adults to maintain sustainable populations of reef-fish, such as black sea bass. Habitat protection and enhancement efforts for black sea bass perhaps should be refocused (summer and winter) to this critical portion of the population (Steimle pers. comm.).

Steimle (pers. comm.) also suggests that some man-made estuarine habitats, such as abandoned piling fields, may be important to black sea bass juveniles, and other species, because they replace the habitat functions lost elsewhere, e.g., by bulkheaded and filled salt marsh. The function of these man-made habitats should be evaluated and perhaps replaced before or while they are removed to "restore" any habitat.

6.2. HABITAT CONDITION

Black sea bass are exposed to the full range of human activities and environmental conditions 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).

A recent study by Steimle *et al.* (1994) has found that important black sea bass prey, such as rock crabs, sand shrimp, and other benthic invertebrates collected in the New York Bight apex contained high concentrations of several potentially toxic metals. Concentrations were especially high near the former 12-mile, sewage sludge disposal site. Black sea bass that are seasonally resident or transient through this area are at risk from eating this prey (Steimle pers. comm.).

Generally, the nation's most contaminated estuaries are in highly urban areas (Turgeon *et al.* 1989) such as those around much of the Mid- Atlantic coast. Turgeon *et al.* (1989) describe concentrations of toxic metals and toxic organics in Long Island Sound and relate them to nation wide levels as found in mussel tissues and fish livers, however since the fish were not specified, it is unknown whether black sea bass 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 black sea bass were sampled for concentrations of selected chemical contaminants, as well as indicators of potential biological effects from 20 sites throughout the northeast region. Unfortunately, no data specific to black sea bass are presented.

Most research on the toxicological effects of various contaminants in fish is recent and ongoing. Many anomalies probably have not been described or their magnitude documented. The Councils encourage fishermen to report or provide fish 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 02543 (508-548-5123).

Chemical contaminants of coastal waters include inputs from municipal and industrial wastewater, agricultural pesticides and fertilizers, animal waste, urban nonpoint sources, stormwater runoff and atmospheric deposition. Within the Mid-Atlantic region (Cape May to Cape Fear, as defined in the Mid-Atlantic Marine Research Plan 1994), there are more than 75 coastal counties and cities that have one or more publicly owned treatment works discharging to coastal waters. Toxic components of these contaminants include heavy metals such as lead, cadmium, chromium, zinc, copper, silver and mercury, and organic compounds such as DDT, chlordane, polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs). All of these compounds are generally due to discharges to coastal waters from human activities, although there are some cases of natural concentrations. In the Mid-Atlantic region, northern Chesapeake Bay (especially Baltimore Harbor) and the Elizabeth River in Virginia contain the highest levels of these contaminants except for DDT (Mid-Atlantic Marine Research Plan 1994). Lead, silver, zinc, DDT, chlordane, and PCBs have high concentrations at sites within Delaware Bay (Figures 6-9). DDT, chlordane and PCBs are now banned for the most part, but continue to exist in the environment and are used in other countries. Atmospheric deposition of toxins such as pesticides and PCBs may be more of a problem in marine waters than on land, since there may be more bioconcentration of pesticides and PCBs in marine food chains (NRC 1993). The National Research Council recommends source control of pollutants, since many toxic substances are difficult and/or expensive to remove from wastewater.

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

systems are needed to conserve habitats and living marine resources, while facilitating the completion of necessary, compatible economic developments.

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

The Regional Action Plan process identified six water management units in the Northeast region (Figure 10). 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 Outer Continental Shelf (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 black sea bass 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) identified environmental threats as potential issues that may affect the black sea bass 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. Environmental and socio-economic issues remaining to be resolved satisfactorily with regard to their impacts on marine organisms, their habitats, and man developed from the multiple, often conflicting uses of coastal lands and waters.

6.3.1.1. Waste Disposal and Ocean Dumping

The Atlantic Ocean off the northeastern United States has been 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 recent potentially serious problem is the at sea incineration of toxic

wastes.

Ocean disposal of sewage sludge, industrial waste products, dredged material, and radioactive wastes degrades water quality and associated habitats. The deep water dump site is 106 miles offshore off the mouth of the Hudson River due east of central New Jersey. Concentrations of heavy metals, pesticides, insecticides, petroleum products, and other toxics all contribute significantly to degradation of waters off the northeastern States. Organic loading of estuarine and coastal waters is an emerging problem. Symptoms of elevated levels include excessive algae blooms, shifts in abundance of algal species, biological oxygen demand (BOD) increases in sediments of heavily affected sites, and anoxic events in coastal waters. Changes in biological components are a consequence of long term ocean disposal. Harmful human pathogens and parasites can be found in biota and sediments in the vicinity of ocean dump sites. In addition, shellfish harvesting grounds have been closed because of excessive concentrations of pathogenic and indicator species of bacteria.

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

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

6.3.1.2. Coastal Urbanization

Half of the human population makes its home within 60 miles of one ocean or another (Zero Population Growth Reporter 1994a). In the US, the home is often accompanied by: a car, and an oil leak that trickles into the nearby stream and down to the shore; a lawn, showered with pesticides that wash "away" in the rain; a neighboring farm, and manure that seeps down to the bay, firing an algae bloom; and a paper mill, spilling traces of toxic dioxin into the river. The list goes on.

The US population rose 85 percent within 50 miles of the coastlines between 1940 and 1980, compared to 70 percent for the nation as a whole (Zero Population Growth Reporter 1994b). To accommodate development and create beach view property, mangroves, marshes and dunes are torn away. Some 110 million Americans live in marine coastal zones,and their number is growing. Each year more beaches close because of contamination as waste from overloaded sewage systems is dumped into oceans. In 1992, the 60 million Americans that live along the Atlantic coastal region saw 1,713 beach closings.

The US Census Bureau projects that by the year 2000, the US population will reach 275 million, more than double its 1940 population. The United States has the third highest population in the world.

The U.N. Food and Agriculture Organization now estimates that all 17 of the world's major fishing areas have either reached or exceeded their natural limits, and that 9 are in serious decline (Postel 1994). It is widely acknowledged that many of the North Atlantic fisheries are seriously depleted and arguments rage over who is to blame. Pogo had the answer: "We have met the Enemy, and he is Us."

Brouha (1994) points out our dilemma and states: "All our scientific work will be for naught if world human population growth and resource consumption are not stabilized soon. Unchecked growth, subsidies that support unsustainable resource use, and natural resource policies focused on short-term economic gains have created a conundrum for the long-term economic integrity and productivity of global

ecosystems."

Ehrlich (1990) states the problem best: "No matter how distracted we may be by the number of problems now facing us, one issue remains fundamental: Overpopulation. The crowding of our cities, our nations, underlies all other problems."

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.

Turek *et al.* (1987) identified numerous studies that have correlated freshwater inflows and fishery resource production. Salinity is a primary ecological factor regulating the distribution and survival of marine organisms. The amount of freshwater entering an estuary determines physicochemical variables (e.g. salinity, temperature, and turbidity) directly affecting physiological processes in organisms. Salinity is a primary factor regulating estuarine primary production. In addition, salinity governs fish distribution by secondarily restricting predator distribution (Turek *et al.* 1987).

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

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

Excessive turbidities can abrade sensitive epithelial tissues, clog gills, decrease egg buoyancy, reduce light

penetration; thereby affecting photosynthesis of phytoplanktonic and submerged vegetation, and cause localized oxygen depression. Suspended sediments subsequently settle, which can destroy or degrade productive shellfish beds and nursery sites.

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

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

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

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

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

6.3.1.3. Energy Production and Transport

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

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

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

6.3.1.4. Port Development and Utilization

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

6.3.1.5. Agricultural Development

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

6.3.1.6. Marine Mineral Extraction

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

Coastal sand mining to support beach restoration projects is another potential threat to consider, especially since the habitat needs of overwintering juveniles are so poorly understood. It may be important for these projects to avoid areas that are rich in clam shells or near other "reef" habitats (Steimle pers. comm.).

6.3.1.7. Other Effects of Nonpoint Pollution (NPS)

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

6.3.1.8. Coastal and Wetland Use and Modification

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

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

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

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

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

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

The NMFS 1985 priorities on the multiple use issues and threats to living marine resources were identified in the RAP document (USDC 1985). Activities identified as high priority included urban and port development, ocean disposal, dams and agricultural practices. Medium priority activities included industrial waste discharges, domestic waste discharges, and OCS oil and gas development (Table 8). These priorities are currently being re-evaluated (Peterson pers. comm.).

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

According to Steimle (pers. comm.) there have been reports from the artificial reef experts in New York and New Jersey (Steve Heins and Bill Figley) that some past or current reef habitats, especially older wrecks or mussel beds, in parts of the Mid-Atlantic are being purposely destroyed or flattened to facilitate the unobstructive use of "rock-hopper" trawls targeting reef-fish such as black sea bass and tautog. Some wreck salvage operations can be highly destructive to reef habitat value, as well. Reduced-profile reefs are less attractive and useful as habitat for reef-fish, including black sea bass, and are more prone to being covered by sediments and lost as functional habitat. This threat is the reason that roller rig size is limited for the preferred alternative.

The loss of traps or nets on reef habitats, which continue to ghost fish, is another habitat threat that is partially dealt with by rapidly degraded panels on traps. Snagged trawl or gill nets on reef wrecks also increase the loss of hooked fishing gear and lead weights on reefs, which further contributes to the degradation of habitat value, and possibly increases the likelihood of metal contamination (Steimle pers. comm.). Steimle (pers. com.) proposed that lost nets can be retrieved by divers, and a coded tag marking

system, associated with licenses, on nets could facilitate assigning responsibility.

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

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

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

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

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

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

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

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

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

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

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

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 meetings have been held with these agencies during the development of this FMP and its Amendments. Several projects (Cedar Island development, marina development in Ocean City, Dam Neck dredge spoil disposal, Assawoman canal dredging, etc.) have been commented on and modified because of impacts to habitat for species managed by MAFMC.

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

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

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

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

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

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

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

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

COUNCIL HABITAT RESPONSIBILITIES

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

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

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

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

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

GUIDELINES

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

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

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

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

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

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

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

Project Review Process

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

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

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

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

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

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

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

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

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

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

Criteria to Define Significant Projects

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

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

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

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

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

6.6. HABITAT PRESERVATION, PROTECTION AND RESTORATION RECOMMENDATIONS

Management of fisheries requires both control of fishing mortality (by the Councils) and preservation and restoration of habitat (by the States, 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, black sea bass are overexploited. Recognizing that black sea bass are 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."

Black sea bass are dependent on estuarine habitats for much of their life (section 6.1). It is precisely these habitats that are most vulnerable to anthropogenic impacts and loss. It is probable that fishing mortality rates on black sea bass may be the primary reason for the declines noted. However, the critical habitat areas designated by the States (section 6.1.2) must be protected in order to allow black sea bass populations to rebuild and be maintained when fishing mortality rates are reduced.

In order to resolve the above problems and prevent overfishing for this species, 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 fishing mortality and reduce that component of risk through the Magnuson Act.

Equally important to reducing risk is the quality of the habitat. In this area the primary Federal responsibility is that of EPA and the Corps of Engineers, since the Magnuson Act only allows the Council the right to comment on proposals. Spawning and nursery areas and migratory pathways must be protected and kept viable if the 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 (section 6.5) to oppose any loss of aquatic habitat or wetlands which contributes to the conservation of fish stocks. Where loss of habitat is unavoidable locally, the Council endorses recreation of quantitatively and qualitatively equivalent habitat. The Council recognizes the multiple resource base of our coastal areas and recognizes the need to accommodate other natural resource management objectives with special sensitivity to goals that may be contrary to the objectives of fishery management. The intent of the Council is to support no net loss of fishery habitat while minimizing all detrimental alterations of these essential habitats.

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

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 black sea bass. 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 black sea bass should be preserved by encouraging management of conflicting uses to assure access by the fish to essential habitat and maintenance of high water quality standards to protect black sea bass migration, spawning, nursery, overwintering, and feeding areas.

2. Filling of wetlands should not be permitted in or near nursery summering areas. Mitigating or compensating measures should be employed where filling is unavoidable. Project proponents must demonstrate that project implementation will not negatively affect black sea bass, 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 black sea bass, their habitat, or their food sources.

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

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

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

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

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

5. Ocean disposal of fish waste should not be allowed in any areas where environmental harm may occur. The burden of proof that no environmental harm exists should be on the entity proposing the disposal. An environmental monitoring program to characterize the proposed site prior to, during, and after disposal

occurs must be undertaken and is the financial responsibility of the entity benefiting from the use of the ocean environment. As an example, the dumping of fish wastes in areas of surf clams or scallops could provide enrichment that could trigger undesirable organisms, such as algea which produce poisoning (PSP).

6. The siting of industries requiring water diversion and large volume water withdrawals should be avoided in black sea bass critical areas. Project proponents must demonstrate that project implementation will not negatively affect black sea bass, their habitat, or their food supply. Where such facilities currently exist, best management practices must be employed to minimize adverse effects on the environment. All Federal and State agencies regulating projects which alter freshwater inflows should consider the cumulative effects to estuarine production in their decision-making processes.

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 black sea bass. Any new potential discharge into critical areas must be shown not to have a harmful effect on black sea bass. 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 black sea bass migratory passage and feeding and to maintain edible black sea bass; 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 black sea bass 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.

6.7. HABITAT RESEARCH NEEDS

The National Status and Trends Program of NOAA (USDC 1987 and 1989) 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 1987 and 1989). 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 black sea bass 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 black sea bass; studies on the interactive effects of pH, contaminants, and other environmental variables on survival of black sea bass; and continued studies on the importance of factors controlling the production and distribution of food items that appear in the diet of young black sea bass.

7. DESCRIPTION OF THE FISHERIES

7.1. DOMESTIC COMMERCIAL FISHERY

Commercial landings of black sea bass have been recorded since the late 1800's. These data indicate that commercial landings north of Cape Hatteras varied around 6 million pounds from 1887 until 1948 when they increased to 15.2 million pounds (NEFSC 1992). Reported landings increased to a peak of 22 million pounds in 1952, declined to 1.3 million pounds in 1971, and in recent years have fluctuated between approximately 3 and 4 million pounds (Figure 11).

Since 1983, commercial black sea bass landings have averaged approximately 3.6 million pounds per year or 42% of the total landings, recreational and commercial landings combined (Table 9). In 1992, fishermen landed approximately 6.3 million pounds of black sea bass of which commercial landings accounted for approximately 3 million pounds. This represents a decline from 4.3 million pounds, the largest amount of black sea bass landed by commercial fishermen during the period 1983 to 1992.

Traditionally, two gears, fish otter trawls and fish pots/traps have accounted for the majority of commercial landings on a coastwide basis. These two gears accounted for nearly 90% of the landings from 1983 to 1992 (Table 10). Other important gear include hand lines (5%) and lobster pots (1%).

Otter trawls, which harvested 56% of the black sea bass coastwide, accounted for the majority of the black sea bass landings in most states with the exception of Massachusetts, Delaware and Maryland (Table 11). Fish pots and traps accounted for the majority of the landings in these states. In addition, hand lines harvested a significant proportion of black sea bass in Massachusetts, New York, Virginia and North Carolina.

During the period 1983 to 1992, the proportion of black sea bass harvested by otter trawls has generally declined (Table 12). In 1984, otter trawls accounted for over 75% of the landings whereas in 1991 less than 25% of the sea bass landed commercially were harvested by this gear. Conversely, the percent of sea bass caught by fish pots and traps has generally increased with almost 62% of the landings attributable to this gear in 1991.

In 1992, approximately 88% of the commercial landings came from the EEZ (Table 13). Coastwide, from 1983 to 1992, an average of 84% of the sea bass landed commercially came from federal waters. By subregion, EEZ landings were predominant in the Mid-Atlantic area each year from 1983 to 1992 (Table 14). In New England, the landings were almost equally divided between state and federal waters from 1983 to 1987 with a predominance in state waters from 1988 to 1991. In 1992, EEZ landings accounted for 64 and 89% of the landings in the New England and Mid-Atlantic regions, respectively. North Carolina landings of black sea bass came almost exclusively from the EEZ during this time period.

Based on average monthly landings for the period 1983-1992, most black sea bass were harvested in federal waters from January through May with peak landings in February (Table 15). In state waters, landings peaked in May. Coastwide, in state and EEZ waters combined, landings peaked in February with

a ten-year average of 501 thousand pounds.

In 1992, 76% of the total commercial landings of black sea bass came from three states: New Jersey (41%), Maryland (15%), and Virginia (19%) (Table 16). Based on a ten year average, New Jersey and Virginia were the predominant states accounting for 26% and 24% of the landings, respectively (Table 17).

7.2. DOMESTIC RECREATIONAL FISHERY

Saltwater angling surveys were conducted for the entire Atlantic coast in 1960 (Clark 1962) and 1965 (Deuel and Clark 1968) by the US Fish and Wildlife Service and in 1970 (Deuel 1973) by the National Marine Fisheries Service. Beginning in 1979 and continuing to present, the NMFS has conducted annual Marine Recreational Fishing Statistical Surveys (MRFSS). This survey is designed to expand interview data on catch and angler effort from both on site creel census and telephone surveys to state and regional levels. The MRFSS distinguishes between fish available for identification and measurement by the interviewers (Type A), fish used as bait, filleted, or discarded dead (Type B1), and fish released alive (Type B2). The sum of types A, B1, and B2 comprise the total recreational catch whereas types A and B1 constitute total recreational landings.

The NMFS is in the process of recalculating MRFSS estimates of catch and effort using an improved methodology to make estimates more accurate. Revisions to the entire time series should be completed by early 1995. Because only more recent years had been revised at this point, recreational catch estimates reported in this document are based on the old methodology to maintain comparability between years. Recreational fishermen caught 8.9 million black sea bass in 1992; they landed approximately 4 million (Table 18). However, both the recreational catch and landings were below the ten year average values of 11.8 and 7.1 million, respectively. The total weight of recreational landings in 1992, approximately 3.2 million pounds, was also less than the ten year average of 5 million pounds (Table 19).

Substantially more black sea bass were landed in the Mid-Atlantic than in either New England or North Carolina during each year from 1983 to 1992 (Table 19). In the Mid-Atlantic, the number of black sea bass landed ranged from a low of 2.3 million in 1984 to a high of 23.1 million in 1986. During most years, black sea bass landings in North Carolina exceeded those in all of New England.

Recreational fishermen in the Mid-Atlantic landed more sea bass from the EEZ in 1992, with 63% of all sea bass landed in the Mid-Atlantic (Table 20). Based on a ten year average, EEZ landings were predominant in the Mid-Atlantic and North Carolina accounting for 58% and 69% of the landings, respectively. However, state landings were predominant in the North Atlantic for most years during the period 1983 to 1992.

Recreational fishermen on party or charter boats in the EEZ landed, on average, approximately 2.4 million black sea bass in the Mid-Atlantic (Table 21). This mode represented the largest portion of the landings by mode and distance from shore in the Mid-Atlantic and also accounted for most of the black sea bass landed from Maine to North Carolina, state and federal waters combined. A similar pattern was observed by weight with most black sea bass, approximately 2.6 million pounds, landed by recreational fishermen in the Mid-Atlantic using party or charter boats (Table 21).

Anglers in Virginia caught the highest percentage of all black sea bass caught by recreational fishermen along the Atlantic coast, catching 33% of the total number of black sea bass caught by Atlantic coast anglers in 1991 (Table 22). The recreational catch in Virginia and two other states, New Jersey and Maryland, accounted for nearly all of the coastwide recreational catch in 1991. In addition, sea bass accounted for over 10% of all fish caught by anglers in New Jersey, Delaware and Maryland. Few if any black sea bass were caught by anglers fishing in states north of New York.

8. ECONOMIC CHARACTERISTICS OF THE FISHERY

Black sea bass is an important component of the commercial and recreational fisheries from Massachusetts to North Carolina. The economic characteristics of the commercial and recreational black sea bass 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. Ex-vessel value in the commercial sector is thus a measure of processor and wholesaler willingness to pay for black sea bass in the dockside market. Likewise, retail value is a measure of final consumer willingness to pay for black sea bass 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, black sea bass 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 and marketing of black sea bass make expenditures and generate employment in the course of business activities, just as participants in the recreational fishery do. Black sea bass have economic value in both recreational and commercial uses and black sea bass related activities have economic impact in each use.

When considering the relative benefits of black sea bass 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 ex-vessel 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

As a general rule, commercial fisheries are divided into three different components: harvesting, processing and marketing. Different degrees of specialization and integration within each of these components exists among different fisheries. That is, 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 intent of the following section is to examine each component in order to better understand the black sea bass fishery.

8.1.1. Harvesting Sector

8.1.1.1. Ex-vessel value and price

Commercial landings of black sea bass decreased approximately 10% from 3.3 million pounds in 1983 to 3.0 million pounds in 1992 (Table 9). Commercial landings in 1992 were 7% above the 1991 level and 16% below the 1983-1992 mean. The commercial ex-vessel value for black sea bass in 1992 was approximately $3.2 million (Table 23). The ex-vessel value for commercial landings in 1992 was about 23% higher than in 1983 (Table 23). The value of commercial landings in 1992 indicated a 10% decrease from the 1991 level and a 13% decrease from the 1983-1992 mean. Adjusted average prices (1992 dollars) for black sea bass increased from $0.85 per pound in 1983 to $1.05 per pound in 1992 and ranged from $0.85 per pound to $1.32 per pound for the 1983-1992 period (Table 24).

A record high average price (all sizes) for black sea bass occurred in 1989 in both nominal and inflation adjusted (1992) dollars (Table 24). Price fluctuations were likely associated with supply responses; generally it was found that higher prices corresponded to significant decreases in landings. On a monthly basis, the supply-price relationship was also evident. As expected, an inverse relationship between landings and average ex-vessel prices was found with overall higher prices corresponding to months with lower landings (Table 25).

The value of black sea bass relative to the value of total landings in 1992 varied for each state from less than 1% (Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, Virginia and North Carolina) to about 3.8% of the total value of landings in Delaware (Table 26).

Prices received for black sea bass harvested in state waters were generally higher than for black sea bass harvested in EEZ waters throughout the year (Table 25). Prices received by fishermen tracked the seasonal supply relationship for black sea bass caught in state waters as well as in EEZ waters. The 1992 coastwide average exvessel price per pound for jumbo black sea bass was $2.76, $2.33 for large, $1.33 for medium, $0.55 for small, $0.42 for pins, and $1.21 for unclassified (Table 27). Price differentials in 1992 indicate that the exvessel price per pound for large black sea bass was 324% greater than for small, and 455% greater than for pins.

8.1.1.2. Fishing Vessel Activity

At the present time there is no annual permit requirement for commercial fishing vessels taking black sea bass within US waters. Without individual logbooks, information on the total number of vessels actually landing black sea bass (or the extent of dependence on black sea bass) is difficult to assemble. The NMFS weighout system records can be used to estimate the number of vessels landing black sea bass in covered states (NC is not included). However, the data do not constitute a complete census. NMFS weighout files indicate that 465 vessels employing diverse types of gear landed black sea bass in 1992. This statistic provides a lower boundary for the number of commercial vessels involved in the black sea bass commercial fishery. In 1992, there were about 80-100 vessels that could have participated in the black sea bass fishery in North Carolina (R. Monaghan pers. comm.). Thus, the number of vessels that could fish for black sea bass could range from 545 to 565 vessels. It is likely that most of the vessels that qualify for black sea bass permits would apply for them in order to maintain flexibility of fishing operations pending the availability of species, or to maintain eligibility given concerns about a potential limited entry program.

In 1992, 340 otter trawl vessels landed black sea bass that were recorded in NMFS weighout records (Table 28). Black sea bass represented 2% of the total pounds landed and 4% of the total exvessel value of all otter trawl trips harvesting 100 pounds or more of black sea bass in 1992 (Table 29). The top ten species (by weight) contributed 89% and 90% respectively, of the total pounds and the total value of the harvest of otter trawl vessels landing 100 pounds or more of black sea bass. When considering the value per pound of these species (obtained by dividing total value by total pounds) black sea bass had the third largest exvessel value per pound.

Based on trips landing more than 100 pounds of black sea bass, the average ex-vessel black sea bass value per trip was $805 (obtained by dividing ex-vessel value by number of trips in 1992). Otter trawl vessels which land black sea bass also harvest other species throughout the year. This activity categorizes this type of fishery as a mixed fishery, where squid, summer flounder, scup, silver hake, angler and other species are harvested on the basis of availability (opportunistic fishery), or land black sea bass as a bycatch from the involvement in other directed fisheries.

In 1992, black sea bass represented 0.2% of Atlantic coast total commercial landings, and 0.3% of the total value (Table 26). Black sea bass ex-vessel value was highest in New Jersey ($974,000), followed by Virginia ($705,000), Maryland ($429,000), and North Carolina ($385,000). However, when black sea bass value is compared to the total value of all species landed in each State, one finds that black sea bass was most important to Delaware, at 3.8% of the total commercial revenue, followed by Maryland (1.2%) and New Jersey (1.0%). Delaware, Maryland and New Jersey accounted for 63% of all black sea bass harvested in 1992 (Table 26).

Activities at the port level indicate that 70% of all black sea bass commercial landings occurred in five ports: Cape May, New Jersey; Hampton Roads, Virginia; Ocean City, Maryland; Montauk, New York; and Point Judith, Rhode Island. The degree of port reliance on black sea bass is low throughout the region. Black sea bass landed value as a percent of total port landed value was: 2.02% for Cape May; 1.66% for Hampton Roads; 4.69% for Ocean City; 0.62% for Montauk; and 0.35% for Point Judith (Finlayson and McCay 1994) .

8.1.1.3. Fishing Costs

Vessel costs are composed of ownership costs and operating costs. Ownership costs are incurred once the durable goods are purchased. These are added costs whether or not the assets (equipment/materials) are used in the production process, that is they remain constant regardless of the output level. Ownership costs are frequently referred to as "fixed costs." They include depreciation, debt, insurance, routine maintenance, and insurance, among others. Operating costs are incurred when the production process occurs. These costs are commonly known as "variable costs." They include fuel, oil, maintenance, wages, food, sale and unloading fees, among others.

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 black sea bass (home port, tonnage class, directed fishery, etc.), exact cost information is difficult to obtain and generally applicable only to a hypothetical "average" vessel.

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 predetermined, set ratio. Ratios are in many instances set according to what is traditional in that port. The particular ratio of the lay system utilized varies between vessels. Often certain expenses such as fuel, ice and in some cases food are deducted from the gross revenues with the remainder divided about 60-40 between the vessel owner and the captain and crew (A. Kitts pers. comm.). When one or the other of the parties is responsible for additional costs, the share split normally reflects this.

Fuel costs vary among ports. As of May 1994, diesel fuel costs for selected ports in the Mid and North Atlantic ranged from about $.60 per gallon to $1.10 per gallon, with an average of $.75 per gallon (A. Kitts pers. comm.). Total vessel fuel costs are directly proportional to the amount of time spent steaming and fishing as well as the size and drag of the fishing gear used.

Ice costs also vary among ports. On a per-ton basis, ice costs $50 in Boston, MA; $35 in Gloucester, MA; $75 in Montauk, NY; and $40 in Cape May, NJ. Typically ice costs will range from $40 to $70 coastwide (A. Kitts 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 number of 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 this 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, etc. Lumpers fees are variable among ports. In Point Judith, RI the cost is $6 per 1,000 lbs (McCauley pers. comm.), $3 per 1,000 in Cape May, NJ (C. Bergman pers. comm.) and $5 per 1,000 lbs in Newport, RI (A. Kitts pers. comm.). In Montauk (NY) lumpers fees are not applicable, since the fish are boxed at sea (A. Kitts pers. comm.). The market charges $.10 per pound for unloading and packaging in Cape May, with transportation charges between $.06 to $.07 per pound (C. Bergman pers. comm.). In Point Judith unloading charges will depend on the value of the fish unloaded. Costs associated with washing, sorting, and packing black sea bass in a carton with ice (including labor) are between $.08 to $.10 per pound. Transportation charges range from $.05 and $.07 per pound (J. McCauley pers. comm.).

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.

Fishing costs for pound nets, fish traps, and hand line operations are much less than costs for otter trawlers (Norton *et al.* 1983). There are no studies addressing black sea bass fishing costs by type of

gear. Fishing costs of commercial striped bass harvesters using fish traps and hook and line gear were developed by Norton *et al.* (1983). The design of floating traps allows for the harvesting of species such as scup, butterfish, squid and fluke. Fish trap fishermen typically use 70 ft vessels with major expenditures for wages (41%) followed by nets (15%) and taxes (14%). Hook and line fishermen typically use a small boat (17 ft average), have major expenses of wages (35%), fuel (16%), and tackle (16%) (Norton *et al.* 1983).

Estimates of vessel costs based on sea sampling data of otter trawl vessels landing mackerel from Maine to Virginia were developed by Walden (1993). In Walden's study, costs were broken down into trip costs or variable costs (fuel, ice and food, etc.) and yearly costs or fixed costs (insurance, engine and gear repair, electronic equipment expenses, etc.). Labor costs were not included in the analysis because labor is generally paid as a percentage of the total revenue after certain expenses are subtracted. Table 30 summarizes estimated average cost data for otter trawlers that operated in the mackerel fishery developed in Walden's study. Otter trawl vessels involved in the squid and black sea bass fishery may generally have similar equipment to the otter trawl vessels in the mackerel fishery. The cost data results developed by Walden might be used to an extent when analyzing cost data for otter trawl vessels in the black sea bass fishery. Vessels that participate in mixed fisheries have their fixed costs distributed over various activities. Utilization of such fixed costs to evaluate the financial performance of a vessel in only one fishery would yield inappropriate results.

An analysis by Buss and Kitts (1994) utilized three data sources (Capital Construction Fund files, Northeast Fisheries Science Center Weighout Files and Northeast Fisheries Science Center Master Vessel Files) to compile a data base containing information regarding revenues, landings, and expenditures for vessels operating in the US Northeast Atlantic coast for the period 1983-1992. Preliminary results from Buss and Kitts' (1994) work indicated that costs as a percent of total gross revenues (from tax return files) for trawlers in the following categories were: trip costs (fuel, oil, ice, water, food, etc.) 18.3%; other variable operating expenses (gear, supplies, freight, payment to lumpers, auction fee, etc.) 5.9%; indivisible operating expenses (insurance, licenses and permits, office expenses, taxes (not income), utilities (telephone), etc.) 16.8%; insurance cost 7.7%; crew share 36.9%; salary (payment to officers) 6.2%; and employee benefits 6%. Since expenses are recorded by individuals differently in tax forms, missing information was treated as missing values, therefore the above percentages do not add up to 100. The economic interpretations of the data provided by Buss and Kitts have limitations. Two significant drawbacks are: 1) data are based on tax returns and techniques dealing with different aspects of the return can vary significantly from one return to the next and 2) the data set does not fully represent the population of Northeast fishing vessels and results in the analysis are probably more applicable to more profitable vessels or "highliners" (Buss and Kitts 1994).

8.1.2. Processing Sector, Marketing and Consumption

Most black sea bass are sold fresh (R. Boragine and R. Ross pers. Comm.). The catch is generally refrigerated or iced during long trips and might or might not be iced during short trips. When the catch arrives at the dock, it is sorted, washed, weighed, and boxed and iced for shipment. Black sea bass might be frozen for future marketing when demand is low or when the market is glutted. When black sea bass is frozen, processing is minimal, mainly consisting of handling and freezing. Boxes containing black sea bass for shipment typically weigh 100 pounds, however, higher value black sea bass may be boxed in 60 pound cartons (J. McCauley pers. comm.).

Black sea bass are generally transported to market by truck. Black sea bass is carried as a specialty item in the Fulton Fish Market in New York City, with supplies peaking during the spring and fall months, then decreasing during the summer and reaching yearly lows during the winter months (Finlayson and McCay 1994).

Finlayson and McCay (1994) reported that "black sea bass dealers in the Fulton Market would pay and charge the highest prices for hook and line-caught fish, somewhat less for pot-caught fish, and the least for dragger-caught fish." This price differential appears to be associated with the quality and appearance of the product.

The greatest proportion of small black sea bass go to dealers in Philadelphia, Washington, Baltimore and points south (Finlayson and McCay 1994).

8.1.3. Economic Impact of the Commercial Fishery

The economic impact of the commercial black sea bass fishery as it relates to employment and wages is difficult to determine given the nature of the fishery. Since, black sea bass represents 0.2% of the total landings and 0.3% of the total value of all finfish and shellfish from North Carolina to Maine, it can be assumed that only a small amount of the region's fishing vessel employment, wages and sales is dependent on black sea bass.

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

The participation of black sea bass anglers by region and mode indicates that from 1983 to 1992, 68% of black sea bass (by number) were caught from party or charter vessels (Table 21). Anglers expenditures in the party boat industry will benefit the party boat industry as well as other businesses in the coastal communities.

In addition to party and charter vessels, 3% of black sea bass were caught from shore, and 29% from private/rental boats (Table 21). 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 black sea bass trips to account for multipurpose use.

At the present time, annual permit requirements for party and charter boats (vessels for hire) which take anglers to fish for black sea bass within the US EEZ do not exist. Without individual logbooks, the total number of party and charter vessels actually directing trips on scup 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 31). These vessels generated revenues of $101 million in 1985. Estimates of party and charter boat trips directed at black sea bass are lacking for specific regions along the coast.

In 1993, a random sample of 821 New Jersey marine recreational fishermen (regardless of mode) indicated that black sea bass was targeted by 3% of the recreational fishermen (B. Brown pers. comm.). Strand *et al.* (1991) estimated that in the latter half of the eighties, black sea bass was the second most popular bottomfish targeted by anglers intercepted in New Jersey.

The National Marine Fisheries Service estimated that in 1991, a total of 15,903,000 trips were taken by marine recreational anglers in the Mid-Atlantic region (USDC 1992). Intercept surveys show that 1.85% of the anglers interviewed indicated that they preferred or sought black sea bass as the primary species targeted in the Mid-Atlantic. That is, an estimated 294,206 angler trips (all modes) were nominally directed at black sea bass in the Mid-Atlantic region in 1991.

8.2.2. Economic Impact of the Recreational Fishery

In 1985, direct sales related to marine recreational fishing for all species from North Carolina to Maine

amounted to over $1.8 billion. Angler purchases or expenditures generate and sustain employment and personal income in the production and marketing of goods and services bought. These sales and services required an estimated 30 thousand person-years of labor and generated wages of $370 million (SFI 1988). These estimates correspond to all marine recreational fishing and help to illustrate the relative importance of the recreational fishery. Unfortunately, estimates of the economic activity specifically associated with black sea bass were not provided separately, but were combined with other species. Furthermore, the fact that fishermen may target more than one species or may incidentally encounter other fish creates difficulty when addressing the direct economic impact associated with a single species.

8.2.3. Value of Black Sea Bass to Anglers

Estimates of aggregate economic value for black sea bass are not currently available. The value that anglers place on the recreational fishing experience can be divided into actual expenditures and non-monetary benefits associated with satisfaction (consumer surplus). Anglers incur expenses for fish (purchase of gear, bait, boats, fuel, etc.), but do not pay for the fish they catch or retain nor for the enjoyment of many other attributes of the fishing experience (socializing with friends, contact with nature, etc.). Despite the obvious value of these fish and other attributes of the experience to anglers, no direct expenditures are made for them, hence the term "non-monetary" benefits.

A demand curve for recreational fishing trips for black sea bass is not available. The demand for recreational fishing trips would be determined by travel expenditures, catch rates, costs of equipment and supplies, accessibility of fishing sites, social experience, weather and a variety of other factors affecting angler enjoyment. A decrease in the catch rate or retention rate holding all other factors constant (e.g weather, travel costs, etc.) would move the demand curve to the left. On the other hand, an increase in the catch or retention rate (assuming everything else constant) would shift the demand curve to the right. Each move will have an associated decrease, increase in angler expenditures and total benefits, respectively.

Economic estimates of total expenditures made for fishing are useful for economic impact analysis. In order to estimate the total value (willingness to pay) of black sea bass, an estimate of the marginal value per trip would be required. However, as already mentioned above, in the case of black sea bass, as with many recreational sought species, an aggregate demand curve is not available.

Estimates of the value of a recreational fishing day for salt water angling have been made in several studies. A recent study by Strand *et al.* (1991) provides information about marine recreational fishing in the Middle and South Atlantic. Table 32 presents estimated total cost (travel and services) or estimated value for a recreational fishing day for selected states. The range of average values were $36.00 to $137.00 for party vessels, $59.88 to $222.81 for charter vessels and $40.33 to $53.03 for private vessels.

Other studies have estimated the value of a recreational fishing day for saltwater angling along the Atlantic coast. Value per trip for marine recreational fishing for nine sites in Delaware was estimated by Rockland (1983). The travel cost method with a variety of estimation approaches was employed. On average, the values for boat fishing sites ranged from $20.58 to $39.90 per day, while the range for shore fishing was $37.47 to $62.53 per day. Norton *et al.* (1983) estimated $39 to $169 per day in a study of the recreational striped bass fishery on the Atlantic coast. Bell *et al.* (1982) estimated values from $18.97 to $57.99 per day for all marine species in the state of Florida. It is important to note that the average cost of a black sea bass trip or fishing day is not equivalent to the marginal value of a recreationally caught black sea bass. Attributes of a recreational fishing day other than catching fish are valued by anglers, so all expenditures are not dependent on black sea bass. The marginal value of black sea bass catch must be estimated, and as with any normal good, marginal value declines with increasing quantity.

An estimate of the total expenditures made fishing for black sea bass can be made by multiplying the number of trips taken by an estimate of average cost per day. However, it is not possible to address the non-monetary benefit derived from fishing without more sophisticated statistical techniques enabling an estimate of the marginal value per trip.

The National Marine Fisheries Service recognizes the importance of the proper valuation of fish stock resources by commercial and recreational fisheries. Currently, a survey is being conducted to collect socio-economic data on the people who participate in marine recreational fishing in the Northeast region, which will in turn be employed to estimate statistical models of the demand for marine recreational fishing for eight important recreational species (bluefish, striped bass, summer flounder, Atlantic cod, black sea bass, tautog, scup, and weakfish) (R. Roe pers. comm.).

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 1983-1992 period, 68% of the black sea bass (in numbers) landed by anglers off the Atlantic coast were caught from party or charter boats (Table 21).

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 33). 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 of interest to their clients.

"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 boats are generally licensed 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 which 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 34). It was followed by bluefish (4.6), then summer flounder (3.6), Atlantic mackerel (3.5), and striped bass (3.5). 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).

For party boats, summer flounder ranked as the fish anglers were least successful in catching (mean success = 1.5). It was followed by weakfish and striped bass (1.7), and sharks (other than dogfish) (1.9).

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 stands out by having the largest difference between interest and success values for party boat fishermen (2.1), followed by striped bass and weakfish. Black sea bass showed one of the smallest differences between interest and success value for party boat fishermen (0.3).

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 along with bluefish (Table 34). The top five species were: spot (4.6), large pelagics (3.9), bluefish (3.9), striped bass (3.7), and summer flounder (3.2). The preference for black sea bass for charter boat owners was 2.1.

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 35). 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

Black sea bass occur primarily on the continental shelf of the north-west Atlantic, and there are no imports of this species into the US. International trade of black sea bass is relatively limited. In 1991 about 6,000 pounds valued at $14,377 were exported to Mexico, and in 1992 about 5,000 pounds valued at $11,766 were exported to Mexico, the Netherlands and Switzerland (R. Ross pers. comm.). These figures represent minimum export values. Given the export classification codes employed by the NMFS, it is possible that some black sea bass were exported under the "unclassified" species category.

9. FISHERY MANAGEMENT PROGRAM

9.1. MEASURES TO ATTAIN MANAGEMENT OBJECTIVES

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.

OY is all black sea bass 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 black sea bass 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 conditions in the fishery, F_{max} is 0.29.

Stock assessment information indicates that black sea bass stocks are overfished. Results of a virtual population analysis indicate that the current fishing mortality rates (F) is 1.05 (an annual exploitation rate of 60%).

The Council and the ASMFC Management Board approved a recovery strategy that reduces overfishing on black sea bass over an 8 year time frame. The recovery strategy calls for minimum fish sizes and commercial gear regulations in year 1 and 2. In years 3 to 5, target exploitation rates would be 48% for black sea bass. In years 6 and 7, the target exploitation rates would be 37% and in year 8 and subsequent years, the target exploitation rate would be based on F_{max}. Based on current conditions in the fishery, F_{max} is 0.29 and the associated exploitation rate is 23%. The recovery schedule is as follows:

	Exploitation Rates
Current	60%
Year 3	48%
Year 6	37%
Year 8	23%

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 black sea bass within the US EEZ for sale, or transport or deliver for sale, any black sea bass 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 black sea bass 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 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 black sea bass 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 black sea bass for sale between 26 January 1988 and 26 January 1993 qualify for a moratorium permit to land and sell black sea bass under this moratorium program. Under the moratorium, vessels and moratorium permits together may be bought and sold with the approval of the Regional Director. Vessels that involuntarily leave the fishery (for example, vessels that were sunk or burnt) may be replaced with vessels of the same Gross Registered Tonnage (GRT) and overall registered length as the vessel being replaced. Commercial vessels that are judged unseaworthy by the Coast Guard for reasons other than lack of maintenance may be replaced by a vessel with the same GRT and vessel registered length. Permits may not be combined to create larger replacement vessels. The moratorium may be terminated or replaced at any time by FMP amendment 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 black sea bass in the management unit for black sea bass between 26 January 1988 and 26 January 1993; or

2. The vessel was under construction for, or was being rerigged for, use in the directed fishery for black sea bass on 26 January 1993 and provided the vessel has landed black sea bass 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 black sea bass; or

3. The vessel is replacing a vessel of substantially similar harvesting capacity which involuntarily left the black sea bass 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 condition 3, a notarized statement from marine architects or surveyors or shipyard officials will be considered acceptable forms of proof.

9.1.2.1.1.3. Permit application

The owner or operator of a qualified US vessel may obtain the appropriate Federal permit by furnishing on the form provided by NMFS information specifying, at least, the names and addresses of the vessel owner, the name of the vessel, official Coast Guard number, directed fishery or fisheries, gear type or types utilized to take black sea bass, 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 black sea bass legally landed during the year prior to the one for which the permit is being applied (documented by sales records), principal State of landing, the home port of the vessel, and number of passengers the vessel may carry (for party and charter boats). Operators of commercial vessels must also supply information required to establish that the vessels qualify for a permit pursuant to the moratorium. The Regional Director will notify the applicant of any deficiency in the application. If the applicant fails to correct the deficiency within 15 days following the date of notification, the application will be considered abandoned.

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

Permits expire: (1) when the owner or operator retires the vessel from the fishery, or (2) on 31 December of each year, or (3) when the ownership of the vessel changes; however, the Regional Director may authorize continuation of a vessel permit for the black sea bass 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 black sea bass 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 black sea bass must have a permit. A dealer of black sea bass is defined as a person or firm that receives black sea bass for a commercial purpose from the owner or operator or a vessel issued a moratorium permit pursuant to this FMP for other than transport.

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

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

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

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

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

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

9.1.2.1.3 Operator permit and fees

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

The permit program has the following requirements:

1. Any operator of a vessel fishing for black sea bass must have an operator's permit issued by the NMFS Regional Director.

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

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

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

5. The permit is not transferable.

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

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

9.1.2.2. Black Sea Bass FMP Monitoring Committee

The Black Sea Bass 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 ASMFC representatives. The MAFMC Executive Director or his designee will chair the Committee.

The Black Sea Bass 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 black sea bass is not exceeded (as specified in section 9.1.1.). The Committee will also review state regulatory programs for consistency with the FMP. The Committee will also review the gear used to catch black sea bass to determine whether additional gears need 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 for action by the Regional Director are:

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

2. The Demersal Species Committee and ASMFC Management 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 Management 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. Beginning in year 3, a quota would be allocated to the commercial fishery to control fishing mortality. The quota would be based on projected stock size estimates for that year as derived from the latest stock assessment information. Estimates of stock size coupled with the target fishing mortality rate would allow for a calculation of total allowable landings. Based on the historic proportion of commercial and recreational landings, 42% (note that this percentage will be recalculated upon completion of the revisions to the MRFSS recreational data base) of the total target would be allocated to the commercial fishery.

The annual commercial quota will be set at a range of between 0 and the commercial share of 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 black sea bass 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 Black Sea Bass 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 quota must apply throughout the management unit, that is, in both state and federal waters. All commercial landings would count toward the quota for that period. When the quota had been landed, fishing for and/or landing black sea bass would be prohibited for the remainder of the period.

Any landings in excess of the quota would be subtracted from the following year's quota. For example, if the quota was exceeded by 10,000 pounds in 1997, 10,000 pounds would be subtracted from the quota in 1998.

Using data collected through this FMP (section 9.1.3), NMFS will monitor the fishery to determine when a quota will be reached. It is expected that the states will assist NMFS with data collection.

The Regional Director shall close the EEZ to fishing for black sea bass by commercial vessels when the quota has been landed.

9.1.2.3.2. Commercial fish size limitations

It is illegal for owners or operators of vessels issued moratorium permits to possess black sea bass less than 9" total length (TL). It is also illegal to possess parts of black sea bass less than 9" to the point of landing.

Beginning in year 3 of the management program, it would be illegal for owners or operators of vessels issued moratorium permits to possess black sea bass less than 10" total length (TL). It would also be illegal to possess parts of black sea bass less than 10" 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 Black Sea Bass FMP Monitoring Committee process set forth in 9.1.2.2.

9.1.2.3.3. Maximum roller diameter

It would be illegal for owners or operators of vessels issued moratorium permits to use roller rig trawl gear equipped with rollers greater than 18" in diameter.

9.1.2.3.4. Minimum escape vent requirement

Black sea bass pots and traps would be required to have a minimum escape vent of 1 1/8" x 6" or 2.5" in diameter. Vents would be required to be placed in a lower corner of the parlor portion of the pot or trap. Pots or traps constructed with wooden lathes would be required to have the spacing between lathes 1 1/8" or greater. The escape vent provision would be implemented at the start of the first calendar year following FMP approval so that fishermen would not be required to pull their pots and add vents in the middle of the season.

Beginning in year 3, vents size would be increased in conjunction with the increase in minimum fish size. Pots and traps would be required to have a minimum escape vent of 1 1/4"x 6" or 2.75" in diameter. Vents would be required to be placed in a lower corner of the parlor portion of the pot or trap. Pots or traps constructed with wooden lathes would be required to have the spacing between lathes 1 1/4" or greater.

A black sea bass pot or trap would be defined by the state regulations that applied to a vessel's principal port of landing. The definition and the minimum escape vent requirement would apply to pots fished in both state and federal waters.

9.1.2.3.5. Degradable fasteners in traps and pots

Black sea bass pots and traps would be required to have hinges and fasteners on one panel or door made of one of the following degradable materials:

a. untreated hemp, jute, or cotton string of 3/16" (4.8 mm) diameter or smaller;

b. magnesium alloy, timed float releases (pop-up devices) or similar magnesium alloy fasteners; or

c. ungalvanized or uncoated iron wire of 0.062" (1.6 mm) diameter or smaller.

9.1.2.3.6. Minimum mesh requirement

Owners or operators of otter trawl vessels possessing 100 lbs or more of black sea bass, may only fish with nets that have a minimum mesh size of 4.0" diamond (3.5" 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.

Beginning in year 3 of the management program, owners or operators of otter trawl vessels possessing 100 lbs or more of black sea bass, may only fish with nets that have a minimum mesh size of 4.5" diamond (4.0" 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 more stringent net mesh regulation, the state regulation would prevail. States with minimum mesh regulations larger than those established in this FMP are encouraged to maintain them.

Owners or operators of otter trawl vessels possessing 100 lbs or more of black sea bass may not have available for immediate use any net, or any piece of net not meeting the minimum mesh size requirements, or mesh that is rigged in a manner that is inconsistent with the minimum mesh size. A net that conforms to one of the following specifications and that can be shown not to have been in recent use is considered to be not "available for immediate use":

(1) A net stowed below deck, provided:

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

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

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

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

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

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

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

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

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

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

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

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

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.

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 Black Sea Bass FMP Monitoring Committee process set forth in 9.1.2.2. Based on the recommendations of the Black Sea Bass Monitoring Committee and Council, the Regional Director, by regulatory amendment, shall implement regulations on gear other than otter trawls to achieve discards of black sea bass 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 black sea bass 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. Beginning in year 3, 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 were required for the following year or if the fishery needed to be closed for certain periods.

Any landings in excess of the target harvest level would be subtracted from the following year's target level. For example, if the target was exceeded by 10,000 pounds in 1997, 10,000 pounds would be subtracted from the target harvest level in 1998.

In years 1 and 2 of the management program, it would be illegal for recreational fishermen to possess whole black sea bass or parts of black sea bass less than 9" total length (TL). Beginning in year 3, it would be illegal for recreational fishermen to possess whole black sea bass or parts of black sea bass less than 10" total length (TL).

The annual recreational possession limit, size limit, and season will be set at a range of between 0 and the maximum allowed by the recreational share of the adopted fishing mortality rate reduction strategy.

On vessels with several passengers, where catches are pooled in one or more containers, the number of black sea bass 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 black sea bass 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 black sea bass fishing.

9.1.2.5. Experimental Fishery

The Regional Director, in consultation with the Executive Director, may exempt any person or vessel from the requirements of this FMP for the conduct of experimental fishing beneficial to the management of the black sea bass resource or fishery.

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

1. have a detrimental effect on the black sea bass resource and fishery or cause any quota to be exceeded; or

2. create significant enforcement problems.

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

This letter must be carried aboard the vessel seeking the benefit of such exemption.

All experimental activities must be consistent with the fishing mortality rate reduction schedule in the FMP.

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

9.1.2.6. Enforcement recommendations

It is recommended that violators of the mesh regulations be severely punished. This is necessary to minimize abuses of the flexibility introduced into the management regime that allow for several meshes onboard. Examples of possible penalties include permit sanctions and requiring that offenders carry only the legal mesh on board.

9.1.2.7. Special Management Zones

Upon request to the Council from a permittee (possessor of a Corps of Engineers permit) for an artificial reef, the modified area and an appropriate surrounding area of an artificial reef or fish attraction device (or other modification of habitat for the purpose of fishing) could be designated as a Special Management Zone (SMZ). The SMZ would prohibit or restrain the use of specific types of fishing gear that are not compatible with the intent of the permittee for the artificial reef or fish attraction device. The establishment of an SMZ would be done by regulatory amendment:

1. A monitoring team (the team will be comprised of members of Council staff, NMFS Northeast Region, and the NMFS Northeast Fisheries Science Center) will evaluate the request in the form of a written report considering the following criteria:

    a. fairness and equity
    b. promote conservation
    c. excessive shares

2. The Council Chairman may schedule meetings of Industry Advisors and/or Scientific and Statistical Committee (SSC) to review the report and associated documents and to advise the Council. The Council Chairman may also schedule pubic hearings.

3. The Council, following review of the Team's report, supporting data, public comments, and other relevant information, may recommend to the Northeast Regional Director of the National Marine Fisheries Service (RD) that a SMZ be approved. Such a recommendation would be accompanied by all relevant background data.

4. The RD will review the Council's recommendation, and if he concurs in the recommendation, will propose regulations in accordance with the recommendations. He may also reject the recommendation, providing written reasons for rejection.

5. If the RD concurs in the Council's recommendations, he shall publish proposed regulations in the *Federal Register* and shall afford a reasonable period for public comment which is consistent with the urgency of the need to implement the management measure(s).

9.1.2.8. Other measures

Only persons with a dealer permit may buy black sea bass 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 black sea bass at the point of first sale only to a dealer that has a dealer permit issued pursuant to this FMP.

Owners or operators of vessels with moratorium permits may not land black sea bass during a period when the Regional Director has determined that the commercial quota has been landed.

All black sea bass on vessels fishing with a mesh smaller than the legal minimum size must have any black sea bass on board boxed in a manner that will facilitate enforcement personnel knowing whether the vessel has 100 lbs or more of black sea bass on board to meet the minimum mesh size criterion. Any unboxed black sea bass on board a vessel fishing with a net smaller than the legal minimum is considered a violation of this FMP. A standard 100 pound tote has a liquid capacity of 18.2 gallons (70 liters), or a volume of not more than 4,320 cubic inches (2.5 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 black sea bass fishery.

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

No vessel may use a net capable of catching black sea bass in which the bars entering or exiting the knots twist around each other.

No person may assault, resist, oppose, impede, harass, intimidate, or interfere with either a NMFS-approved observer aboard a vessel, or an authorized officer conducting any search, inspection, investigation, or seizure in connection with enforcement of this FMP.

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) black sea bass catch, effort, and ex-vessel value and the catch and ex-vessel value of those species caught in conjunction with black sea bass 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 boats with Federal permits issued pursuant to this FMP must submit logbooks monthly showing at least name and permit number of the vessel; total 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. A sample of party and charter boats may be required to report length frequencies of species caught for a sample of their trips.

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

It is intended that the reports required by this section are the same as the reports required by the Summer

Flounder FMP, the Northeast Multispecies FMP, and the Atlantic Sea Scallop FMP. That is, fishermen need to submit one logbook report, not one report for each FMP.

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 black sea bass purchased (in pounds), and the name and permit number of the vessels from whom the black sea bass 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).

It is intended that the report required by this section is the same as the report required by the Summer Flounder FMP. That is, fishermen need to submit one logbook report, not one report for each FMP.

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 black sea bass. OY is all black sea bass harvested pursuant to this FMP.

Overfishing in the Black Sea Bass FMP is defined as fishing in excess of the F_{max} level. F_{max} is a biological reference point derived from yield per recruit analysis that corresponds to the level of fishing mortality (F) that produces the maximum yield per recruit. The Council has adopted an overfishing definition for black sea bass based on an estimate of F_{max}. Best available information indicates that F_{max} is 0.29 for black sea bass based on current conditions in the fishery.

Recent stock assessment information indicates that black sea bass stocks are overfished (NEFSC 1995). Results of a virtual population analysis indicate that the current fishing mortality rate (F) is 1.05 (an annual exploitation rate of 60%). Based on this mortality estimate, exploitation rates would have to be reduced 62% to achieve an F_{max} of 0.29.

The Council and the ASMFC Management Board approved a recovery strategy that reduces overfishing on black sea bass over an 8 year time frame. The recovery strategy calls for minimum fish sizes and commercial gear regulations in year 1 and 2. In years 3 to 5, target exploitation rates would be 48% for black sea bass. In years 6 and 7, the target exploitation rates would be 37% and in year 8 and subsequent years, the target exploitation rate would be based on F_{max}. Based on current conditions in the fishery, F_{max} is 0.29 and the associated exploitation rate is 23%.

This eight-year strategy reflects the pressure now being placed on fishermen by other FMPs. Although the black sea bass resource should be rebuilt as quickly as possible, black sea bass management measures can be implemented over an eight-year time frame to minimize the short term economic burden placed on

fishermen and still reduce the overfished condition of the stocks.

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 black sea bass research should be devoted toward both data collection and analysis in order to evaluate the effectiveness of this FMP. This species should be reviewed annually by the NEFSC 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 black sea bass throughout their range on the Atlantic coast from Maine through Cape Hatteras, 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.

This FMP would establish a commercial fishery quota system for black sea bass, based on historical landings data. This allocation, based on traditional landings patterns, would ensure that fishermen from each state received a fair and equitable share of the resource.

Commercial regulations would be applied coastwide. The minimum sizes for the recreational fishery, are also the same throughout the management unit.

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

The moratorium is fair and equitable. The Council voted to establish 26 January 1990 as a control 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 this FMP. The long time period for establishing eligibility (26 January 1988 through 26 January 1993) 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.

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 minimum size regulations were developed with the recognition that the commercial and recreational fisheries have traditionally harvested similar sizes of black sea bass.

The commercial minimum size regulations, mesh regulations, and pot requirements were designed to reduce the discarding of small black sea bass by commercial vessels, increase yields, and allow more black sea bass to reach sexual maturity and spawn. Monitoring of the fishery will indicate if discards are reduced and whether modifications in gear regulations or minimum sizes should be implemented during any year of the management program.

The commercial minimum fish size, gear regulations, and commercial quota and the recreational size limits, possession limits, and season are all specified so that they may be adjusted annually following procedures set forth in the FMP to assure that the fishing mortality reductions strategy is followed.

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, gear regulations, 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 with regard to the guidelines established 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 an overfishing definition for black sea bass. The Council has also determined that black sea bass are currently overfished and has adopted an eight year strategy to reduce fishing mortality to prescribed levels in order to end the overfished condition.

This eight-year strategy reflects the pressure now being placed on fishermen by other FMPs. Although the black sea bass resource should be rebuilt as quickly as possible, black sea bass management measures can be implemented over an eight-year time frame to minimize the short term economic burden placed on fishermen and still reduce the overfished condition of the stocks.

The excessive take of black sea bass will cease when fishing mortality is at the F_{max} level, which current analyses indicate is F = 0.29. The current fishing mortality rates is 1.05. Thus, there is at least a four 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 62%.

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. The recovery strategy calls for minimum fish sizes and commercial gear regulations in year 1 and 2. In years 3 to 5, target exploitation rates would be 48% for black sea bass. In years 6 and 7, the target exploitation rates would be 37% and in year 8 and subsequent years, the target exploitation rate would be based on F_{max}. Based on current conditions in the fishery, F_{max} is 0.29 and the associated exploitation rate is 23%.

The recovery schedule is as follows:

Exploitation Rates

Current	60%
Year 3	48%
Year 6	37%
Year 8	23%

9.2.2.2. Recreational Fishery

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

The proposed minimum size limits would effect recreational landings of black sea bass in all states with landings of black sea bass. In 1991, almost 100% of the sea bass were landed in states from New York to North Carolina (Table 22). In states north of New York, landings were relatively small. In fact, during most years from 1983-92, landings in North Carolina exceeded the landings in all the North Atlantic states combined.

Analysis of 1990-92 intercept data for states from New York through North Carolina indicated that 14 to 38% of the measured sea bass were less than 9" TL (Table 36). On a coastwide basis, Maine to Cape Hatteras, NC approximately 28% of the black sea bass were less than 9" TL. Assuming a post-release mortality of 25%, the percent reduction in the number of black sea bass killed by anglers associated with a 9" TL minimum size limit would be 21% (Table 37).

The assumed level of post-release mortality (hooking and handling mortality) used in the above calculations is based on several studies. Bugley and Shepherd (1991) conducted a hooking mortality study on black sea bass caught by hook and line in Nantucket Sound, MA. They estimated a hooking mortality of 4.7% based on their sample size of 64 fish. However, these fish were caught in water depths of 6-12 m. Rogers et al. (1986) found severe trauma in black sea bass caught by hook and line in relatively deep water (37 m) due to oral protrusions of the swim bladder. Of the 169 black sea bass collected by angling, 45 or 27% had protrusions of the swim bladder. Based on these studies and hooking mortality studies conducted for other fish, the ASMFC technical committee assumed a 25% hooking mortality for black sea bass caught by recreational fishermen.

Beginning in year 3, the same minimum size of 10" TL would apply to the recreational fishery throughout the management unit. Based on 1990-92 intercept data, 45.9% of the sea bass landed during these years were less than this size (Table 36). However, increased survival of smaller fish due to minimum size regulations and reduced discards in years 1 and 2 of the management program should allow larger fish to become more available to recreational fishermen in year 3. As a result, the short term effect of the 10" TL minimum size to the fishermen in these states would be less than the 45.9% reduction associated with 1990-92 landings.

Based on the fishing mortality reduction schedule adopted by the Council and Commission, exploitation would have to be reduced 20% in year 3 to achieve the target F. MRFSS data for 1990-92 indicate that catch frequencies for black sea bass ranged from 1 to 150 fish per day on a coastwide basis (Table 38). Based on these data, the reductions in exploitation associated with various possession limits for 1 to 50 black sea bass per trip were calculated (Table 39). The coastwide possession limit associated with a 20% reduction in exploitation is 16 fish. The possession limit would increase when combined with size limits and/or seasons.

Analysis of black sea bass recreational data indicated that nearly 30% of the annual landings occurred from September through October for the years 1990 to 1992 combined (Table 40). Seasons based on this MRFSS data could be established on a coastwide basis to reduce exploitation. A season could be combined with the size limit to allow for higher possession limits.

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 50 black sea bass per angler, the size limit from 9" TL to 12" 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.

Short term impacts due to restrictive limits would be outweighed by the long term benefit of conserving the black sea bass stock for future generations of recreational anglers. The possession limit could be as high as 50 black sea bass, the size limit decreased to 9" TL, and the season open throughout the year. However, decreases in restrictions would only occur under circumstances of increased black sea bass 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 black sea bass are abundant or angler effort is less. Although it is not possible to estimate exact impacts for hypothetical levels of black sea bass 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 black sea bass 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 12" 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 58% based on 1990-1992 coastwide MRFSS data (Table 37). 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. 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.

Beginning in year 3 of the management program, 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.

9.2.2.3. Commercial Fishery

9.2.2.3.1. Minimum fish size

Historic commercial length frequencies were used as an estimate of potential short-term impacts of length limits on the commercial black sea bass fisheries (Tables 41 to 44). Specifically, commercial length frequencies from the NMFS Weighout Data and North Carolina DMF from 1982 to 1992 were used to determine potential size limit effects. In general, size frequency data indicated that potential size limit effects increased from north to south, were gear dependent, and varied from one year to the next.

Based on NMFS weighout data, approximately 11% of the measured black sea bass were less than 9" TL for all otter trawl vessels with sampled landings (Table 43). This gear is associated with most of the

commercial landings coastwide; otter trawl vessels accounted for over 56% of the coastwide landings based on 1983-1992 General Canvass data (Table 10).

A 9" TL minimum size regulation would have a slightly greater effect on landings from fish pots/traps, the other predominant gear in the black sea bass fishery (this gear accounted for 33% of the landings from 1983-92). Based on NMFS weighout data, almost 26% of the measured fish were less than 9" TL for the 4,592 black sea bass obtained from this gear from 1983 to 1991 combined (Table 43).

Size limit effects varied annually in North Carolina landings from the winter trawl fishery (Table 44). From 1983 to 1992, the amount of measured fish less than 9" TL ranged from 18.3% to 40.7%. North Carolina accounted for 11% of the coastwide commercial landings on average from 1983-1992 (Table 17).

Assuming that undersized fish are not caught and discarded, minimum size regulations have positive impacts on the stock. In general, because minimum sizes increase the size at full recruitment, yields are increased as fishermen catch larger, heavier fish. In addition, minimum size regulations can increase the resilience of the stock to overfishing, i.e., the biological reference points (F_{max}) can increase. Finally, minimum size regulations can increase spawning stock biomass by allowing more fish to spawn. Sexual maturity data for black sea bass indicate that 50% of the black sea bass are mature by a size of 7.7" TL.

9.2.2.3.2. Minimum mesh size

Owners or operators of otter trawl vessels possessing 100 lbs or more of black sea bass would only be allowed to fish with nets that have a minimum mesh size of 4.0" diamond (3.5" square) in the codend. The L_{25} (the length at which 25% of the black sea bass are retained) is 9.3 inches for this mesh size (Table 45).

Mesh selectivity studies have not been conducted for black sea bass. The relationship between body depth and total length as derived by Weber and Briggs (1983) was used to calculate the 50% retention lengths for black sea bass. A selection range of 2 inches (based on selectivity studies conducted on fish of similar shape) was then used to estimate 25% and 75% retention lengths.

Landings of black sea bass represent only a portion of the fishing mortality experienced by the stock. Undersized black sea bass, those less than 9" 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.

Black sea bass are a component of the mixed trawl fishery in Southern New England and the Mid-Atlantic. Although Sea Sampling data indicate that fishermen may differentiate between species on a per tow basis (i.e., target a single species on a tow), fishermen land many different species on a per trip basis. Based on 1992 NMFS weighout data, black sea bass are most frequently landed with *Loligo* squid, silver hake, scup, and flounder. In fact, for trips landing a 100 or more pounds of black sea bass per trip, more *Loligo* squid were landed than black sea bass in 1992 (Table 29).

However, this predominance of *Loligo* may reflect reduced availability of other species in 1992. Based on 1983 to 1987 data, the landings of otter trawl vessels landings 100 lbs or more of black sea bass were composed primarily of scup (29%) and summer flounder (24%) (Table 46). *Loligo* accounted for only 17% of the landings.

The 100 pound threshold would effect 62% of the vessels and 34% of the trips that landed black sea bass in 1992 (Table 47) These trips accounted for 95% of the black sea bass landed by otter trawl vessel in 1992.

Regulations that allow multiple nets onboard would allow fishermen who traditionally targeted multi-species on a trip, to fish for and retain other species with small mesh until the 100 pound threshold of black sea bass was reached. These fishermen would then have to use the 4.0" mesh if they decided to target more black sea bass. Once the threshold was reached fishermen would have to properly stow other

cod ends for the remainder of the trip.

Landings of black sea bass by fishermen targeting *Loligo* squid and scup on the same trip could be effected by these regulations. Based on 1992 NMFS weighout data, 45% of the vessels and 29% of the trips landing 2500 pounds or more of *Loligo* squid, landed over 95% of *Loligo* landed by all *Loligo* otter trawl fishermen (Tables 48 and 49). Based on this 2500 pound threshold, black sea bass comprise slightly less than 0.7% of the total fish landed on these trips (Table 50). However, the total pounds accounted for approximately 41% of all black sea bass landed by otter trawl fishermen in 1992.

Similarly, 52% of the vessels and 28% of the trips landing 1000 pounds or more of scup, landed over 95% of scup landed by scup otter trawl fishermen (Tables 51 and 52). Based on this 1000 pound threshold, black sea bass comprise slightly more than 1.1% of the total fish landed on these trips (Table 53). Because scup and *Loligo* squid are frequently landed on the same trip, the total pounds accounted for approximately the same amount of black sea bass landed by directed *Loligo* squid trips.

In general, these regulations would modify some traditional fishing practices. The fishermen most effected by these regulations would be those fishermen who targeted other species on a trip with small mesh net (squid, scup, or whiting) and had coincidental catches of black sea bass. If a fishermen had 100 lbs of black sea bass on board, and desired to continue fishing with a small mesh net, he would be required to discard any sea bass caught in tows directed to other species. Alternatively, if he desired to continue to fish for black sea bass, he would have to stow his other cod ends for the remainder of the trip perhaps losing an opportunity to catch and land valuable bycatch (i.e., summer flounder, squid, etc.).

However, these mesh provisions should have minimal effect on bycatch species. Most of the species caught with black sea bass are regulated, or have proposed regulations that require mesh sizes and/or minimum fish sizes that equal or exceed the black sea bass regulations. A 6" minimum mesh size is required for most of the New England groundfish species. The minimum mesh size for summer flounder is 5.5" with a minimum fish size of 13" TL. The proposed minimum size for black sea bass would require that fishermen use a 4.0" tail bag to reduce catch of sublegal fish, i.e. those less than 9" TL.

Minimum mesh provisions in conjunction with the minimum fish size will ensure that discards of sub-legal black sea bass will be reduced. Greater gains will accrue to fishermen through protecting black sea bass until they reach legal size. Discard mortality is extremely high for trawl caught fish and the problem is particularly acute when new year classes are abundant. The benefits of the proposed minimum fish size and mesh size regulations will be manifested through a more balanced age structure of the black sea bass stock. Further, waste will be reduced due to (1) lower total discards and (2) lower mortality of net encounter.

9.2.2.3.3. Maximum roller diameter

It would be illegal for owners or operators of vessels issued moratorium permits to use roller rig trawl gear equipped with rollers greater than 18" in diameter. A 18" diameter corresponds to the maximum roller diameter limitation imposed by the state of Massachusetts to regulate this gear in state waters.

Roller diameter is correlated with vessel size and the ability of vessels to fish rough, hard bottom areas. Larger roller sizes require larger engine sizes to pull the net. An engine size with an associated horsepower of 800-900 hp is required to tow a net with 18" to 24" rollers whereas 10" to 12" rollers can be pulled by a boat using a 175-200 hp engine (D. Simpson pers. comm.).

Information is lacking as to the relationship between roller diameter and the size of obstruction that it can clear. In general, 10-12" diameter rollers can be used for fishing over rough bottom that can include ledges and cliffs. Limitations on roller size will make some areas of the ocean inaccessible to trawls by preventing fishermen from trawling in the harder, rough bottom areas. As a result, black sea bass associated with these areas would be protected from harvest allowing more fish to grow to maturity and spawn increasing stock biomass and yields.

9.2.2.3.4. Minimum escape vent requirement

Black sea bass pots are required to have a minimum escape vent of 1 1/8" x 6" or 2.5" in diameter. The escape vent provision would be implemented at the start of the first calendar year following FMP approval so that fishermen would not be required to pull their pots and add vents in the middle of the season.

During the development of this plan, Council staff proposed that black sea bass pots or traps have escape vents that would allow for the release of undersized fish. Although there were a number of studies that indicated that escape vents release fish from pots and traps, there were a lack of specific studies on black sea bass. MAFMC staff initiated a project in 1994 to determine the size selectivity of traps fitted with vents of various sizes. The objective of the study was to determine the vent size which allowed 50% escapement of black sea bass below the proposed minimum size limits of 9" and 10" TL.

In the study, the catch and size distribution of black sea bass taken in commercial sea bass pots fitted with escape vents was compared to catches from unvented traps. Four strings of 25 traps (100 traps) were fished from May through October, 1994 on commercial fishing grounds in areas offshore from Cape May, NJ to Ocean City, MD. A total of 9 trips were made to haul the traps.

A total of 100 traps were assigned a vent size of 1 1/8" x 6", 1 1/4" x 6", 1 3/8" x 6", 1 ½" x 6", or no vent (control). The traps with the various vent sizes were randomly placed in groups of five on the four strings. The vents were made from aluminum and were patterned after the vents used in lobster traps. Vents were placed vertically in the door of the trap such that they would allow fish to escape from the lower corner of the parlor portion of the trap. The lower corner location was used as the result of aquarium studies that indicated sea bass almost always tried to escape from a lower corner after they were placed in a trap (G. Shepherd pers. comm.).

Traps were fished under normal commercial fishing conditions. Soak time, the period between hauls, averaged 14 days. The catch from each trap was retained separately and all black sea bass were measured to the nearest half cm TL.

Length frequency distributions were constructed for black sea bass from each of the treatment vent sizes and control. Proportions retained at length were computed as the ratio between the number of fish taken in vented traps and the number taken at that length in the control traps. The length at 50% retention for each vent size was estimated by fitting a logistic curve to the proportion retained at length data for each vent size.

A total of 5574 black sea bass were measured from the 100 traps from April through October. Black sea bass ranged in size from 16.5-36.5 cm. The control traps caught the largest number of sea bass (n=1534) followed in descending order by traps with the experimental vents: 1 1/8" (n=1164), 1 1/4" (n=644) 1 3/8" (n=397) and 1 ½" (n=305).

Results indicate that vents do release undersized black sea bass. Length frequency histograms for black sea bass from each vent size compared to the control are presented in Figures 12 - 15. Based on these length frequencies, the L_{50} derived for traps fitted with the 1 1/8" and 1 1/4" vents was 8.7" TL and 10.1" TL, respectively (Table 54). Based on these results, a 1 1/8" x 6" vent would be required for traps when the size limit was 9" TL and 1 1/4" x 6" when the size limit was 10" TL.

Studies were not conducted to determine the selectivity of traps fitted with circular escape vents. A body length/depth relationship (Weber and Briggs 1983) was used to derive the minimum sizes of black sea bass that would be retained by fish traps fitted with these escape vents (Table 55).

Pots and traps accounted for approximately 33% of the total commercial landings for the period 1983-1992 (Table 10). However, in recent years the proportion of the landings attributable to this gear has generally increased. In 1991, this gear accounted for almost 62% of the landings (Table 12). The escape vents will allow for a significant proportion of undersized fish to escape alive. Currently, relatively few sea bass fishermen in the Mid-Atlantic have escape vents in their pots and traps. This gear is fished at

varying depths and hauled to the surface quickly with hydraulic or electric pot hauler. As a result, fish may experience internal trauma due to changes in pressure and a significant portion may not survive (Rogers et al. 1986). Although many pot fishermen use sorters on deck to release nonmarketable fish, the escape of these fish from the traps before they are hauled will significantly increase survival.

In addition, fishermen are encouraged to use sorting devices that allow for undersized fish to be returned quickly to the water. Combined, the escape vent provisions and sorting devices will significantly reduce the number of undersized fish that are killed by pot fishermen. This reduction in sublegal mortality will increase yields and the amount of mature fish in the stock.

9.2.2.3.5. Degradable fasteners in traps

Black sea bass pots would be required to have hinges and fasteners of one panel or door made of degradable materials. These materials would allow the door or panel of a trap to fall away from an unattended trap. This would prevent lost traps from "ghost fishing", i.e., continuing to catch and retain fish that could not be removed from the trap. Thus black sea bass and other species of fish and invertebrates typically caught by these traps could escape preventing waste and lost yields in a number of fisheries.

9.2.2.3.6. Commercial quota

Beginning in year 3 a quota would be allocated to the commercial fishery to control fishing mortality. The quota would be based on stock assessment information on projected stock size estimates for that year. Estimates of stock size coupled with the target fishing mortality rate would allow for a calculation of total allowable landings. Based on the historic proportions of commercial and recreational landings for 1983 to 1992, 42% of the total target would be allocated to the commercial fishery. Note that this percentage would change to reflect the revisions to the MRFSS data set that will be available in 1995.

To assess potential impacts of the quota, landings data were used from 1988-1992 to derive average landings for those years (3.275 million lbs). Based on these data, a 20% reduction in exploitation would equate to a commercial quota of 2.62 million lbs (80% x 3.275).

The gear restrictions and minimum fish size regulations will reduce discard and escape mortality of undersized black sea bass. However, decreases in mortality would occur only with the smaller fish; reductions in mortality would not occur for black sea bass once they reached the legal size of 10" TL. Essentially the fish that contribute the most to the spawning population, fish 10" 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.

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 black sea bass will allow for an increase in yield or harvest as small fish that were previously killed grow larger and add weight to the stock.

Combined, these management measures, the minimum size regulation and the commercial quota, will prevent overfishing and reduce waste. As the stock rebuilds, commercial quotas would increase.

9.2.2.3.7. 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 black sea bass commercial fishery is estimated to range between 545 and 565 vessels.

In addition to black sea bass, these vessels land *Loligo* squid, Atlantic mackerel, silver hake, summer flounder, scup, and other species. Most of the marketable species caught in the mixed trawl and pot fisheries are depleted, if not technically overfished. A moratorium exists for vessels in the summer flounder fishery. The Mid-Atlantic Council has already determined that scup are overfished, and has adopted a control date for limited entry. The New England Council has approved moratoria for the Northeast Multispecies FMP and the Scallop FMP.

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 beginning in year 3 of the management program, 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.

The Amendment proposes a moratorium on new entrants to the commercial black sea bass 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 black sea bass between 26 January 1988 and 26 January 1993.

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 black sea bass 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.

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 black sea bass fishery follows:

A. Present participation in the fishery.

Present participation in the black sea bass commercial fishery is estimated to range between 545 and 565 vessels. The proposed program of limited entry seeks to reduce the size of the fleet gradually through natural attrition. No vessel which was actively fishing for black sea bass between 26 January 1988 and 26 January 1993 would be denied access to the fishery.

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

Fishermen using otter trawls and pots/traps account for the majority of commercial landings; 56% and 33% respectively, based on 1983 to 1992 data (Table 10). Other important commercial gears include hand lines, lobster pots, and floating traps. Many species are caught in conjunction with black sea bass (Table 29). Economically, black sea bass is an important species in the mixed trawl fishery (Table 29).

C. The economics of the fishery.

Black sea bass are economically important species in the mixed trawl fishery, the predominant species landed by black sea bass pot fishermen, and an important bycatch for some lobster fishermen. 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 dissipated among new entrants following recovery.

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

Black sea bass vessels traditionally harvest other species. However, a number of species in the mixed trawl and pot fisheries have also been determined to be overfished. The Mid-Atlantic Council has determined that summer flounder and scup are overfished and is preparing an amendment to the Bluefish FMP to eliminate the overfished nature of that resource. The ASMFC has adopted an Amendment to their Weakfish FMP to eliminate an overfished situation. The Mid-Atlantic Council has prepared an Amendment to the Atlantic Mackerel, Squid, and Butterfish FMP to limit entry into the squid and butterfish fisheries.

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.

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

Many of the vessels in the fishery are owned and operated by independent, individual fishermen who have obtained their position of ownership through individual enterprise. There is a strong tradition of black sea bass 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.

9.2.2.4. Special Management Zones

The intent of a SMZ is to enhance management of fishery resources on or around artificial reefs while optimizing fishing opportunities that would not otherwise exist. Artificial reefs are costly and provide benefits that can be easily nullified by the use of certain types of fishing gear. In addition, certain types of gear pose various threats to the reef structure and associated fishery resources, including: a) entanglement

of other boating and fishing gear; b) entanglement in the reef structure ("ghost gear"); and c) damage to or movement of reef structure.

Many artificial reefs, including those constructed by state governments, are located in the EEZ. If management measures are needed to control fishing on and around those artificial reefs, they must be developed through a fishery management plan. Providing a process through which the Council can develop these measures on a case by case basis is an efficient way of achieving this control.

However, such a system must be coupled with a process that provides the Council an opportunity to comment, in a timely manner, on the location of artificial reefs before they are constructed. Industry advisors report that on occasion artificial reefs are constructed in existing black sea bass habitat areas, thereby possibly accomplishing a *de facto* allocation of a portion of the fishing grounds from the pot or trawler fishery to the hook and line fishery. While such allocations may be appropriate from time to time, they should be made only after all potentially affected interests are aware of the proposal and have an opportunity to comment.

9.2.2.5. Administrative, enforcement, and information costs

Currently, a reporting system is being implemented by the NMFS. This system has been designed to collect information for various fisheries according to their respective FMP's.

The cost of enforcing the black sea bass size limit equals the value of the additional capital and labor resources required to expand current enforcement efforts to encompass the new regulations. Minimum size regulations for black sea bass are currently enforced in various states (Table 60). The additional cost to existing dockside enforcement in these states from the implementation of the minimum size limit alternative is expected to be minimal. In addition, in states with minimum size regulations for other species, additional reporting and enforcement from black sea bass regulations should also be minimal.

It is assumed that most individuals that will potentially apply for black sea bass operator permits already hold operator permits for summer flounder, multispecies, and/or scallops. It is also expected than since most of the vessel's operators already submit logbook reports under the Northeast Multispecies, Scallop, and Summer Flounder FMPs, the implementation of this plan would not affect the reporting process to any significant extent.

9.2.2.6. Prices to consumers

In recent years, the exvessel price per pound of black sea bass caught commercially has shown a slight upward trend, indicating that supply and/or demand factors may be shifting. For the period between 1983 to 1992, the highest price for all size categories of black sea bass occurred in 1989. NMFS weighout data for 1992 indicate an average exvessel price of $1.05 per pound coastwide, ranging from $0.42 per pound for pins to $2.76 per pound for jumbos (Tables 24 and 27). Continual increase in the demand of fish and shellfish in general (due to health awareness) could be the cause for increased ex-vessel revenue. However, the effects of this factor on ex-vessel price can not be address quantitatively at the time.

Potential reduction in landings and value attributed to this plan in its early years are not expected to significantly increase overall ex-vessel black sea bass price. Future increases in black sea bass supply due to reduction in mortality, higher harvest weight, and stock stability, should maintain the consumer black sea bass price level (assuming everything else constant).

9.2.2.7. 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.

9.2.2.8. Fishery impact statement

The impacts of the proposed actions on participants in the black sea bass fisheries including analyses of biological, economic, and social impacts are described in section 9.2 (Analysis of Beneficial and Adverse Impacts of Adopted Management Measures), in Appendix 1 (Alternatives to the Amendment) and in appendix 2 (Regulatory Impact Review) of the FMP. The Mid-Atlantic Fishery Management Council commissioned two reports to assess the probable socio-economic impacts of management options identified in the draft FMP. The first report titled "Part 2, Phase I, Fishery Impact Statement Project, Mid-Atlantic Fishery Management Council" by McCay *et al.* (1993), described the people and communities involved in the region's fisheries. The second report titled "Social and Economic Impacts of the Draft Management Plans for Black Sea Bass and Scup" by Finlayson and McCay (1994), assessed the probable socio-economic impacts of management options identified in the draft FMP. This section is intended to further describe the potential effects of the proposed FMP on the people and the communities involved in the scup fisheries throughout the region based on these reports.

The principal approaches employed to compile the information presented in the two reports mentioned above were open-ended phone interviews, port visits, data analysis, and interviews of people involved in different aspects of the fishing industry. It is important to note the potential biases in the comments provided by some of the individuals interviewed. In the second report, Finlayson and McCay (1994) stated that:

> "When assessing the claims and opinions of members of the fishing industry cited and quoted in this report, the reader should remain critically aware that in many if not all cases there is an element of self-interest at work. This is particularly true where there is a real or perceived conflict between gear sectors and/or regions in competition for a limited, and declining, resource, and where they fear that draft regulations will result in an unequal, and hence unfair, distribution of economic impacts among the user groups."

The first report (McCay *et al.* 1993), identified ports that appeared in the top 10, in terms of landed value, for any of the species that the Mid-Atlantic Fishery Management Council has full or shared responsibility for the preparation of Fishery Management Plans (tilefish, scup, black sea bass, summer flounder, dogfish, Atlantic mackerel, *Loligo* squid, *Illex* squid, butterfish, weakfish, bluefish, and angler or monkfish). The ports identified as relevant in the first report covered ports from Chatham, Massachusetts, to Wanchese, North Carolina. The second report (Finlayson and McCay 1994), identified ports that met one or both of the following criteria: the port or closely related port group accounted for more than 1 percent by landed value of the total landings of black sea bass or scup, or the landings of black sea bass or scup accounted for more than 1 percent of all commercial landings in that port or port group (Finlayson and McCay 1994). The ports identified as relevant on the second report covered ports from Gloucester, Massachusetts, to Hampton Roads, Virginia.

Landing statistics and values are from the National Marine Fisheries Service weighout data. Information about the ports is from interviews with key informants and from earlier studies conducted by McCay's research team (McCay *et al.* 1993).

In this section, both reports will be used to assess the socio-economic implications of the proposed FMP at the individual and aggregate level as permitted by the available information. For a more through review of the potential socio-economic implications of the FMP, refer to these reports.

Table 56 shows port groups ranked by landed value of black sea bass as a percentage of the value of port landings for all species. In 1992, black sea bass accounted for 4.69% of the value of total port landings in Ocean City; 2.02% in Cape May; 1.66% in Hampton Roads; 0.85% in Freeport/Brooklyn; 0.62% in Montauk; 0.61 in Monmouth; and less than 0.5% for the rest of the ports. Three ports accounted for 60% of all black sea bass landed value in 1992: Cape May, Hampton Roads, and Ocean City (Table 57). Cape May accounted for approximately 27% of the

total black sea bass landed value; Hampton Roads 20%; Ocean City 14%; Montauk 6%; Point Judith 5%; Monmouth 2%; and less than 2% for the rest of the ports. Black sea bass landed values are higher for ports located in the southern part of the region (Tables 56 and 57).

The degree of reliance on black sea bass for selected ports from Gloucester, Massachusetts, to Hampton Roads, Virginia, is low. In no instance were the ports (or port group) dependent on black sea bass for 5% or more value from fish and shellfish. One port represented 4.69% of the total landed value of black sea bass (Ocean City), with the rest of the ports having a value somewhere between 0 and 2% (Table 56).

9.2.2.8.1. Port level - Commercial fishery

The port discussion includes a description of the fleet (number of vessels and type of gear employed), a description of the landings (species and value) and a general description of the community and port characteristics as permitted by the available information. The discussion provided in the port description is based on findings by McCay *et al.* (1993). The overall description may vary from port to port due to the confidentiality of data.

9.2.2.8.1.1. Hampton Roads, Virginia

The Hampton Roads area ports include the following ports: Hampton, Newport News, Norfolk, Seaford and Virginia Beach. According to McCay *et al.* (1993), 30 boats are home ported in the Hampton area in the summer and 75 in the winter. The number of boats in the port vary depending on where the boats decide to land. Most of the fish houses in Hampton Roads own boats. The boats work on a regular basis in Virginia. There are over 100 draggers in the Hampton Roads area. This does not include the gill netters, trap fishermen and longliners. According to an informant, there are about 100 of these boats. The Hampton boat fleet is described by an informant as 50-60% full-time scalloping, 30-40% part-time scalloping (in the summer) and part-time fishing (flounder in the winter), and about 10% fish full time doing any kind of dragging.

The Hampton Roads area ports landed ninety-five different species in 1992. In terms of landed value, sea scallops (63%) and summer flounder (17%) were the two most important species landed in the Hampton Roads area in 1992. Black sea bass accounted for approximately 2% of the total landed value by species for the same period.

In 1992, scallop dredgers accounted for 54% of the total landed value by gear type in Hampton Roads, followed by otter trawls (bottom fish) (20%), otter trawls (scallop) (12%), tong/clam (6%), crab pot (3%). Summer flounder accounted for 84% of the total landed value by species of bottom fish otter trawls in 1992, black sea bass ranked second with 6% of the total landed value.

Black sea bass are targeted in the EEZ by trawlers, potters, and hook and line fishermen. Draggers landed 66% of the total black sea bass landed in the area in 1992, while handliners landed 32%. Black sea bass is also an incidental catch for haul seiners and gill netters in coastal waters. Sea bass are also caught with otter trawl/fly nets. Most of these nets are equipped with rollers on the bottom and buoys on the nets. Commercial fishermen may also catch sea bass with pots or with hook and line at wrecks or other bottom structures.

Many of the boats dragging for black sea bass in the Hampton Roads area are from North Carolina. These fishermen also shrimp in the summer and then flounder fish in the winter. Some commercial fishermen also employ pots and hook and line to catch black sea bass. Black sea bass pots are relatively new in the Hampton roads area. They are similar to crab pot and are typically deployed close to wrecks.

Summer flounder has been a major money species in the spring and fall in Hampton Roads. Weakfish is caught all summer and targeted by gill netters in the fall. *Illex* squid is targeted during the summer, *Loligo* squid is mainly targeted in the fall. Atlantic mackerel is mainly caught by

draggers, but a small amount are also caught by sink gill nets and pound nets. Most of the scup landed in Hampton Roads are landed by draggers. Scup are mainly targeted offshore and to the north of the Hampton Roads area. Most of the scup are landed in Hampton and Newport News in the winter.

The packing houses (fish houses) in the Hampton Roads area, act as wholesale buyers and distributors. One fish house in the area has a government contract and supplies the US Navy with all its seafood. Seafood products are distributed locally and throughout the United States. Some species are shipped overseas to places like Japan, France and England. Most of the black sea bass is sold wholesale to New York. A few are sold locally.

Hampton Roads has a mix of boats that are owner operated or have a hired captain. The fish companies may own a number of boats and will hire captains to run them. The scallop boats are also often operated by hired captains. However, independent boats may be owner operated or a father may have a son or some other male relative running a boat for him.

There is a mix of different age groups in commercial fishing in Hampton Roads. Generally, commercial fishing is not a typical summer job for high school or college students. However, some high school students may work with a relative during the summer. In the Hampton Roads area, there are boats owned and operated by fishermen of Vietnamese ancestry, Mexicans and Mexican-American crews. Women do not fish offshore. Fishermen's wives primarily take care of the "bookwork" and other offshore tasks. Crews are paid with a share system. The share system varies among boats.

Hampton Roads have historically been a fishing community. Currently, the fishing industry is but one of the many industries in the area. While Hampton itself is not a big tourist area, the town is trying to emphasize its waterfront area and its tourist potential. Hampton has an Air and Space Museum and a marina for pleasure boats. The military presence in the Hampton Roads area is also a large part of the economy, keeping this area from being totally dependent on tourism and fishing. Other industries in the area include: a large coal port in Newport News, CSX railroad, and shipping and freight companies.

9.2.2.8.1.2. Ocean City, Maryland

According to McCay *et al.* (1993), Ocean City has a fishing fleet of longliners, trawlers, gillnetters and potting boats. Three of the home ported longline boats home ported in Ocean City are 70 ft and 130 GRT, the others are smaller. There are between 6 to 10 trawlers ranging in size from 62 ft (32 GRT) to 73 ft (103 GRT). These trawlers do not have refrigerated sea water capacity. In 1993, there were five full-time boats involved in the sea bass potting fishery, ranging from 25 ft to 57 ft. Overall, according to McCay *et al.* (1993), the number of vessels in Ocean City declined in the 1991-1992 period primarily because of changes in the surf clam/ocean quahog fleet. Clam dredgers accounted for 63% of the total landed value of all gear, pelagic longline 12%, otter trawls 12%, and pots and traps for fish (black sea bass) 5%.

The total landed value of fish and shellfish in Ocean City and surrounding areas in 1992 was approximately $8 million. The top 10 species by percent landed value in 1992 were: surf clam (34%), ocean quahog (28%), summer flounder (5%), black sea bass (5%), sea scallop (4%), bigeye tuna (4%), swordfish (4%), dogfish (4%), yellowfin tuna (4%), and lobster (2%).

Pelagic longline gear is mainly use to catch tunas, swordfish, sharks, and dolphin fish. Inshore handlining for black sea bass and weakfish is also practiced in the Ocean City area. The top 4 species by percent landed value for handlining and pelagic longlining in 1992 were: black sea bass (53%), yellowfin tuna (20%), bluefin tuna (18%), and weakfish (4%).

The Ocean City otter trawlers take a large variety of finfishes, topped with summer flounder (40%), and spiny dogfish (28%), black sea bass ranked fifth (3%).

Black sea bass accounted for 0.08% of the total landed value for sink gill-nets, and 1.24% of the total landed value for drift gill-nets in 1992.

A significant black sea bass pot fishery exists in Ocean City. According to McCay *et al.* (1993) sea bass pots are a traditional gear in this area. Black sea bass are caught with pots from April to September. Black sea bass accounted for approximately 92% of the total landed value of fish pots. Conch potting have increased in the area in recent years. Boats involved in conch potting have gill-netted in the past.

Even though the number of vessels operating in the surf clam and ocean quahog fishery has decrease substantially in recent years, they still contribute a large percentage of the port total landed value by species.

Loligo squid is caught by trawlers year round. During May and June there is a spring run in Ocean City, and during the rest of the year fishermen go offshore for squid. Trawling for butterfish mainly occurs in the fall. Butterfish is also a bycatch with weakfish. Bluefish are caught with trawl and gill-net in the spring and fall.

Several boats use gill-nets for weakfish and dogfish. Boats from Maine and New Hampshire have come to the Ocean City area to gill-net for dogfish. The dogfish season lasts from around the first of November until April.

The number of boats targeting summer flounder in Ocean City is small, mainly because Maryland's quota is small. Atlantic mackerel is targeted for about one week between March and April. According to an informant (McCay *et al.* 1993), there have been no unusual changes in fishing in the Ocean City area. When a fishery is doing better, fishermen drift towards it in order to relieve pressure on another fishery.

Most of the vessels in Ocean City are owner operated, but a few hire captains. The transient longliners are generally not owner operated. Most owners pay their crew by the share system. In general the crew are younger men. Captains range in age from 23 years on up. A few of the captains have Masters or Bachelors degrees and some are high school graduates. A few African-Americans are part of the crews, and at least one boat had an African-American captain. Some of the boats from North Carolina also have African-American captains and crews.

No women are currently participating in fishing activities. However, in the past there have been a couple of women involved in fishing. In fact, there was a woman captain on a transient gill-net boat from New England.

According to McCay *et al.* (1993), the port and community of Ocean City is described as follows:

> "The principal ocean fishing port of Maryland is Ocean City. Ocean City is a commercial fishing community with families that have been involved in fishing for at least sixty years. Ocean City is made up of approximately ten miles of barrier island and is next to an inlet that was created during a hurricane in the 1930s (Lipton and Strand 1983:1-2). Ocean City is currently the primary port for ocean fishing vessels in Maryland. Its boats are primarily smaller boats; they are either inshore boats or small trawler, day boats. Its harbor area is directly west of the inlet at the southern end of the city and is one and a quarter miles from the ocean (see Lipton and Strand 1983:1-2 for further description)."
>
> "In the last fifteen years, Ocean City has grown into its current status as a summer resort area. It has a permanent population of about 10,000 to 14,000 and a summer population of about 250,000 to 300,000. Many hotels, condominiums and summer homes as well as other service businesses for the summer tourists exist in Ocean City. One informant said that Worcester County is the wealthiest county in

> Maryland precisely because of the revenue generated by tourism. Major sources of employment such as work in tourist businesses and construction are thus related to the mainstay of the economy--tourism. Most of Ocean City's growth has occurred gradually over the last fifteen years. However, new development is not taking place at the same levels it did in the past. Thus most of the construction jobs involve the maintenance of current structures. In fact, fishermen are also finding it hard to go into other industries such as crabbing or construction because these are depressed as well."

According to McCay *et al.* (1993), there is no direct competition for docking space between commercial and recreational boats in Ocean City. However there are more marinas for recreational boats than for commercial boats.

9.2.2.7.1.3. Cape May, New Jersey

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

The total landed value of all species for the Cape May/Wildwood area was approximately $37 million in 1992. Cape May alone landed about $30.4 million, Wildwood landed $4.5 million, and other ports in the Cape May area landed $2.3 million. The landed value of the major species landed in 1992 included sea scallops (28%), ocean quahog (11%), *Illex* squid (10%), *Loligo* squid (9%), and surf clams (8%). Black sea bass contributed 2% of the total landed value of all species. Other ports in this area and the statistics that follow include Cold Spring Harbor, near Cape May, and Sea Isle City, located to the north. There are now two tilefish boats, two fish trap (pot) boats and one dragger working out of Sea Isle City. Tilefish and black sea bass are species targeted.

The general outline of Cape May/Wildwood fisheries is described by McCay *et al.* (1993):

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

Bottom fish otter trawling, along with bottom sea scallop trawling accounted for 39% of the total landed value by gear in the Cape May/Wildwood area in 1992. The major species caught by value by bottom fish otter trawl in 1992 were: *Illex* squid (27%), *Loligo* squid (25%), and summer flounder (20%). Black sea bass ranked seventh with 2%.

Scallop dredges landed 28% of the total value landed in Cape May by gear type in 1992. Black sea bass contributed 0.01% of the total landed value for scallop dredgers. Off-shore lobster pots landed 2% of the total landed value landed in Cape May by gear type in 1992. Black sea bass contributed 3% of the total landed value for wire pots, and 9% for plastic pots.

Different species may be targeted at different times of the year by different types of boats or gear. *Loligo* squid is targeted during the winter by freezer trawlers. Once aboard the boat the squid is flash frozen into blocks of ice and kept in cold storage until the boat reaches port. The demand for *Loligo* squid is mostly for an export market in flash frozen squid. To a lesser extent, squid is marketed domestically in the fresh fish markets in New York and Philadelphia. Both the domestic and foreign markets are slowly growing.

Illex squid is the largest summer fishery for freezer trawlers. It is a relatively new fishery because *Illex* is very susceptible to higher temperatures. Recirculating sea water technology is required to handle large volumes of *Illex*. However, flash freezers are desirable in order to ensure a better product. *Illex* is mainly marketed as a flash frozen product in Europe.

Butterfish sometimes is a bycatch of the squid fishery. When butterfish is caught with large amounts of squid, it is unmarketable (sometimes it is consumed by the captain and crew of the vessel). However, if landed in considerably large quantities it can be marketed.

During the winter, scup sometimes is targeted by RSW and normal trawlers. Mixed trawl and porgy nets are employed to fish for scup. The product is marketed in the fresh fish markets.

Cape May is the most southerly town in New Jersey. Cape May has a vibrant tourist and beach economy during the summer. The commercial docks are located along one stretch of the road separated from the rest of the community.

9.2.2.7.1.4. Montauk Area, New York

The Montauk area ports (Montauk, Shinnecock/Hampton Bay, and Greenport) had a total of $28 million in landings of fish and shellfish in 1992. Black sea bass accounted for less than 1% of the total landed value in the area in 1992. The Montauk area is characterized by a high diversity of species and gear types, reflecting the coexistence of estuarine, inshore, and offshore fisheries. An interesting fishing innovation called "double crewing" has developed in Montauk and other ports. The double crew strategy provides the boats and the crew with a greater degree of operational flexibility. According to McCay *et al.* (1993):

> "Boats that double crew have two sets of captains and crews. In a double crewing situation one set of captain and crew comes in and unloads the boat and then the other captain and crew comes on board and takes the boat out for another trip. "They are willing to spend money, they are making money, and they are doing it by making the boat work harder," said one informant regarding double crewing. This same person commented that one of the reasons they are working the boats harder today in 1993 than fifteen years ago are the large mortgages that are on these vessels that they did not have before."

There are between 20 and 35 draggers in Montauk. The major gear types, in terms of percentage of landed value in 1992 were: bottom dragging (finfish) 40%, tilefish longlining (25%), and pelagic longlining (swordfish and tuna) 18%. Handlining (scup, black sea bass, and Atlantic mackerel) accounts for 6% of the total landed value.

Loligo squid is the main target of the Montauk fishing fleet. The contribution of black sea bass to the total landed value per species for bottom draggers is minimal. The typical dragger in Montauk is owner operated, and vessels might have a second captain and a double crew.

There are approximately fifty-five commercial fishing boats operating in the Shinnecock/Hampton Bays area. Most of these boats are draggers. Otter trawlers and dredgers (scallop/ocean quahog) accounted for 66% and 24% of the total landed value for all species in these ports in 1992, respectively.

The top four species in landed value in 1992 in this area were: *Loligo* squid, silver hake, ocean quahog, and surf clam. They contributed for about 68% of the total landed value. *Loligo* accounted for 27% of the total landed value (97% caught by trawlers). Black sea bass ranked twenty-six, with 0.18% of the total landed value by species for the same period.

Loligo squid and whiting are the major targeted species for draggers from the Shinnecock/Hampton Bays area, representing 66% of the total landed value for all species in 1992. Black sea bass ranked nineteen with 0.17% of the total landed value. *Loligo* squid and whiting are both targeted all year round. Scup is targeted for about three to four weeks as they migrate through the Hampton area.

Sink gill netting and inshore lobster potting were the third and fifth fisheries in terms of total landed value in 1992, (5% and 1%, respectively). However, they do not target black sea bass.

Pound nets represented 0.13% of the total value for all species in 1992. *Loligo* squid accounted for approximately 34% of the total landed value for pound nets in 1992, scup for 16%, winter flounder for 14% and butterfish for 10%. Black sea bass is not targeted by this type of gear.

Based on McCay *et al.* (1993), fishery trends and changes in Shinnecock indicate that:

> "Whiting has always been targeted but more so in the last six months (July-December 1993) because of a new market for juvenile whiting. Within the last year (1993), very small whiting has become a big export item to Spain. The Spanish want the really small whiting; it is prepared by putting the tail in the mouth like a donut and frying it. There are about a half a dozen boats targeting small whiting as of December 1993. There is an export operation in Greenport for these small whiting."
>
> "According to informants, whiting and squid are plentiful right now, (December 1993). Scup are becoming harder and harder to get every year. The species caught by Shinnecock boats depends on availability and the market. If whiting is in big demand, the fishermen go for that."

Ninety-five percent of the fish (except squid, swordfish, and tuna) in Shinnecock goes to Fulton Market in New York. Swordfish and tuna are sold by the vessel owner. Squid is usually sent to New Jersey for processing.

The social nature of the Shinnecock fishing community indicates that most boats are owner operated. Many fishermen in Shinnecock have families in the commercial fishing industry. It is also evident that father-son operations are more common in this community than in Montauk.

The crews are mostly integrated by local men that are not usually family members. Crews are paid using the share system. Most crew members in Shinnecock are white males with about 60-70% of them having a high school education.

At the present time, there are no women fishing in Shinnecock. However, fishermen's wives have been very active in pushing for the maintenance of the Shinnecock Inlet.

In addition to a stable year-round population, Hampton Bays has a large tourist community. Numerous businesses such as bars, banks, liquor stores and restaurants cater to the tourist. The growth of the service industry in the area provides additional opportunities of summer employment in the community. Overall, construction, fishing and tourism are the largest sources of employment.

In Shinnecock a small number of support businesses to the fishing industry exist. There is one craftsman who does boat work exclusively. Welders and wood workers can do wood work as well

as other types of work. Their electronic repairmen in the community are very specialized in marine electronics.

Three principal types of fishing are done by Greenport vessels: bottom dragging, offshore and inshore potting, pound netting and gillnetting. Between ten and twenty otter trawlers are home ported in Greenport. These bring about 60% of the total landed fish value. Offshore and inshore potting accounted for more than 25% of the landed value by gear in 1992. There are ten boats in the pound net fishery, which account for about 6% of the total landed value by gear in 1992. The five major species caught as a percent of the total landed value by all gear in 1992 were: lobster (28%), *Loligo* squid (13%), silver hake (12%), scup (9%), and summer flounder (7%). Black sea bass is not considered a major species in the Greenport area.

Loligo squid, whiting, scup, winter flounder, and summer flounder were the top five species by landed value for Greenport otter trawlers in 1992, with 21%, 20%, 14%, 10%, and 10% of the total landed value of otter trawlers, respectively. Black sea bass accounted for less than one percent of the total landed value of otter trawlers. Black sea bass are not rarely caught by otter trawlers because their stocks are down and the draggers do not target them. None of the boats target black sea bass specifically but they are a bycatch in the summer months. Scup is typically targeted in the late fall and early winter. *Loligo* squid is targeted in the spring and fall and it is also a bycatch with whiting. Summer flounder are targeted during the summer and through the fall.

Lobster potting is the second most important fishery in Greenport in terms of landed value. Black sea bass contributed 0.24% of the total landed value by species for inshore lobster pots.

Pound-net fishing accounts for a small percentage of the total landed value in Greenport. In 1992, black sea bass accounted for 0.06% of the total landed value for pound-netters.

The number of boats engaged in fishing activities in Greenport has been increasing in the last two to six years. This has created an upward trend in the importance of ancillary services such as ice and fuel. Other support businesses include a local welding business and Greenport Yacht and Shipping. These last two businesses are diversified and serve both commercial and recreational boats.

There are three packing facilities in Greenport. Most of the fish either go to Fulton market in New York or are exported (juvenile whiting).

To an extent, family is important in commercial fishing in Greenport. About half of the boats may have a family member (primarily a son) working on the boats. During the summer a number of high school students may work aboard a relative's boat.
The crews are full-time, local men. Most fishermen are high school or college graduates. The average age of the crew members and captains is between 25 and 35, and 40 to 60 years of age, respectively. The crews are typically paid using the share system.

There are no women working as part of the crews or the packing staff. However, some wives may be involved in other support aspects of the fishing operations.

The ethnic background of the fishing community in Greenport is quite diverse. There are African-Americans, Puerto Ricans, Russians and Poles working either as crews or as packing staff.

9.2.2.7.1.5. Freeport/Brooklyn Area, New York

According to McCay *et al.* (1993), there is a total of 71 permitted commercial fishing vessels in Freeport and 33 in Brooklyn. The average length, gross tonnage and horse power are slightly larger in the Brooklyn vessels than in the Freeport vessels.

The total value of all species landed in the area was about $4 million in 1992. Surf calms

represented the most important fisheries in terms of landed value (45%), followed by *Loligo* (13%), summer flounder (11%), scup (10%), lobster (6%), winter flounder (2%), and black sea bass (1%). In 1992, the majority of the landed value by gear type corresponded to bottom otter trawls with 48%, and surf clam dredges with 45%. The four major species targeted by otter trawlers in the Freeport area are whiting, winter flounder, summer flounder and squid.

There are three lobster boats working out of Freeport. Some fishermen have unsuccessfully tried potting for scup and black sea bass, and according to some Freeport fishermen, no one in Nassau County fishes with traps (McCay *et al.* 1993). Inshore and offshore lobster potting accounted for about 6% of the total landed value by gear in the area in 1992.

The otter trawl boats pay on the share system, and most boats use a captain and a crew member. The dredgers are all owner operated and mostly day boats.

The level of tourism in the Freeport area is substantial. Freeport is located near Jones Beach and has a number of charter boats.

9.2.2.7.2. Individual level - Commercial fishery

The possibility of significant impacts of the management actions may be expected to be quite different at the individual level than at the "global" or "port level." That is, the proposed management actions may significantly affect a specific group of fishermen employing specific gear types that depend or mainly target the species being managed. The purpose of this section is to address the potential effects at the individual level of the proposed management actions.

Table 58 shows the degree of specialization in the black sea bass fishery by gear type for selected ports from Gloucester, Massachusetts, to Hampton Roads, Virginia. The hook and line fishery in Hampton Roads, Virginia is an example of specialization or "reliance" on the fishery. Even though only 6% of the value of black sea bass throughout the region caught with hook and line gear was landed in Hampton Roads, black sea bass represented about 98% of the landed value of fish caught with hook and line in this port (Table 58).

Table 10 indicates that the hook and line fishery accounted for 5% of the landings from 1983-1992. able 11 indicates that, on average, black sea bass was predominantly targeted by hook and line in Massachusetts, New York, Virginia, and North Carolina. According Finlayson *et al.* (1994), this fishery is largely confined in the Hampton Roads area, Virginia (Table 58). Hook and line fishermen typically target large fish and the minimum size limit addressed in the FMP is not expected to substantially affect this fishery. The hook and line specialists are not likely to be affected by the minimum size limit addressed in the FMP. These fishermen fish for large black sea bass by employing large hooks.

In addition to this, "weekend warriors" may also participate in the black sea bass fishery. The degree to which this type of activity extends is not known. "Weekend warriors" are described by Finlayson and McCay (1994) as follows:

> "...people who may have full-time jobs during the week but who have developed private unregulated and unreported markets for the fish they catch on the weekends. They may sell to restaurants or to retail fish markets. They may have very sophisticated electronics and fish-finding gear including color side-scan sonar. They may be using multiple rods with motorized reels. It is impossible to estimate with any useful precision how many of these people are out there or what their impact is on the stocks. But most commercial fishermen are in agreement that their numbers are large and that their aggregate catch is significant."

Table 11 indicates that, on average, 33% of the commercial landing of black sea bass from Maine to Cape Hatteras (NC) for the 1983 - 1992 period were made by pots and traps for fish. In

Connecticut, a 8" total length recreational and commercial size limit has been established by state laws, and in New York and New Jersey, a 8" total length commercial size limit is in effect. It is expected that the two management alternatives most relevant to this fishery (escapement and minimum size limit) will have little negative impact. Finlayson and McCay (1994) indicated that some of the fishers and dealers interviewed indicated that the presence of large quantities of relatively small black sea bass in the market, depresses the price for larger fish.

Fifty-six percent of all the black sea bass commercially landed from Maine to Cape Hatteras, NC, from 1983 - 1992 were landed by otter trawls (Table 10). The mixed-trawl fishery takes an economically significant bycatch of black sea bass, mainly in the fall and winter. This bycatch is important because it helps covering part of the total annual expenses for these boats. Direct tows for black sea bass are occasionally made by trawlers when wintering schools concentrate in deep waters on relatively open bottom.

9.2.2.7.3. Recreational fishery

Section 2.3.1 of the RIR provide detailed discussions of the potential effects of the proposed management plan on the recreational fishery.

The group of individuals that could be most likely affected by the possession and minimum size limits are fishermen that are largely interested in obtaining very large catches per fishing trip. Such as fishermen that participate in the "party" or "head boats" fishery.

"Party" or "head" boats are described by Finlayson and McCay (1994) as follows:

> "...boats which take large numbers of people out for a day or half-day fishing for a fee. From the point of view of the owners, skippers, and crew of these boats, this is a business and is therefore, in a sense, a commercial fishery. A significant portion of the "party" or "head' boat business from Massachusetts to Virginia is now comprised of organized bus tours from remote urban centers whose subscribers are fishing for personal and family sustenance and/or monetary gain, and seek, and sometimes find, very large catches. The demographics of this sub-set of the recreational fishery should be the subject of further detailed study. The fishers are best characterized as "ethnic" with Spanish, Italian, Greek, and Portuguese-speaking people appearing to predominate in the northern Scup fishery while African Americans from urban centers such as Philadelphia and Washington predominate in the ports from Cape May south. Anecdotal evidence suggests that many of these recreational fishers see the $30-50 dollar fee for a day's fishing as money well-spent if they can return with 100 lbs. or more of fish in their cooler. Whether these fish are primarily destined for personal or family consumption or for sale is not known although many commercial fishers believe that the latter is true. Certainly, some of the practices used by the operators of these boats such as cash pools for "high hook"--the person who catches the greatest number or weight of fish-- should receive critical attention from management."

Table 32 indicates that the average total cost for a day trip for selected states for party boats ranges from $43 to $137. It is likely that the implementation of size and bag limits would mostly have some impact on the number of individuals that are willing to pay between that range for a fishing day.

The degree of the impact derived from different management actions would depend on the experience and expectations of what constitutes a "good fishing trip" and the degree to which these boats have become dependent upon people fishing for subsistence or sale.

A survey of charter and party boats conducted in 1990, indicates that for "party boats", the relative customer interest for black sea bass ranked sixth after summer flounder and stripe bass.

For "charter boats", the relative customer interest for black sea bass, along with hakes ranked last (Table 34) Overall, the proposed management alternatives in the FMP are likely to have minimal impacts on the recreational fishery.

9.2.2.8.4. Summary

According to the 1992 landings statistics, black sea bass is not of critical importance to the commercial fishery industry in the ports addressed above. Given the degree of port reliance on black sea bass, it can be expected that the proposed regulatory measures will have a minimal effect on the communities and local economies of these ports. The effects of proposed regulations on individual commercial fishermen and recreational fishermen are also expected to be minimal.

The adopted management measures are considered the most reasonable 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. It will also provide 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.

In terms of the consultative requirement of this provision of the Magnuson Act, since the management unit of the FMP is black sea bass in US waters in the western Atlantic Ocean from Cape Hatteras, North Carolina northward to the US - Canadian border, the South Atlantic and New England Councils were invited and did designate members of their Councils to the Mid-Atlantic Council's Demersal Species Committee, the oversight committee for this FMP. Additionally, both Councils were invited to appoint industry advisors to the Mid-Atlantic Council Black Sea Bass Advisory Panel.

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 can cause significant nontarget species fishing mortality on other stocks. In addition, black sea bass are food items for many commercially and recreationally important fish species. Black sea bass also utilize many finfish and invertebrate species as food items.

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 59). 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.

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

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

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

The range of black sea bass 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

National marine sanctuaries are allowed to be established under the National Marine Sanctuaries

Act of 1973. Currently there are 11 designated marine sanctuaries (Figure 16) that creates a system that protects over 14,000 square miles (National Marine Sanctuary Program 1993).

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

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

NOAA/NOS issued a proposed rule on 8 February 1991 (56 FR 5282) proposing designation under MPRSA of the Stellwagen Bank National Marine Sanctuary, in Federal waters between Cape Cod and Cape May, Massachusetts. On 4 November 1992, the Sanctuary was Congressionally designated. Implementing regulations (15 CFR 940) will became effective March 1994. Commercial fishing is not specifically regulated by Stellwagen Bank regulations. The regulations do however call for consultation between Federal agencies and the Secretary of Commerce on proposed agency actions in the vicinity of the Sanctuary that "may affect" sanctuary resources. The process for consultation is currently (late 1995) being worked out between the Regional office of NMFS, the Sanctuary, and NEFMC for Amendment 7 to groundfish. Correspondence for this sanctuary should be addressed to: Stellwagen Bank NMS, 14 Union Street, Plymouth, MA. 02360.

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

9.3.3.3. Indian treaty fishing rights

No Indian treaty 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.

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

Several states have minimum size limits pertaining to the possession of black sea bass. Massachusetts has the largest size limit (12" TL), which applies to both the commercial and recreational fisheries. The Rhode Island (10" TL) and Connecticut (8" TL) minimum size limits also apply to all fisheries. New York and New Jersey have 8" TL minimum size limits for black sea bass which apply to the commercial fisheries only. North Carolina has an 8" TL minimum size limit which applies to both commercial and recreational fisheries from Cape Hatteras and south. None of the remaining states in the management unit (ME, NH, DE, MD, VA) regulate the minimum size of black sea bass. Some states have minimum mesh size requirements, but none pertain directly to black sea bass. Minimum mesh requirements vary by state, area, and season. Massachusetts requires a special moratorium permit for black sea bass pots. In addition, many of the states have season, area and gear restrictions which may affect fishing for black sea bass. No state has a recreational possession limit pertaining to black sea bass.

State regulations for black sea bass are summarized in Table 60.

9.3.4.2. Impact of Federal regulations on State management activities

The management measures of this Amendment complement or are identical to those proposed by ASMFC for the coastal States.

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.

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 black sea bass fisheries into the overall NEFC data bases. Additionally, improved stock assessments are necessary for FMP monitoring. As a result of that monitoring, the Councils and ASMFC will determine whether it is necessary to amend the FMP.

The primary organization in the review and monitoring process will be the Black Sea Bass FMP Monitoring Committee (section 9.1.2.2).

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

Estimates of discarded black sea bass will be very important for monitoring the effectiveness of the minimum size and gear regulations and 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 black sea bass fishing mortality to accurately describe the level of discard. It must be recognized that this sea sampling will likely involve some vessels not in the directed black sea bass fishery, but vessels in the squid and groundfish fisheries, for example, where large quantities of black sea bass are caught and possibly discarded.

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Table 1. The NEFC autumn inshore survey index (stratified mean number per tow) for black sea bass pre-recruits and the spring offshore survey index (stratified mean number per tow) for black sea bass recruits.

Year	Pre-recruit No/tow	Recruit No/tow
1972	0.02	0.49
1973	0.45	0.87
1974	0.33	2.36
1975	3.95	2.02
1976	0.93	1.62
1977	15.87	6.09
1978	0.08	2.94
1979	0.91	5.21
1980	0.60	1.41
1981	0.10	0.89
1982	11.63	0.20
1983	1.42	0.67
1984	0.61	0.25
1985	2.90	0.39
1986	6.66	2.06
1987	0.34	1.17
1988	0.26	0.68
1989	2.17	0.76
1990	0.46	1.00
1991	0.74	1.13
1992	0.45	1.99
1993	0.03	0.87
1994	5.60	0.28
Mean	2.35	1.54

Table 2. The probability that a female black sea bass will transform to a male by size.

SL (cm)	TL (in)	Probability of Transition
7	2.7	0.000
8	3.3	0.010
9	3.8	0.015
10	4.4	0.025
11	4.9	0.050
12	5.5	0.072
13	6.1	0.100
14	6.6	0.125
15	7.2	0.145
16	7.7	0.150
17	8.3	0.151
18	8.9	0.152
19	9.4	0.152
20	10.0	0.150
21	10.5	0.140
22	11.1	0.130
23	11.7	0.120
24	12.2	0.110
25	12.8	0.095
26	13.3	0.080
27	13.9	0.060
28	14.5	0.045
29	15.0	0.035
30	15.6	0.030
31	16.1	0.025
32	16.7	0.020
33	17.3	0.015
34	17.8	0.010
35	18.4	0.005
36	18.9	0.002
37	19.5	0.001
38	20.0	0.000

Source: Gary Shepherd pers. comm.

Table 3. The mean back-calculated lengths (TL inches) at age for black sea bass collected from the Mid-Atlantic, 1973-75.

		AGE								
	N	1	2	3	4	5	6	7	8	9
male	972	3.7	8.0	10.6	12.4	14.2	16.4	18.2	19.2	20.3
female	1797	3.8	7.9	10.2	12.0	13.4	14.4	17.6		
combined	2905	3.7	8.0	10.4	12.2	13.9	15.7	18.2	19.2	20.3

Table 4. Estimates of fishing mortality (F) and corresponding exploitation rates (Exp) for black sea bass based on the results of virtual population analysis.

Year	F	Exp (%)
1984	1.16	63.4
1985	1.32	67.8
1986	1.57	73.6
1987	1.17	63.7
1988	1.45	71.0
1989	1.09	61.2
1990	1.13	62.5
1991	2.03	81.2
1992	1.89	79.2
1993	1.05	59.9

Source: NEFSC 1995.

Table 5. Spatial distribution and relative abundance of black sea bass in the Mid-Atlantic Estuaries.

Species/Life Stage		Waquoit Bay			Buzzards Bay			Narragansett Bay			Long Island Sound			Connecticut River			Gardiners Bay		
		*	M	S	*	M	S	T	M	S	T	M	S	T	M	*	*	M	S
Black sea bass	A			√		√	O		√	O		√	√					√	O
	S						O												
Centropristis striata	J			√		√	O		√	O		√	O					√	O
	L						O			√									
	E						O												

Species/Life Stage		Great South Bay			Hudson R./ Raritan B.			Barnegat Bay			New Jersey Inland Bays			Delaware Bay			Delaware Inland Bays		
		*	M	S	T	M	S	T	M	S	T	M	S	T	M	S	*	M	S
Black sea bass	A			O		√	√		O	◉		O	◉		√	O			√
	S																		
Centropristis striata	J					√	√		O	◉		O	◉		O	O		O	O
	L									√									
	E																		

Species/Life Stage		Chinco-teague Bay			Chesapeake Bay Mainstem			Chester River			Choptank River			Patuxent River			Potomac River		
		*	*	S	T	M	S	T	M	*	T	M	*	T	M	*	T	M	*
Black sea bass	A			O		O	O		√			√			√			√	
	S																		
Centropristis striata	J			O		O	O		√			√			√			√	
	L																		
	E																		

Species/Life Stage		Tangier / Pocomoke Sound			Rappa-hannock River			York River			James River		
		*	M	*	T	M	*	T	M	*	T	M	*
Black sea bass	A		O			√			√			O	
	S												
Centropristis striata	J		O			√			√			O	
	L												
	E												

Relative Abundance

- ● Highly Abundant
- ◉ Abundant
- O Common
- √ Rare
- Blank Not Present

Salinity Zone

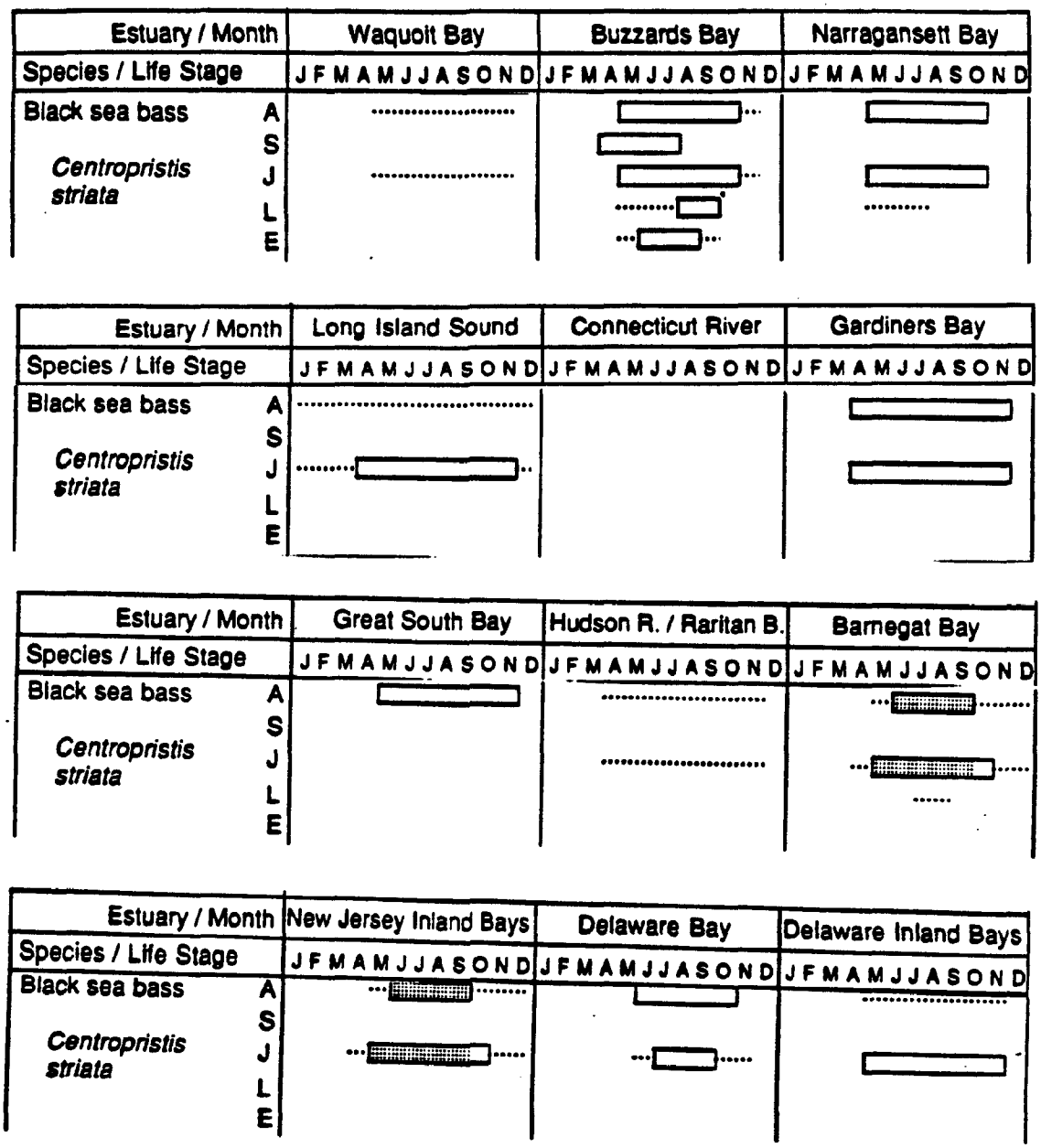
- T - Tidal Fresh
- M - Mixing
- S - Seawater
- * - Salinity zone not present

Life Stage

- A - Adults
- S - Spawning adults
- J - Juveniles
- L - Larvae
- E - Eggs

Source: USDC 1994a.

Table 6. Temporal distribution of black sea bass in Cape Cod through Delaware Inland Bays.



Source: USDC 1994a.

Table 7. Temporal distribution of black sea bass in Maryland and Virginia Estuaries.

Estuary / Month		Chincoteague Bay	Chesapeake B. mainstem	Chester River
Species / Life Stage		J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D
Black sea bass	A	▭	···▭···	·····
	S			
Centropristis striata	J	▭	···▭···	·····
	L			
	E			

Estuary / Month		Choptank River	Patuxent River	Potomac River
Species / Life Stage		J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D
Black sea bass	A	·····	·····	·····
	S			
Centropristis striata	J	·····	·····	·····
	L			
	E			

Estuary / Month		Tangier/Pocomoke Sd.	Rappahannock River
Species / Life Stage		J F M A M J J A S O N D	J F M A M J J A S O N D
Black sea bass	A	···▭···	·····
	S		
Centropristis striata	J	···▭···	·····
	L		
	E		

Estuary / Month		York River	James River
Species / Life Stage		J F M A M J J A S O N D	J F M A M J J A S O N D
Black sea bass	A	·····	···▭···
	S		
Centropristis striata	J	·····	▭
	L		
	E		

Relative Abundance

- ▬ Highly Abundant
- ▒ Abundant
- ▭ Common
- ——— Rare
- Blank Not Present

Life Stage

- A - Adults
- S - Spawning adults
- J - Juveniles
- L - Larvae
- E - Eggs

Source: USDC 1994a.

Table 8. Preliminary ranking of major threats to living marine resources and habitats in the Northeast.

1.	Urban and port development *
2.	Ocean Disposal #
3.	Dams
4.	Agricultural Practices ●
5.	Industrial Waste Discharges @
6.	Domestic Waste Discharges @
7.	OCS Oil and Gas Development
8.	Insect Control
9.	Water Division
10.	Sand and Gravel Mining
11.	Power Generation

* Includes dredge and fill and construction activities covered by Section 10/104 permits, as well as point source pollution covered by NPDES permits and nonpoint source pollution.

\# Includes dredged material disposal in State waters, as well as actual ocean dumping of dredged material, sewage sludge, etc., covered by Section 103 permits.

● Includes nonpoint source pollution (fertilizers, animal wastes, biocides, sediments, heavy metals, etc.) that affects coastal aquatic areas.

@ Point source pollution covered by NPDES permits.

Source: USDC, 1985.

Table 9. Commercial and recreational landings (thousands of pounds) of black sea bass.

Year	Comm	Rec	Total	% Comm	% Rec
1983	3336	5776	9112	37	63
1984	4332	2840	7172	60	40
1985	3420	4836	8256	41	59
1986	4191	14233	18424	23	77
1987	4168	2194	6362	66	34
1988	4143	5151	9294	45	55
1989	2918	3588	6506	45	55
1990	3502	3300	6802	51	49
1991	2805	4568	7373	38	62
1992	3007	3246	6253	48	52
Avg	3582	4973	8555		

Source: NMFS General Canvass and MRFSS Data.

Table 10. Black sea bass commercial landings by gear, Maine to Cape Hatteras, North Carolina, 1983 - 1992 combined.

GEAR	1000 Lbs	Percent
Haul Seines, Beach	0	*
Haul Seines, Long	0	*
Haul Seines, Long(Danish)	0	*
Stop Nets	0	*
Otter Trawl Bottom, Fish	20,403	56
Otter Trawl Bottom, Lobster	6	*
Otter Trawl Bottom, Scallop	30	*
Otter Trawl Bottom, Shrimp	0	*
Trawl Midwater, Paired	82	*
Trawl Bottom, Paired	5	*
Scottish Seine	0	*
Pound Nets, Fish	77	*
Pound Nets, Other	2	*
Floating Traps (Shallow)	401	1
Fyke And Hoop Nets, Fish	0	*
Pots And Traps, Conch	0	*
Pots And Traps, Crab, Blue	28	*
Pots And Traps, Fish	11,936	33
Pots And Traps, Lobster Inshore	483	1
Pots And Traps, Lobster Offshore	153	*
Pots And Traps, Other	1	*
Gill Nets, Other	29	*
Gill Nets, Drift, Other	13	*
Gill Nets, Drift, Runaround	5	*
Gill Nets, Stake	0	*
Trammel Nets	0	*
Lines Hand, Other	2,113	5
Lines Troll, Other	14	*
Lines Long Set With Hooks	11	*
Spears	0	*
Dredges Scallop, Sea	22	*
Unknown Gears	0	*
All Gear	35,827	100

Source: Unpublished NMFS General Canvass Data.

Table 11. Black sea bass commercial landings by state and gear type, 1983 - 1992 combined.

	State									
	ME % 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
GEAR										
Haul Seines, Beach	.	.	.	.	.	.	0.0	.	.	.
Haul Seines, Long	.	.	.	.	.	.	.	.	.	0.0
Haul Seines, Long(Danish)	.	0.0	.	.	.	.	.	.	.	.
Stop Nets	.	.	0.0	.	.	.	.	.	.	.
Otter Trawl Bottom, Fish	58.0	17.9	84.8	65.0	70.8	50.9	.	8.9	81.6	82.2
Otter Trawl Bottom, Lobster	.	.	.	.	0.0	.	.	.	0.1	.
Otter Trawl Bottom, Scallop	.	.	.	.	.	0.0	.	0.1	0.3	0.0
Otter Trawl Bottom, Shrimp	.	.	0.0	.	.	.	.	.	.	0.0
Trawl Midwater, Paired	.	2.5	0.0	.	.	.	.	.	.	.
Trawl Bottom, Paired	.	.	0.2	.	0.0	.	.	.	.	.
Scottish Seine	.	0.0	0.0	.	.	.	.	.	.	.
Pound Nets, Fish	.	2.1	.	.	0.4	0.0	.	0.0	0.0	0.0
Pound Nets, Other	.	0.1	.	.	.	.	.	.	.	.
Floating Traps (Shallow)	.	.	10.8	.	.	.	.	.	.	.
Fyke And Hoop Nets, Fish	.	.	.	.	.	.	.	0.0	.	.
Pots And Traps, Conch	.	.	.	.	.	.	.	0.0	.	.
Pots And Traps, Crab, Blue	.	.	.	.	.	0.0	.	.	0.3	.
Pots And Traps, Fish	.	67.0	0.8	29.8	0.0	45.5	97.0	89.8	7.4	1.5
Pots And Traps, Lobster Inshore	.	0.1	1.7	2.2	18.1	1.9	.	.	.	.
Pots And Traps, Lobster Offshore	.	.	0.3	.	2.4	0.7	2.0	0.3	0.0	.
Pots And Traps, Other	.	0.0	0.0	.	.	.	.	0.0	0.0	.
Gill Nets, Other	42.0	0.0	0.2	.	0.2	0.0	.	0.0	0.1	0.0
Gill Nets, Drift, Other	.	.	.	0.1	0.2	0.0	0.0	0.1	0.1	.
Gill Nets, Drift, Runaround	.	.	.	.	.	0.1	.	.	.	.
Gill Nets, Stake	.	.	.	0.1	.	.	.	.	.	.
Trammel Nets	.	.	.	.	.	0.0	.	.	.	.
Lines Hand, Other	.	10.1	0.8	2.8	7.8	0.8	0.9	0.8	9.9	16.3
Lines Troll, Other	.	.	0.4	.	.	.	.	.	.	.
Lines Long Set With Hooks	.	0.2	.	.	0.0	0.0	.	.	0.0	.
Spears	.	.	0.0	.	.	.	.	.	.	.
Dredges Scallop, Sea	.	0.0	0.0	.	.	0.1	.	0.0	0.2	0.0
Unknown Gears	.	.	.	.	.	.	.	.	0.0	.
All Gear	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Unpublished NMFS General Canvass Data.

Table 12. Black sea bass commercial landings by year and gear type, Maine to Cape Hatteras, North Carolina.

	YEAR									
	83	84	85	86	87	88	89	90	91	92
	% of	% of	% of	% of	% of	% of	% of	% of	% of	% of
GEAR	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
Haul Seines, Beach	.	.	0.0	.	.	.	.	.	.	.
Haul Seines, Long	.	.	0.0	.	.	0.0	0.0	.	.	.
Haul Seines, Long (Danish)	.	.	0.0	.	0.0	.	.	.	.	.
Stop Nets	.	.	.	.	.	.	0.0	.	.	.
Otter Trawl Bottom, Fish	67.7	75.6	66.9	60.7	61.5	59.1	51.9	48.7	24.6	37.0
Otter Trawl Bottom, Lobster	.	0.1	0.0	.	.	.	.	.	.	.
Otter Trawl Bottom, Scallop	.	.	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.2
Otter Trawl Bottom, Shrimp	.	.	.	.	.	0.0	0.0	.	.	.
Trawl Midwater, Paired	0.3	0.4	0.0	0.3	0.2	0.3	0.5	0.2	0.0	0.0
Trawl Bottom, Paired	.	.	0.0	0.1	.	0.0	.	.	0.0	.
Scottish Seine	.	0.0	.	.	.	.	.	.	.	0.0
Pound Nets, Fish	0.2	0.4	0.1	1.0	0.1	0.1	0.0	.	0.1	0.0
Pound Nets, Other	.	.	.	.	.	.	0.0	0.0	.	0.0
Floating Traps (Shallow)	1.3	1.1	5.7	1.1	0.3	0.5	0.4	0.3	0.2	0.3
Fyke And Hoop Nets, Fish	.	.	.	.	.	.	0.0	.	.	.
Pots And Traps, Conch	.	.	.	.	.	.	.	.	0.0	0.0
Pots And Traps, Crab, Blue	0.0	.	.	0.1	0.1	0.0	0.1	0.0	0.1	0.5
Pots And Traps, Fish	22.8	16.7	17.0	28.5	32.6	33.5	39.4	43.2	61.9	50.8
Pots And Traps, Lobster Inshore	2.6	2.0	2.5	1.3	1.4	0.8	0.5	0.4	0.5	1.4
Pots And Traps, Lobster Offshore	0.1	0.4	0.7	0.5	0.1	0.2	0.2	0.6	1.3	0.5
Pots And Traps, Other	.	.	.	.	.	0.0	0.0	.	0.0	0.0
Gill Nets, Other	0.2	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.2	0.2
Gill Nets, Drift, Other	.	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1
Gill Nets, Drift, Runaround	0.0	0.0	0.0	0.0	.	0.0	.	0.0	0.1	0.0
Gill Nets, Stake	.	.	.	.	.	.	0.0	.	.	.
Trammel Nets	.	.	.	.	.	.	.	.	0.0	.
Lines Hand, Other	4.7	3.0	7.0	6.3	3.5	5.2	6.6	6.2	10.7	8.5
Lines Troll, Other	0.0	.	.	0.0	0.1	0.1	0.1	0.0	0.0	0.0
Lines Long Set With Hooks	0.0	0.2	.	.	0.0	0.1	.	0.0	0.0	0.0
Spears	.	.	.	.	.	.	.	.	.	0.0
Dredges Scallop, Sea	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.4
Unknown Gears	.	.	.	.	.	.	.	.	.	0.0
All Gear	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Unpublished NMFS General Canvass Data.

Table 13. Black sea bass commercial landings by year and water area, Maine to Cape Hatteras, North Carolina, all gears combined.

Year	State < 3 mi		EEZ > 3 mi		Total	
	1000 Lbs	% of Total	1000 Lbs	% of Total	1000 Lbs	% of Total
83	595	17	2,741	82	3,336	100
84	665	15	3,666	84	4,332	100
85	650	19	2,769	80	3,420	100
86	743	17	3,448	82	4,191	100
87	526	12	3,641	87	4,168	100
88	571	13	3,571	86	4,143	100
89	457	15	2,461	84	2,918	100
90	636	18	2,866	81	3,502	100
91	511	18	2,293	81	2,805	100
92	347	11	2,660	88	3,007	100
Mean	570	15	3,012	84	3,582	100

Source: Unpublished NMFS General Canvass Data.

Table 14. Black sea bass commercial landings by year.

REGION/AREA		Year 83	84	85	86	87	88	89	90	91	92
New England											
State	1000 Lbs	402	474	547	552	410	497	379	473	261	66
(<3 mi)	% REG	42	47	54	53	54	65	66	72	79	35
	% CST	67	71	84	74	78	87	83	74	51	19
EEZ	1000 Lbs	542	520	448	477	347	261	194	175	65	122
(>3 mi)	% REG	57	52	45	46	45	34	33	27	20	64
	% CST	19	14	16	13	9	7	7	6	2	4
All	1000 Lbs	945	994	996	1,029	758	758	574	649	327	188
	% REG	100	100	100	100	100	100	100	100	100	100
	% CST	28	22	29	24	18	18	19	18	11	6
Mid-Atlantic											
State	1000 Lbs	191	190	98	187	115	73	77	38	231	280
(<3 mi)	% REG	8	7	5	7	3	2	3	1	10	10
	% CST	32	28	15	25	21	12	16	6	45	80
EEZ	1000 Lbs	2,031	2,517	1,594	2,476	3,134	2,586	1,916	2,400	2,062	2,317
(>3 mi)	% REG	91	92	94	92	96	97	96	98	89	89
	% CST	74	68	57	71	86	72	77	83	89	87
All	1000 Lbs	2,222	2,707	1,693	2,664	3,249	2,659	1,993	2,438	2,293	2,598
	% REG	100	100	100	100	100	100	100	100	100	100
	% CST	66	62	49	63	77	64	68	69	81	86
North Carolina											
State	1000 Lbs	1	1	4	2	0	0	0	124	18	0
(<3 mi)	% REG	0	*	0	0	*	*	*	29	10	*
	% CST	*	*	0	*	*	*	*	19	3	*
EEZ	1000 Lbs	168	628	726	495	160	724	349	290	165	220
(3> mi)	% REG	99	99	99	99	99	99	99	70	89	99
	% CST	6	17	26	14	4	20	14	10	7	8
All	1000 Lbs	169	629	731	498	160	724	350	414	183	220
	% REG	100	100	100	100	100	100	100	100	100	100
	% CST	5	14	21	11	3	17	12	11	6	7
All											
State	1000 Lbs	595	665	650	743	526	571	457	636	511	347
(<3 mi)	% REG	17	15	19	17	12	13	15	18	18	11
	% CST	100	100	100	100	100	100	100	100	100	100
EEZ	1000 Lbs	2,741	3,666	2,769	3,448	3,641	3,571	2,461	2,866	2,293	2,660
(>3 mi)	% REG	82	84	80	82	87	86	84	81	81	88
	% CST	100	100	100	100	100	100	100	100	100	100
All	1000 Lbs	3,336	4,332	3,420	4,191	4,168	4,143	2,918	3,502	2,805	3,007
	% REG	100	100	100	100	100	100	100	100	100	100
	% CST	100	100	100	100	100	100	100	100	100	100

% REG = area % of regional total, % CST = area % of coastwide area total

Source: Unpublished NMFS General Canvass Data.

Table 15. Average ex-vessel commercial landings of black sea bass by month, Maine to Cape Hatteras, North Carolina, 1983 - 1992.

	Water Area		
	State (<3 mi)	EEZ (>3 mi)	All
	1000 Lbs	1000 Lbs	1000 Lbs
Month			
JAN	10	357	367
FEB	0	500	501
MAR	3	468	471
APR	9	342	352
MAY	125	290	416
JUN	90	218	309
JUL	44	118	162
AUG	27	88	115
SEP	26	84	110
OCT	43	131	175
NOV	18	148	167
DEC	4	146	151
All	406	2,895	3,301

Source: Unpublished NMFS General Canvass Data.

Table 16. Black sea bass commercial landings by year and state.

	Year									
	83	84	85	86	87	88	89	90	91	92
	1000 Lbs	1000 Lbs	1000 Lbs	1000 Lbs	1000 Lbs	1000 Lbs	1000 Lbs	1000 Lbs	1000 Lbs	1000 Lbs
State										
ME	6	.	.	.	.	1	3	1	.	.
MA	254	419	311	417	323	476	351	435	243	43
RI	674	562	671	607	358	220	208	197	74	140
CT	10	12	12	4	77	59	10	14	9	4
NY	76	160	131	208	245	121	77	71	91	111
NJ	855	826	642	798	1,109	1,180	840	989	1,033	1,244
DE	70	84	92	178	196	171	132	149	189	193
MD	180	244	220	435	492	394	295	342	481	468
VA	1,038	1,391	605	1,044	1,205	792	648	885	497	580
NC	169	629	731	498	160	724	350	414	183	220

Source: Unpublished NMFS General Canvass Data.

Table 17. Average annual commercial landings of black sea bass by state, 1983 - 1992.

State	10 Year Average Landings 1000 Lbs	Percent
ME	1	*
MA	327	9
RI	371	10
CT	21	0
NY	129	3
NJ	952	26
DE	145	4
MD	355	9
VA	868	24
NC	408	11
All states	3,582	100

Source: Unpublished NMFS General Canvass Data.

Table 18. The number ('000) of black sea bass caught and landed by recreational anglers each year 1983-1992.

	Catch	Landings	% Catch released
1983	10917	7565	31
1984	7242	4207	42
1985	11421	7305	36
1986	31455	23817	24
1987	6354	3762	41
1988	12357	5309	57
1989	7378	4968	33
1990	10282	4735	54
1991	11465	5516	52
1992	8900	3964	55
Mean	11777	7115	40

Source: Unpublished MRFSS data.

Table 19. Recreational landings ('000 lbs) of black sea bass by year and region, Maine to North Carolina.

	Number			Weight		
	NA	MA	SA*	NA	MA	SA*
1983	324	4903	2338	365	4359	1051
1984	86	2288	1835	63	1527	1249
1985	94	4814	2396	20	3131	1685
1986	563	23146	107	674	13515	44
1987	231	3103	429	59	1844	291
1988	233	4102	973	355	3731	1064
1989	93	4456	419	81	3214	293
1990	45	4305	384	50	2977	273
1991	45	5232	239	76	4358	133
1992	31	3620	312	29	2969	247
Mean	212	6613	1091	244	5187	729

* Include only NC Landings.
Source: Unpublished MRFSS data.

Table 20. The percent of total number and total weight of black sea bass landed by marine recreational fishermen from state waters and the EEZ in each Atlantic coast subregion, 1983-92.

Subregion	Year	State	EEZ	Unk	State	EEZ	Unk
North Atlantic							
	1983	45	53	2	46	53	1
	1984	27	73	-	33	67	-
	1985	54	46	-	98	2	-
	1986	61	39	-	62	38	-
	1987	55	45	-	75	25	-
	1988	58	42	-	59	41	-
	1989	82	18	-	99	1	-
	1990	70	30	-	66	34	-
	1991	95	5	-	94	6	-
	1992	78	22	-	75	25	-
	Mean	63	37	*	71	29	*
Mid-Atlantic							
	1983	16	82	2	7	91	2
	1984	56	42	2	36	63	2
	1985	34	65	-	25	75	-
	1986	56	42	2	46	53	2
	1987	64	36	-	54	46	-
	1988	29	71	-	20	80	-
	1989	49	51	-	44	56	-
	1990	33	67	-	24	76	-
	1991	39	61	-	24	76	-
	1992	37	63	-	38	62	-
	Mean	41	58	*	32	68	*
North Carolina							
	1983	16	83	1	15	83	-
	1984	17	83	-	1	99	-
	1985	19	81	-	6	94	-
	1986	66	34	-	48	52	-
	1987	18	82	-	19	81	-
	1988	18	82	-	8	92	-
	1989	33	67	-	21	79	-
	1990	38	62	-	28	72	-
	1991	47	53	-	48	52	-
	1992	40	60	-	37	63	-
	Mean	31	69	0	23	77	0

* = less than 1, - = zero.
Source: Unpublished MRFSS data.

Table 21. The average number ('000) and weight ('000 lbs) of black sea bass landed by recreational fishermen from each Atlantic coast subregion by mode and area, 1983-1992.

Number

Region and mode	State	EEZ	Unk	Total	% Reg	% Cst
North Atlantic						
Shore	2	-	*	2	1	*
Party/Charter	19	21	1	41	23	1
Private/Rental	79	53	132	75	2	-
Mid-Atlantic						
Shore	19	-	2	221	4	3
Party/Charter	1321	2416	19	3756	63	47
Private/Rental	1140	833	46	2019	34	26
North Carolina						
Shore	42	-	42	4	1	-
Party/Charter	23	523	*	546	58	7
Private/Rental	133	218	3	354	38	4
Total						
Shore	263	-	2	267	3	3
Party/Charter	1363	2960	20	5376	68	68
Private/Rental	1352	1104	49	2273	29	29

Weight

Region and mode	State	EEZ	Unk	Total	% Reg	% Cst
North Atlantic						
Shore	1	-	*	1	1	*
Party/Charter	14	20	*	34	19	1
Private/Rental	-	94	48	142	80	2
Mid-Atlantic						
Shore	74	-	*	74	2	1
Party/Charter	689	1866	12	2567	62	42
Private/Rental	620	877	23	1520	37	25
North Carolina						
Shore	-	17	-	17	3	*
Party/Charter	4	426	*	430	68	7
Private/Rental	53	132	1	186	29	3
Total						
Shore	92	-	99	2	2	-
Party/Charter	707	2312	12	4399	71	71
Private/Rental	767	1057	24	1663	27	27

* = less than 1, - = zero.
Source: Unpublished MRFSS data.

Table 22. The estimated number ('000) of black sea bass caught by recreational fishermen in each state as a percent of both the total Atlantic coast catch of black sea bass (% of CST) and the total recreational catch of all marine fish (AF) in each state, 1991.

State	BSB	% of CST	AF	% of AF
ME	-	*	2067	*
NH	*	*	639	*
MA	42	*	12001	*
RI	*	*	5559	*
CT	36	*	7979	*
NY	412	4	22536	2
NJ	3205	28	31803	10
DE	465	4	3642	13
MD	3057	27	25263	12
VA	3754	33	46373	8
NC	479	4	13654	4

* = less than 1, - = zero.
Source: Unpublished MRFSS data.

Table 23. Ex-vessel value of black sea bass commercial landings by year and water area, Maine to Cape Hatteras, North Carolina, all gears combined.

	State<3 mi		FEZ>3 mi		Total	
Year	1000 $	% of Total	1000 $	% of Total	1000 $	% of Total
83	635	25	1,826	74	2,462	100
84	740	21	2,635	78	3,376	100
85	764	23	2,503	76	3,268	100
86	1,067	25	3,071	74	4,138	100
87	785	18	3,479	81	4,264	100
88	1,005	22	3,417	77	4,423	100
89	909	24	2,780	75	3,690	100
90	960	24	2,975	75	3,936	100
91	973	27	2,538	72	3,511	100
92	472	14	2,684	85	3,157	100
Mean	831	22	2,791	77	3,622	100

Source: Unpublished NMFS General Canvass Data.

Table 24. Ex-vessel value of black sea bass commercial landings by year, Maine to Cape Hatteras, North Carolina.

Year	Nominal Value 1000 $	Nominal Price Mean	Mean Price in constant 1992 $
83	2,462	0.74	0.85
84	3,376	0.78	0.88
85	3,268	0.96	1.08
86	4,138	0.99	1.15
87	4,264	1.02	1.17
88	4,423	1.07	1.17
89	3,690	1.26	1.32
90	3,936	1.12	1.13
91	3,511	1.25	1.26
92	3,157	1.05	1.05

Prices adjusted with PPI (1982 = 100)

Source: Unpublished NMFS General Canvass Data.

Table 25. Average ex-vessel landings of black sea bass, value and price by month, Maine to Cape Hatteras, North Carolina, 1983 - 1992.

	Water Area								
	State(<3mi)			EEZ(>3mi)			All		
MONTH	1000 Lbs	Value in constant 1992 $ ('000)	Mean price in constant 1992 $	1000 Lbs	Value in constant 1992 $ ('000)	Mean price in constant 1992 $	1000 Lbs	Value in constant 1992 $ ('000)	Mean price in constant 1992 $
JAN	10	9	0.90	357	363	1.02	367	372	1.01
FEB	0	1	1.27	500	417	0.83	501	418	0.84
MAR	3	6	1.76	468	443	0.95	471	449	0.95
APR	9	14	1.53	342	355	1.04	352	370	1.05
MAY	125	174	1.39	290	260	0.90	416	434	1.04
JUN	90	118	1.30	218	169	0.77	309	287	0.93
JUL	44	70	1.59	118	141	1.20	162	212	1.30
AUG	27	56	2.05	88	126	1.43	115	182	1.58
SEP	26	51	1.94	84	109	1.30	110	160	1.45
OCT	43	86	1.97	131	147	1.12	175	234	1.34
NOV	18	34	1.85	148	188	1.27	167	223	1.33
DEC	4	7	1.72	146	189	1.29	151	196	1.30
All	406	630	1.55	2,895	2,911	1.01	3,301	3,542	1.07

Prices adjusted with PPI (1982 = 100)
Source: Unpublished NMFS General Canvass Data.

Table 26. Total landings and ex-vessel value for all finfish and shellfish, total landings and value for black sea bass, and black sea bass percent of total landings and value by state, 1992.

	All fish and finfish		Black Sea Bass		Black Sea Bass %	
	Total Landing (1,000 lbs)	Total Value ($1,000)	Total Landing (1,000 lbs)	Total Value ($1,000)	Total Landing	Total Value
ME	201,217	163,341	0	0	0.0	0.0
NH	10,328	11,503	0	0	0.0	0.0
MA	274,269	280,589	43	108	*	*
RI	141,655	85,681	180	179	0.1	0.2
CT	19,634	62,672	4	8	*	*
NY	50,112	53,985	111	206	0.2	0.4
NJ	204,368	97,500	1,244	974	0.6	1.0
DE	6,554	4,207	193	158	2.9	3.8
MD	57,067	36,424	468	429	0.8	1.2
VA	630,521	90,500	580	705	0.1	0.8
NC	154,035	57,458	220	385	0.1	0.7
Total	1,750,760	943,860	3,003	3,152	0.2	0.3

* less than 0.1%

Source: Fisheries of the United States 1994c.
Unpublished NMFS General Canvass data.

Table 27. Landings, ex-vessel value and price of black sea bass by size category for 1992, all states and gear combined.

Size Category	Landings (1,000 lbs)	Value ($ 1,000)	Price ($ /lb)
Jumbo	63	174	2.76
Large	294	685	2.33
Medium	457	609	1.33
Small	62	34	0.55
Pins	1,319	551	0.42
Unclassified	593	718	1.21

Parameters associated with size categories are determined by dealers and vary among ports. For example, in Cape May (NJ), black sea bass in classified as follows: small 8" to 0.75 lb; medium 0.75 lbs; large 1.25 lbs to 1.75 lbs; and jumbo > 1.75 lbs (W. Makowski pers. comm.). In Point Judith (RI), black sea bass is classifed as follows: pins 8" to 0.74 lb; small 0.75 lbs to 0.9 lbs; medium 1.0 lbs to 1.24 lbs; large 1.25 lbs to 1.99 lbs; and jumbo > 2.0 lbs (E. Hutchins pers. comm.).

Table 28. The number of otter trawl vessels, trips, and associated pounds for a given threshold (pounds) of black sea bass landings.

Threshold Pounds	Vessels	Trips	Pounds
>=1	340	3327	1009746
>=100	212	1132	955795
>=200	182	784	907088
>=300	159	592	860274
>=400	144	477	820235
>=500	123	393	783196
>=600	108	338	753507
>=800	88	243	687765
>=1000	80	199	648060
>=5000	16	31	320427
>=10000	9	11	179301

Source: NMFS weighout data.

Table 29. Landings by species for all otter trawl trips harvesting 100 pounds or more of black sea bass, 1992.

Common Name	Pounds*	Species % of Total Pounds	Value	Species % of Total Value
SQUID (LOLIGO)	13,225,429	34.099%	7,362,802	29.238%
HAKE, SILVER	5,191,162	13.384%	2,382,006	9.459%
SCUP	4,803,237	12.384%	2,980,079	11.834%
FLOUNDER, SUMMER	4,467,072	11.517%	6,536,286	25.956%
MACKEREL, ATLANTIC	1,694,588	4.369%	155,991	0.619%
ANGLER	1,227,456	3.165%	864,277	3.432%
DOGFISH SPINY	1,102,054	2.841%	102,464	0.407%
BUTTERFISH	991,346	2.556%	583,126	2.316%
SEA BASS, BLACK	955,795	2.464%	911,281	3.619%
FLOUNDER, WINTER	891,065	2.297%	882,725	3.505%
BLUEFISH	862,789	2.225%	257,425	1.022%
HAKE, RED	693,049	1.787%	209,526	0.832%
SKATES UNC	654,466	1.687%	65,288	0.259%
FLOUNDER, YELLOWTAIL	383,695	0.989%	405,644	1.611%
HERRING, ATLANTIC	237,891	0.613%	11,383	0.045%
COD	205,272	0.529%	202,287	0.803%
WEAKFISH, SQUETEAGUE	195,664	0.504%	141,236	0.561%
DOGFISH (NK)	124,699	0.322%	21,272	0.084%
SCALLOP, SEA	98,084	0.253%	452,404	1.797%
SQUID (ILLEX)	96,332	0.248%	26,532	0.105%
TAUTOG	94,488	0.244%	62,167	0.247%
LOBSTER	85,303	0.220%	319,489	1.269%
FLOUNDER, WITCH	69,900	0.180%	76,943	0.306%
EEL, CONGER	64,638	0.167%	16,972	0.067%
TILEFISH	64,426	0.166%	40,826	0.162%
POUT, OCEAN	56,134	0.145%	9,486	0.038%
SEA ROBINS	42,401	0.109%	9,949	0.040%
HAKE, WHITE	22,141	0.057%	8,037	0.032%
OTHER FISH	20,590	0.053%	824	0.003%
CONCHS	17,015	0.044%	16,271	0.065%
CROAKER, ATLANTIC	13,342	0.034%	2,796	0.011%
FLOUNDER, SAND-DAB	13,287	0.034%	3,985	0.016%
CRAB, HORSESHOE	12,000	0.031%	1,200	0.005%
PUFFER, NORTHERN	10,604	0.027%	3,676	0.015%
CRAB, JONAH	9,670	0.025%	4,553	0.018%
POLLOCK	8,153	0.021%	4,056	0.016%
OTHER FISH	8,141	0.021%	4,121	0.016%
STURGEONS	7,478	0.019%	9,107	0.036%
SQUIDS (NS)	6,722	0.017%	3,243	0.013%
SHAD, AMERICAN	5,226	0.013%	2,313	0.009%
SHARK, SANDBAR	5,146	0.013%	1,851	0.007%
MENHADEN	5,070	0.013%	314	0.001%
SHARK, NK	4,848	0.012%	2,654	0.011%
FLOUNDER, AM. PLAICE	4,384	0.011%	5,819	0.023%
MACKEREL, SPAN	4,316	0.011%	2,811	0.011%
WOLFFISHES	3,480	0.009%	2,100	0.008%
WHITING, KING	3,314	0.009%	858	0.003%
DOGFISH SMOOTH	3,157	0.008%	1,062	0.004%
SHARK, PORBEAGLE	2,712	0.007%	1,481	0.006%

Table 29 (continued). Landings by species for all otter trawl trips harvesting 100 pounds or more of black sea bass, 1992.

Common Name	Pounds*	Species % of Total Pounds	Value	Species % of Total Value
JOHN DORY	2,479	0.006%	1,503	0.006%
WHELK, CHANNELED	2,126	0.005%	2,072	0.008%
WHELK, KNOBBED	2,027	0.005%	907	0.004%
HERRING (NK)	1,409	0.004%	196	0.001%
SPOT	1,227	0.003%	168	0.001%
BONITO	1,097	0.003%	365	0.001%
CUNNER	732	0.002%	66	0.000%
SHEEPSHEAD	655	0.002%	167	0.001%
SPADEFISH	640	0.002%	606	0.002%
BASS, STRIPED	611	0.002%	1,075	0.004%
FLOUNDERS (NK)	510	0.001%	335	0.001%
SHARK, THRESHER	412	0.001%	131	0.001%
COBIA	302	0.001%	316	0.001%
MULLETS	275	0.001%	73	0.000%
CRAB, BLUE	242	0.001%	99	0.000%
CRAB, ROCK	227	0.001%	225	0.001%
OCTOPUS	224	0.001%	189	0.001%
HADDOCK	177	0.000%	173	0.001%
TRIGGERFISH	157	0.000%	80	0.000%
DRUM, BLACK	121	0.000%	61	0.000%
HALIBUT, ATLANTIC	113	0.000%	196	0.001%
REDFISH	76	0.000%	30	0.000%
SHARK, BLACK TIP	65	0.000%	21	0.000%
MACKEREL, KING	60	0.000%	46	0.000%
DRUM, RED	58	0.000%	17	0.000%
AMBER JACK	38	0.000%	24	0.000%
SHARK, DUSKY	38	0.000%	11	0.000%
ALEWIFE	31	0.000%	2	0.000%
WEAKFISH, SPOTTED	21	0.000%	14	0.000%
Total	38,785,381	100.000%	25,182,166	100.000%

Note: Records with unknown vessel identity were excluded.
Number of Trips = 1,132.

Source: 1992 NMFS weighout data.

Table 30. Estimated cost data for otter trawlers that operated in the US mackerel fishery from 1989-1991 by gross tonnage.

Item	Vessel Size 5-50 $	GRT %	51-150 $	GRT %	>150 $	GRT %
Fixed Costs						
Gear	8,902	22.43	14,095	15.12	33,407	19.46
Electronics	3,509	8.84	3,385	3.62	8,352	4.87
Engine	3,123	7.87	9,216	9.88	26,951	15.70
Other hull costs	4,038	10.17	5,090	5.46	6,170	3.59
Insurance	7,800	19.65	21,095	22.63	34,256	19.95
Subtotal	27,372	68.95	52,881	56.72	109,146	63.57
Variable costs						
Fuel	6,371	16.05	26,624	28.56	42,656	24.84
Ice	3,534	8.90	7,584	8.13	11,160	6.50
Food	2,418	6.09	6,144	6.59	8,730	5.08
Subtotal	12,323	31.04	40,352	43.28	62,546	36.43
Total	39,695	100	93,233	100	171,692	100

[1] All values are in 1987 dollars.
[2] GRT = gross registered tonnage.

Source: Adapted from Walden 1993.

Table 31. 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 1988.

Table 32. Average total cost[a] for a day trip, by mode for selected states (1980-1989).

State	Mode				
	Pier	Beach	Party	Charter	Rental	Private
New York	$16.09	$13.77	$43.35	$59.88	$78.19	$44.38
New Jersey	21.10	16.32	45.36	146.66	92.41	40.93
Delaware	34.15	44.44	69.69	73.66	[b]	40.33
Maryland	21.71	23.31	57.27	181.08	52.25	41.19
Virginia	20.14	15.20	36.00	74.00	122.47	44.50
North Carolina	24.85	18.69	137.00	222.81	237.03	53.03

[a] Travel and services (services might be composed of a combination of the following: costs for bait, tackle, cleaning, fuel, pier fees, and boat fees).
[b] Not enough observations for precise estimates.

Source: Adapted from Strand *et al.* 1991.

Table 33. 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 34. 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 35. 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 36. The percent of measured black sea bass (TL) less than a given size based on 1990-1992 MRFSS intercept data.

ST	7	8	9	10	11	12	N
ME	-	-	-	-	-	-	-
NH	-	-	-	-	-	-	-
MA	2.7	2.7	2.7	5.5	8.2	19.2	73
RI	0.0	1.7	6.7	21.7	40.0	53.3	60
CT	6.7	20.0	40.0	53.3	73.3	86.7	15
NY	1.4	5.8	14.4	33.0	47.8	71.5	737
NJ	4.4	20.1	38.1	54.4	69.5	80.4	2047
DE	3.6	13.8	33.3	55.2	74.1	86.2	1380
MD	2.1	7.3	19.3	41.0	62.4	78.5	703
VA	5.0	11.3	22.8	38.5	55.0	72.1	1812
NC	2.4	11.0	27.5	46.2	60.8	73.0	1127
TOTAL	3.6	12.9	27.8	45.9	62.4	76.7	7954

Table 37. The percent reduction in exploitation associated with various size limits for black sea bass, 1990-1992. The reductions are based on measured fish from the MRFSS survey and assume a post-release mortality of 25%.

Size (TL)	PR
8	10.1
9	21.0
10	34.4
11	46.9
12	57.8

Table 38. The percent of successful anglers landing 1 to 150 black sea bass (MRFSS A fish) per day, coastwide, 1990-92.

C_PER_T	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	1810	51.5	1810	51.5
2	426	12.1	2236	63.6
3	256	7.3	2492	70.9
4	177	5.0	2669	76.0
5	139	4.0	2808	79.9
6	81	2.3	2889	82.2
7	53	1.5	2942	83.7
8	91	2.6	3033	86.3
9	47	1.3	3080	87.7
10	85	2.4	3165	90.1
11	4	0.1	3169	90.2
12	14	0.4	3183	90.6
13	16	0.5	3199	91.1
14	19	0.5	3218	91.6
15	43	1.2	3261	92.8
16	9	0.3	3270	93.1
17	39	1.1	3309	94.2
18	2	0.1	3311	94.2
19	3	0.1	3314	94.3
20	15	0.4	3329	94.8
21	19	0.5	3348	95.3
22	12	0.3	3360	95.6
23	8	0.2	3368	95.9
24	13	0.4	3381	96.2
25	9	0.3	3390	96.5
27	8	0.2	3398	96.7
28	9	0.3	3407	97.0
30	33	0.9	3440	97.9
31	4	0.1	3444	98.0
32	3	0.1	3447	98.1
35	3	0.1	3450	98.2
36	1	0.0	3451	98.2
38	8	0.2	3459	98.5
40	2	0.1	3461	98.5
45	9	0.3	3470	98.8
48	5	0.1	3475	98.9
49	1	0.0	3476	98.9
50	7	0.2	3483	99.1
52	2	0.1	3485	99.2
57	2	0.1	3487	99.3
60	9	0.3	3496	99.5

Table 38 (continued). The percent of successful anglers landing 1 to 150 black sea bass (MRFSS A fish) per day, coastwide, 1990-92.

C_PER_T	Frequency	Percent	Cumulative Frequency	Cumulative Percent
61	1	0.0	3497	99.5
63	4	0.1	3501	99.7
68	2	0.1	3503	99.7
74	1	0.0	3504	99.7
76	1	0.0	3505	99.8
90	1	0.0	3506	99.8
100	2	0.1	3508	99.9
105	1	0.0	3509	99.9
120	1	0.0	3510	99.9
135	2	0.1	3512	100.0
150	1	0.0	3513	100.0

Table 39. The percent reduction in exploitation associated with various possession limits for black sea bass, 1990-1992. The reductions assume a post-release mortality of 25%.

Limit	PR
1	67.5
2	59.1
3	52.8
4	47.7
5	43.5
6	40.0
7	36.9
8	34.1
9	31.7
10	29.6
11	27.8
12	26.1
13	24.5
14	22.9
15	21.5
16	20.2
17	19.0
18	18.0
19	17.0
20	16.0
21	15.1
22	14.3
23	13.5
24	12.8
25	12.2
26	11.6
27	10.9
28	10.4
29	9.9
30	9.3
31	9.0
32	8.6
33	8.3
34	8.0
35	7.6
36	7.3
37	7.0
38	6.7
39	6.4
40	6.2
41	5.9
42	5.7
43	5.4
44	5.1
45	4.9
46	4.7
47	4.5
48	4.2
49	4.1
50	3.9

Table 40. Black Sea Bass recreational landings by wave, 1990-1992 combined.

Wave	% of total
J-F	1.6
M-A	4.5
M-J	22.1
J-A	19.7
S-O	29.6
N-D	22.5

Table 41. The percent of measured black sea bass (TL) less than a given size based on 1983-1991 NEFSC weighout data.

Year	≤ 7.0	≤ 8.0	≤ 9.0	≤ 10.0	≤11.0	≤12.0	N
1983	0.2	5.5	19.3	50.5	66.2	81.1	3,219
1984	0.3	3.1	9.9	28.5	42.0	64.0	3,841
1985	0.0	2.1	13.3	38.5	51.5	62.3	2,509
1986	0.2	7.3	20.1	40.6	50.0	60.1	2,922
1987	0.0	4.6	13.3	35.4	46.0	56.8	1,545
1988	0.1	2.7	9.5	25.5	38.3	61.8	1,376
1989	0.0	6.9	17.0	30.7	44.4	64.2	883
1990	0.0	1.1	7.0	28.5	42.9	69.4	1,142
1991	0.0	2.9	19.0	42.4	50.6	62.2	735

Table 42. The percent of measured black sea bass (TL) less than a given size based on 1983-1991 NEFSC weighout data for each state.

State	≤ 7.0	≤ 8.0	≤ 9.0	≤ 10.0	≤11.0	≤12.0	N
MA	0.0	0.0	0.0	0.0	0.0	5.1	313
RI	0.0	0.0	2.6	14.5	20.4	31.7	2,136
CT							0
NY	0.0	0.0	0.0	5.6	16.2	37.1	197
NJ	0.2	5.2	18.8	46.4	60.7	77.6	9,950
DE							0
MD	0.1	2.5	13.6	33.5	45.9	65.8	966
VA	0.2	4.7	12.5	30.7	44.1	61.1	4,610

Table 43. The percent of measured black sea bass (TL) less than a given size based on 1983-1991 NEFSC weighout data for each major gear type.

Gear	≤ 7.0	≤ 8.0	≤ 9.0	≤ 10.0	≤11.0	≤12.0	N
Otter Trawl	0.2	3.3	10.8	29.6	42.0	59.5	13,374
Floating Traps	0.0	0.0	0.0	1.0	8.7	31.6	206
Pots/Traps	0.1	7.1	25.8	59.3	73.0	85.1	4,592

Table 44. The percent of measured black sea bass (TL) less than a given size based on 1982-1992 North Carolina winter trawl data.

Year	≤ 7.0	≤ 8.0	≤ 9.0	≤ 10.0	≤11.0	≤12.0	N
1982-1983	0.3	4.5	26.3	53.3	70.5	82.6	38,239
1983-1984	0.3	2.5	17.1	41.2	63.8	77.4	94,048
1984-1985	2.4	9.8	22.7	43.2	59.4	71.0	175,099
1985-1986	0.2	13.7	38.4	54.9	69.1	77.2	105,684
1986-1987	1.5	5.1	26.9	56.2	75.2	82.4	108,696
1987-1988	1.8	11.6	38.9	61.3	73.6	82.6	120,197
1988-1989	0.4	5.8	23.1	49.0	68.7	79.9	29,927
1989-1990	0.2	6.6	27.1	55.8	74.5	85.7	153,044
1990-1991	0.8	11.7	34.3	56.0	71.4	84.9	5,832
1991-1992	0.0	3.8	25.6	56.9	83.7	94.0	83,885

Table 45. The length at which 25% of the black sea bass would be retained by a particular mesh size. Estimates represent L_{25}'s and are based on retention lengths as calculated from the body depth/total length relationship for black sea bass derived by Weber and Briggs (1983).

Mesh size	Total Length
2.0	4.0
2.5	5.3
3.0	6.6
3.5	7.9
4.0	9.3
4.5	10.6
5.0	11.9

Table 46. Catch Composition (%) for Black Sea Bass Otter Trawl Trips, 1983-1987 Average.

Species	>0 Lbs/Trip	>100 Lbs/Trip	>250 Lbs/Trip	>500 Lbs/Trip	>1,000 Lbs/Trip
Black Sea Bass	*	2	4	5	12
Scup	16	29	37	34	41
Bluefish	1	2	2	4	5
Butterfish	7	4	5	9	4
Croaker	*	*	*	*	*
Winter flounder	4	1	*	*	*
Summer flounder	29	24	18	13	6
Mackerel	4	13	7	3	3
Weakfish	1	*	*	*	*
Tautog	*	*	*	*	*
Whiting	9	3	3	3	5
Lobster	*	*	*	*	*
Sea scallop	*	*	*	*	*
Loligo	15	17	19	26	22
Other	11	4	3	3	2
Trips	11,357	1,154	478	216	72

*=less than 0.5%. -=zero.
Source: NMFS NEFC weighout data.

Table 47. The percent of otter trawl vessels, trips, and associated pounds for a given threshold (pounds) of black sea bass landings, 1992.

Threshold Pounds	Vessels	Trips	Pounds
>=1	100	100	100
>=100	62	34	95
>=200	54	24	90
>=300	47	18	85
>=400	42	14	81
>=500	36	12	78
>=600	32	10	75
>=800	26	7	68
>=1000	24	6	64
>=5000	5	1	32
>=10000	3	0	18

Source: Unpublished NMFS General Canvass Data.

Table 48. The number of otter trawl vessels, trips, and associated pounds for a given threshold (pounds) of *Loligo* landings, 1992.

Threshold	Vessel	Trips	Pounds
>=1	383	5608	39548368
>=200	313	3794	39426206
>=400	283	3187	39252701
>=600	260	2806	39066885
>=800	245	2529	38875824
>=1000	229	2352	38716974
>=2500	172	1644	37605209
>=5000	139	1159	35857109
>=10000	110	719	32697193

Source: NMFS weighout data.

Table 49. The percent of otter trawl vessels, trips, and associated pounds for a given threshold (pounds) of *Loligo* landings, 1992.

Threshold	Vessel	Trips	Pounds
>=1	100	100	100
>=200	82	68	100
>=400	74	57	99
>=600	68	50	99
>=800	64	45	98
>=1000	60	42	98
>=2500	45	29	95
>=5000	36	21	91
>=10000	29	13	83

Source: NMFS weighout data.

Table 50. Landings by species for all otter trawl trips harvesting 2,500 pounds or more of *Loligo*, 1992.

Common Name	Pounds*	Species % of Total Pounds	Value	Species % of Total Value
SQUID (*LOLIGO*)	37,605,209	48.861%	21,946,834	51.956%
HAKE, SILVER	9,431,248	12.254%	4,082,811	9.665%
MACKEREL, ATLANTIC	7,063,093	9.177%	1,214,848	2.876%
SCUP	4,685,335	6.088%	3,186,156	7.543%
BUTTERFISH	3,983,006	5.175%	2,510,065	5.942%
SQUID (ILLEX)	3,963,974	5.150%	1,137,752	2.693%
FLOUNDER, SUMMER	2,195,269	2.852%	3,595,796	8.513%
ANGLER	1,379,661	1.793%	922,119	2.183%
BLUEFISH	1,150,885	1.495%	287,213	0.680%
HAKE, RED	1,114,031	1.447%	303,351	0.718%
FLOUNDER, WINTER	1,008,942	1.311%	969,747	2.296%
SKATES UNC	641,492	0.834%	64,277	0.152%
SEA BASS, BLACK	502,602	0.653%	456,282	1.080%
HERRING, ATLANTIC	428,410	0.557%	38,235	0.091%
FLOUNDER, YELLOWTAIL	393,679	0.512%	405,059	0.959%
COD	218,049	0.283%	204,273	0.484%
DOGFISH (NK)	190,695	0.248%	25,416	0.060%
TILEFISH	175,398	0.228%	97,953	0.232%
WEAKFISH, SQUETEAGUE	96,904	0.126%	92,866	0.220%
EEL, CONGER	93,578	0.122%	19,914	0.047%
TAUTOG	93,516	0.122%	59,635	0.141%
FLOUNDER, WITCH	89,113	0.116%	109,019	0.258%
LOBSTER	72,531	0.094%	277,736	0.657%
HAKE, WHITE	65,306	0.085%	23,264	0.055%
POUT, OCEAN	51,657	0.067%	8,548	0.020%
WHITING, BLACK	40,206	0.052%	10,258	0.024%
SEA ROBINS	39,423	0.051%	10,135	0.024%
FLOUNDER, SAND-DAB	21,551	0.028%	6,172	0.015%
OTHER FISH	20,590	0.027%	824	0.002%
SCALLOP, SEA	19,941	0.026%	101,002	0.239%
DOGFISH SPINY	16,350	0.021%	1,512	0.004%
OTHER FISH	10,387	0.013%	4,746	0.011%
POLLOCK	10,066	0.013%	5,266	0.012%
CONCHS	9,005	0.012%	11,410	0.027%
CROAKER, ATLANTIC	6,844	0.009%	1,383	0.003%
STURGEONS	6,338	0.008%	7,469	0.018%
FLOUNDER, AM. PLAICE	5,954	0.008%	7,768	0.018%
SHAD, AMERICAN	5,762	0.007%	2,398	0.006%
DOGFISH SMOOTH	5,349	0.007%	1,782	0.004%
SHARK, SANDBAR	5,225	0.007%	1,859	0.004%
SQUIDS (NS)	5,209	0.007%	2,738	0.006%
MENHADEN	4,900	0.006%	294	0.001%
JOHN DORY	4,490	0.006%	2,502	0.006%
MACKEREL, SPAN	4,141	0.005%	2,730	0.006%
WHITING, KING	4,102	0.005%	811	0.002%
WOLFFISHES	3,802	0.005%	2,304	0.005%

Table 50. (continued). Landings by species for all otter trawl trips harvesting 2,500 pounds or more of *Loligo*, 1992.

Common Name	Pounds*	Species % of Total Pounds	Value	Species % of Total Value
HADDOCK	3,335	0.004%	747	0.002%
SWORDFISH	2,829	0.004%	8,022	0.019%
PUFFER, NORTHERN	2,313	0.003%	1,237	0.003%
BONITO	1,946	0.003%	623	0.001%
HERRING (NK)	1,506	0.002%	240	0.001%
SHARK, NK	1,460	0.002%	1,664	0.004%
SHARK, THRESHER	1,400	0.002%	1,076	0.003%
REDFISH	869	0.001%	523	0.001%
BASS, STRIPED	698	0.001%	1,214	0.003%
SHARK, BLACK TIP	666	0.001%	120	0.000%
CUNNER	598	0.001%	51	0.000%
SHARK, DUSKY	582	0.001%	91	0.000%
CRAB, JONAH	425	0.001%	309	0.001%
COBIA	207	0.000%	267	0.001%
CRAB, ROCK	172	0.000%	170	0.000%
SPOT	170	0.000%	42	0.000%
TRIGGERFISH	145	0.000%	68	0.000%
FLOUNDER, FOURSPOT	102	0.000%	19	0.000%
SHARK, PORBEAGLE	97	0.000%	52	0.000%
FLOUNDERS (NK)	59	0.000%	60	0.000%
CRAB, HORSESHOE	40	0.000%	4	0.000%
ALEWIFE	31	0.000%	2	0.000%
HALIBUT, ATLANTIC	29	0.000%	40	0.000%
SHARK, MAKO SHORTFIN	15	0.000%	46	0.000%
MACKEREL, KING	10	0.000%	9	0.000%
TUNA, ALBACORE	9	0.000%	4	0.000%
CUSK	6	0.000%	2	0.000%
WHELK, CHANNELED	6	0.000%	5	0.000%
WHELK, KNOBBED	6	0.000%	4	0.000%
Total	76,962,949	100.000%	42,241,243	100.000%

Note: Records with unknown vessel identity were excluded.
Number of Trips = 1,644.

Source: NMFS Weighout data.

Table 51. The number of otter trawl vessels, trips, and associated pounds for a given threshold (pounds) of scup landings, 1992.

Threshold	Vessel	Trips	Pounds
> = 1	394	4135	9220675
> = 200	287	1961	9120186
> = 400	255	1607	9018579
> = 600	230	1408	8922550
> = 800	217	1262	8822145
> = 1000	203	1155	8726706
> = 5000	99	401	6976707
> = 10000	60	213	5648598

Source: NMFS weighout data.

Table 52. The percent of otter trawl vessels, trips, and associated pounds for a given threshold (pounds) of scup landings, 1992.

Threshold	Vessel	Trips	Pounds
> = 1	100	100	100
> = 200	73	47	99
> = 400	65	39	98
> = 600	58	34	97
> = 800	55	31	96
> = 1000	52	28	95
> = 5000	25	10	76
> = 10000	15	5	61

Source: NMFS weighout data.

Table 53. Landings by species for all scup - otter trawl trips harvesting 1,000 pounds or more of scup, 1992.

Common Name	Pounds*	Species % of Total Pounds	Value	Species % of Total Value
SQUID (*LOLIGO*)	13,018,782	29.350%	7,284,066	30.199%
SCUP	8,726,706	19.674%	5,359,489	22.220%
MACKEREL, ATLANTIC	6,154,322	13.874%	937,815	3.888%
HAKE, SILVER	6,005,925	13.540%	2,621,675	10.869%
FLOUNDER, SUMMER	1,756,288	3.959%	2,893,398	11.996%
BUTTERFISH	1,327,231	2.992%	735,860	3.051%
ANGLER	1,072,460	2.418%	786,734	3.262%
BLUEFISH	1,057,301	2.384%	265,791	1.102%
FLOUNDER, WINTER	1,028,547	2.319%	989,719	4.103%
HAKE, RED	818,438	1.845%	215,078	0.892%
SKATES UNC	707,300	1.595%	70,080	0.291%
SEA BASS, BLACK	527,857	1.190%	485,966	2.015%
HERRING, ATLANTIC	394,617	0.890%	27,616	0.114%
FLOUNDER, YELLOWTAIL	283,940	0.640%	282,531	1.171%
COD	214,515	0.484%	190,671	0.791%
SQUID (ILLEX)	165,623	0.373%	42,347	0.176%
WEAKFISH, SQUETEAGUE	159,393	0.359%	122,011	0.506%
TAUTOG	153,497	0.346%	87,188	0.361%
DOGFISH (NK)	101,820	0.230%	17,607	0.073%
DOGFISH SPINY	99,379	0.224%	10,701	0.044%
LOBSTER	86,447	0.195%	313,335	1.299%
TILEFISH	63,173	0.142%	43,101	0.179%
EEL, CONGER	58,399	0.132%	15,301	0.063%
FLOUNDER, WITCH	54,691	0.123%	63,336	0.263%
FLOUNDER, SAND-DAB	47,298	0.107%	13,090	0.054%
SEA ROBINS	40,407	0.091%	9,945	0.041%
POUT, OCEAN	34,588	0.078%	5,396	0.022%
SCALLOP, SEA	32,234	0.073%	152,331	0.632%
HAKE, WHITE	30,625	0.069%	11,346	0.047%
OTHER FISH	20,590	0.046%	824	0.003%
CRAB, HORSESHOE	16,420	0.037%	1,675	0.007%
OTHER FISH	12,539	0.028%	8,407	0.035%
STURGEONS	9,249	0.021%	10,213	0.042%
CONCHS	8,872	0.020%	14,242	0.059%
SQUIDS (NS)	8,833	0.020%	4,459	0.018%
MENHADEN	8,545	0.019%	541	0.002%
CRAB, JONAH	8,151	0.018%	3,575	0.015%
FLOUNDERS (NK)	6,510	0.015%	4,235	0.018%
SHAD, AMERICAN	6,473	0.015%	2,304	0.010%
POLLOCK	4,540	0.010%	2,709	0.011%
MACKEREL, SPAN	4,211	0.009%	2,764	0.011%
BONITO	3,570	0.008%	1,219	0.005%
WHELK, KNOBBED	2,511	0.006%	1,365	0.006%
PUFFER, NORTHERN	2,313	0.005%	1,222	0.005%
SHARK, NK	1,785	0.004%	1,092	0.005%
WHELK, CHANNELED	1,193	0.003%	777	0.003%

Table 53 (continued). Landings by species for all scup - otter trawl trips harvesting 1,000 pounds or more of scup, 1992.

Common Name	Pounds*	Species % of Total Pounds	Value	Species % of Total Value
JOHN DORY	1,026	0.002%	472	0.002%
BASS, STRIPED	940	0.002%	1,603	0.007%
FLOUNDER, AM. PLAICE	850	0.002%	554	0.002%
CUNNER	757	0.002%	66	0.000%
HERRING (NK)	706	0.002%	101	0.000%
WHITING, KING	699	0.002%	180	0.001%
SHARK, PORBEAGLE	687	0.002%	195	0.001%
SHARK, SANDBAR	556	0.001%	200	0.001%
WHITING, BLACK	515	0.001%	155	0.001%
SHARK, THRESHER	365	0.001%	102	0.000%
WOLFFISHES	340	0.001%	217	0.001%
SHARK, TIGER	321	0.001%	69	0.000%
CRAB, ROCK	227	0.001%	225	0.001%
CROAKER, ATLANTIC	171	0.000%	40	0.000%
REDFISH	165	0.000%	84	0.000%
PERCH, WHITE	160	0.000%	42	0.000%
TRIGGERFISH	145	0.000%	68	0.000%
HADDOCK	137	0.000%	122	0.001%
SWORDFISH	72	0.000%	243	0.001%
AMBER JACK	38	0.000%	24	0.000%
ALEWIFE	31	0.000%	2	0.000%
SPOT	20	0.000%	5	0.000%
DOGFISH SMOOTH	18	0.000%	8	0.000%
COBIA	15	0.000%	15	0.000%
SHARK, DUSKY	14	0.000%	4	0.000%
HAKE MIX RED & WHITE	5	0.000%	2	0.000%
CRAB, BLUE	5	0.000%	2	0.000%
Total	44,357,093	100.000%	24,119,947	100.000%

Note: Records with Vessel identity unknown were excluded.
Number of Trips = 1,155.

Table 54. The total length (inches) at which 50% of the black sea bass would be retained (L_{50}) by a fish trap fitted with escape vents (inches). The vent size in the table is the width of a rectangluar vent that was also 6" in length. The derived fish lengths are based on the results of a Mid-Atlantic Council study conducted in 1994.

Vent	L_{50}
1.125	8.7
1.250	10.1
1.375	11.5
1.500	12.0

Table 55. The minimum theoretical size of black sea bass (TL inches) that would be retained by a fish trap fitted with escape vents (inches). The derived lengths are based on the body depth/total length relationship for black sea bass derived by Weber and Briggs (1983).

Vent Diameter	Size (TL)
1.9	7
2.2	8
2.5	9
2.76	10
3.0	11
3.31	12

Table 56. Estimated commercial black sea bass landed value as a percentage of the total port landings for all species for selected ports from Gloucester, Massachusetts, to Hampton Roads, Virginia, all gears combined, 1992.

Port Group	BSB % of Port Value*
Ocean City	4.69
Cape May	2.02
Hampton Roads	1.66
Freeport/Brooklyn	0.85
Montauk	0.62
Monmouth	0.61
Point Judith	0.35
Barnstable	0.13
Pt. Pleasant	0.13
Stonington	0.10
Barnegat Light	0.10
Other Wash.	0.07
New Bedford	0.00
Gloucester	0.00

Source: Adapted from Finlayson and McCay, 1994.

*Ports for which there is confidential data have been removed.

Table 57. Estimated commercial black sea bass landed value as a percentage of the of total port landed value of black sea bass for selected ports from Gloucester, Massachusetts, to Hampton Roads, Virginia, all gears combined, 1992.

Port Group	BSB % of Port Value*
Cape May	27.08
Hampton Roads	19.58
Ocean City	13.59
Montauk	6.15
Point Judith	4.57
Monmouth	2.17
Barnstable	1.49
Newport1	0.38
Freeport/Brooklyn	1.28
Pt. Pleasant	0.75
Other Wash.	0.53
Barnegat Light	0.33
Stonington	0.27
New Bedford	0.04
Gloucester	0.00

Source: Adapted from Finlayson and McCay, 1994.

*Ports for which there is confidential data have been removed.

Table 58. Estimated percentage of commercial landings of black sea bass by port and gear for selected ports, 1992[a].

Port	Gear[b]	Port/gear	All BSB
Cape May	Pots	87.37%	16.85%
	OT	1.76%	9.31%
Ocean City	H&L	53.21%	0.21%
	Pots	90.73%	12.34%
Hampton Roads	H&L	97.65%	6.32%
	OT	3.44%	13.05%

Source: Adapted from Finlayson and McCay, 1994.

[a]Criteria for port selection (ports considered ranged from Gloucester, MA, to Hampton Roads, VA): Percent landed value of all fish caught per gear type, per port (>5%); percent landed value of all black sea bass caught in the region (>5%), 1992.

[b]Legend: H&L = hook and line; OT = otter trawls; pots = pots, fish pots, lobster pots.

Note: An example of how to read this table: 1) Black sea bass represented 87.37% of the landed value of fish caught with pots in Cape May, NJ, and Cape May pots caught 16.85% of the landed value of black sea bass throughout the region, or 2) the otter trawlers landing at Cape May caught 9.31% of the landed value of black sea bass in the larger region; black sea bass represented 1.76% of the landed value of fish caught by otter trawls in Cape May.

Table 59. 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	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	loggerhead 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 60. Overview of State laws for black sea bass, Maine to North Carolina. (Note that this table is only a summary of State regulations. Fishermen should contact State agencies to obtain a complete copy of regulations applicable to black sea bass in their State.)

	Maine
Size limits	none.
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 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: $33 for individual, resident operators; $89 for resident operator with crew; $334 for nonresident operator and crew. No license is required for fish taken with hook and line for personal use. There is no recreational license, except for Atlantic Salmon.
Other	Nonresidents are required by law to report all groundfish catches.
	New Hampshire
Size limits	none.
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.
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	As of January 1, 1995: 12" recreational and commercial; (All are possession restrictions; total length measurements.)
Gear restrictions	Minimum mesh sizes for mobile trawl gear: • North of Cape Cod:

- 6" required year-round. Permitted small mesh exemptions are allowed for underutilized species (e.g. dogfish, ocean pout) with no bycatch of regulated species.
* South of Cape Cod:
- 5.5" required Nov. 1 - April 23.
- 4.5" required June 1 - Oct. 31.
- No minimum required April 23 - June 1 (squid season).
* East of Cape Cod:
- 6" required year round.

There is a special black sea bass moratorium permit for pots (no new permits are being issued), and a pot limit of 200 or 350 if two permit holders fish from the same vessel. 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.

Other

Night trawling prohibited 1/2 hour after sunset to 1/2 hour before sunrise from March 1- Oct. 31 and from 6 am- 6 pm from Nov. 1- Feb. 28. Also, the bycatch of finfish in the lobster fishery may not exceed the catch of lobster (by weight).

Rhode Island

Size limits

10" total length measurement which applies to both commercial and recreational fishermen.

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. Each person utilizing traps or pots in the fishery for finfish are limited to no more than 50 pots, and each vessel is limited to 50 pots regardless of the number of license holders on board. In addition, finfish traps (pots) must be constructed with escape openings which may be circular (minimum 2 3/8" diameter), rectangular (1 7/8" X 5 3/4" minimum) or of square mesh wire at least 2 1/4" X 2 1/4".

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	8" commercial and recreational.
Gear restrictions	Cod end minimum mesh size of 5.5" (6" square) in trawls from Nov 15 - June 30 and 4"(4.5" square) from July 1 - Nov 14. May 15- July 31 vessels fishing for squid may use mesh of any size. 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 in rivers, coves and harbors as well as in portions of Long Island Sound (LIS). Night trawling prohibited in the western two-thirds of LIS. Vessels greater than 44 ft prohibited in western one-third of LIS unless owner fished there in 1982.
Seasons	None except as noted above
Licenses	A variety of commercial resident and non-resident licenses are available allowing for the harvest and sale of fish. Fees range from $50- $225. No marine recreational fishing license required but commercial sale of fish taken by hook and line requires a commercial license ($50) and the fee is doubled for species regulated by recreational creel limit. Personal use fishing with trawls and other specific gear requires a commercial license.

New York

Size limits	8" commercial only.
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, Non-resident: $1,000. (The non-resident harvest license may only be purchased in January.) A non-resident license which allows landing only: $250. There is no sport license for fish caught for personal use.

New Jersey

Size limits	8" commercial only.

Gear restrictions	None pertaining to black sea bass. 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 (for food fish) 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. Limited entry for gill net licenses in Delaware Bay only.

Delaware

Size limits	none.
Gear restrictions	Trawls, purse seines, power-operated seines, and run-around 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 hrs Friday - 1,600 hrs 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; Non-residents: $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	none.
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	An appropriate commercial fishing or license or a fish dealers license is required to catch, buy, sell, process, export, transport, or otherwise deal in fish that were

caught in the tidal waters of Maryland. License fees vary from $37.50 to $300.00 depending on license type. Chesapeake sportfishing license: resident - $7.00, non-resident $12.00.

Virginia

Size limits	none.
Gear restrictions	Trawls and encircling gillnets are prohibited in Virginia waters. Minimum mesh sizes: pound nets = 2"; haul seines over 200 yards = 3"; Various gill net mesh restrictions in various areas at different times of the year.
Area closures	Fish trot lines cannot be set on the sea side of the eastern shore. Various area gill net closures at different times of the year.
Seasons	none.
Licenses	Commercial licenses are required for specific fishing gears, with the fee dependent on the gear type. There is sport fishing license (Atlantic Ocean exempt) with variable fees and a $25 license is required to sell hook and line caught fish. All fishermen must register ($150 fee) before they can purchase individual gear licenses. There also is a two year waiting period for commercial registration.
Other	Virginia required mandatory reporting for all species caught in commercial gear in Virginia waters beginning in 1993.

North Carolina

Size limits	8" south of Cape Hatteras (nothing to the north).
Gear restrictions	No net may be towed by more than one vessel except in long-haul (seine) fishing operations. Flynet codends must be at least 15 ft. in length and have a minimum mesh of 3" square or 3.5 "diamond. In addition, flynets must have an extension a minimum of 20 ft. in length constructed of 3" square mesh. All trawls fished in the Atlantic Ocean (except flynets) required to have a minimum codend mesh of 5.5". Additional exceptions include vessels possessing State Atlantic mackerel and/or squid permits and crab trawls.
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. No flynet fishing in Atlantic Ocean south of Cape Hatteras.
Seasons	Several specific seasonal restrictions pertaining to gillnets.
Licenses	A commercial license is required for vessels, with fees dependent on vessel length (non-residents have an additional $200 surcharge). An endorsement on the vessel license or a non-vessel endorsement to sell fish is required to sell fish products.
Other	There is a two-year moratorium on any new vessel, shellfish or crab license.

Table 61. Closed seasons necessary to achieve reductions in exploitation for black sea bass.

Subregion	Gear	Closed Season	% Reduction 0% Rec	% Reduction 15% Rec
Coast	Otter Trawl	Nov 15-Jan 31	34	22
		Oct 15-Feb 7	41	31
North (ME-NY)	Pots/Traps	Apr 1-May 15	24	-
	Hand Lines	May 1-Jul 15	29	17
		May 1-Jul 31	40	33
South (NJ-NC)	Pots/Traps	Apr 1-May 31	27	-
	Hand Lines	Jul 1-Sep 30	30	18
		Jul 1-Oct 31	41	30

Table 62. Bimonthly allocations based on a coastwide quota of 2.6 million pounds for Black Sea Bass. Shares are based on five years of landings data, 1988 - 1992.

Bimonthly Period	Percent	Pounds
Jan - Feb	26.44%	687,440
Mar - Apr	20.19%	524,940
May - Jun	20.79%	540,540
Jul - Aug	8.46%	219,960
Sep - Oct	10.83%	281,580
Nov - Dec	13.29%	345,540
Total	100.00%	2,600,000

Table 63. Average bimonthly landings by State, Maine to Cape Hatteras, NC. Percentage of bimonthly landings which occur in each State, 1988 - 1992.

State	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
ME	0.11%	0.01%	0.03%	0.00%	0.02%	0.09%
MA	0.02%	0.04%	17.87%	2.65%	4.41%	0.29%
RI	5.85%	4.51%	5.32%	2.47%	2.35%	9.86%
NY	1.91%	2.29%	1.76%	5.43%	3.44%	3.01%
NJ	33.07%	27.11%	30.80%	30.00%	45.67%	46.66%
DE	0.00%	0.61%	8.01%	6.66%	9.58%	16.00%
MD	2.46%	4.10%	26.94%	32.05%	19.09%	9.07%
VA	35.76%	38.33%	7.64%	8.25%	10.74%	11.24%
NC	20.82%	22.99%	1.65%	12.48%	4.69%	3.77%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Table 64. Average bimonthly landings of black sea bass, Maine - Cape Hatteras, NC. Percentage of State landings which occur in each bimonthly period, 1988 - 1992.

State	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec	Total
ME	57.05%	2.20%	12.56%	0.00%	5.41%	22.78%	100.00%
MA	0.14%	0.20%	83.10%	5.02%	10.69%	0.85%	100.00%
RI	29.00%	17.06%	20.70%	3.91%	4.77%	24.55%	100.00%
NY	19.66%	18.03%	14.27%	17.93%	14.52%	15.58%	100.00%
NJ	25.49%	15.96%	18.66%	7.40%	14.42%	18.07%	100.00%
DE	0.00%	2.25%	30.17%	10.22%	18.82%	38.55%	100.00%
MD	4.98%	6.34%	42.86%	20.76%	15.83%	9.23%	100.00%
VA	42.70%	34.97%	7.17%	3.16%	5.25%	6.75%	100.00%
NC	43.84%	36.98%	2.73%	8.42%	4.05%	3.99%	100.00%

Table 65. State shares of a coastwide quota of 2.6 million pounds for black sea bass. Shares are based on five years of landings data, 1988 - 1992.

State	Percent	Pounds
ME	0.05%	1,300
MA	4.47%	116,220
RI	5.34%	138,840
NY	2.56%	66,560
NJ	34.31%	892,060
DE	5.52%	142,520
MD	13.06%	339,560
VA	22.14%	575,460
NC	12.56%	326,560
Total	100.00%	2,600,260

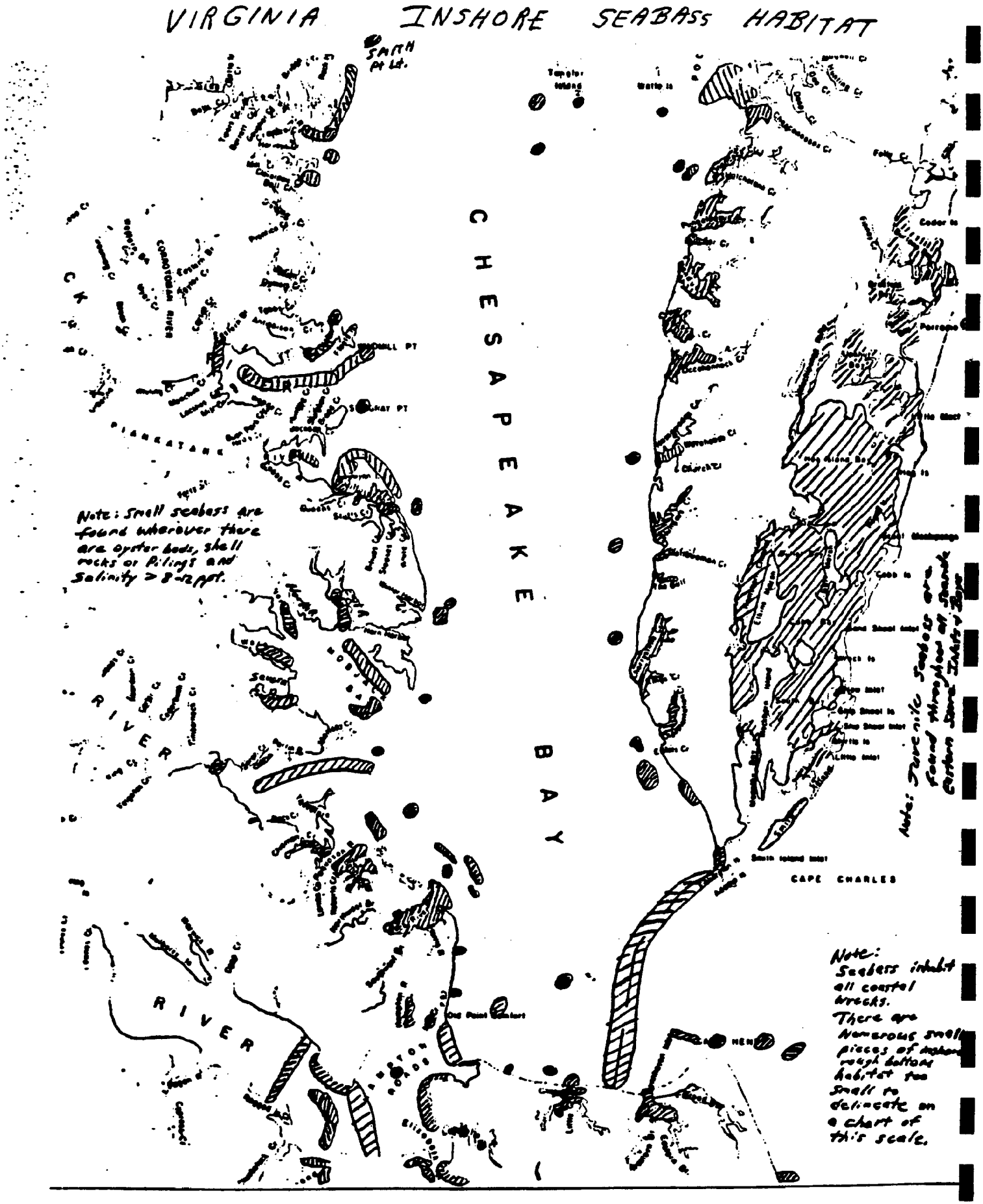


Figure 1. Black Sea Bass Habitat in Virginia.

Source: Boyd pers. comm.

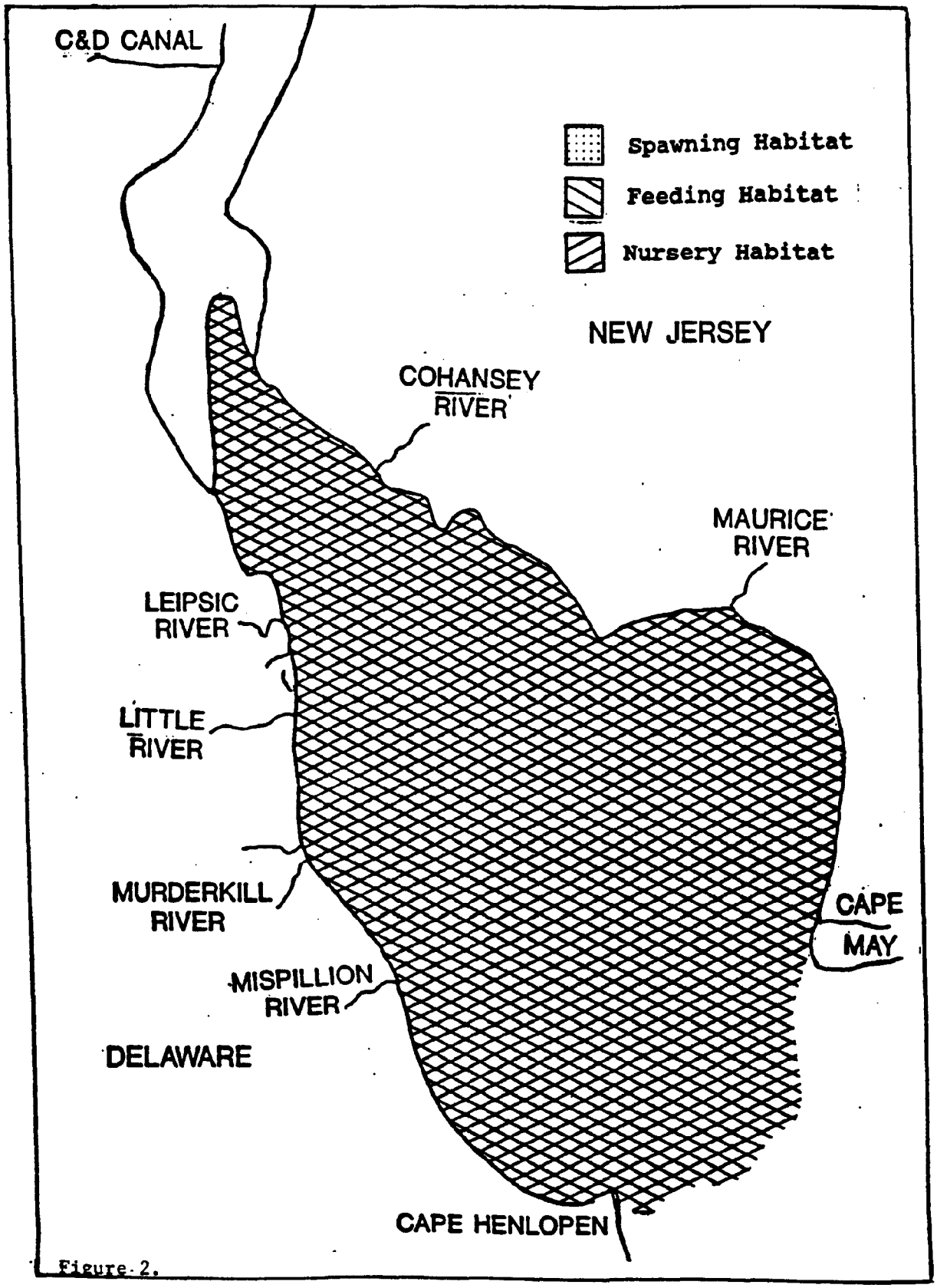


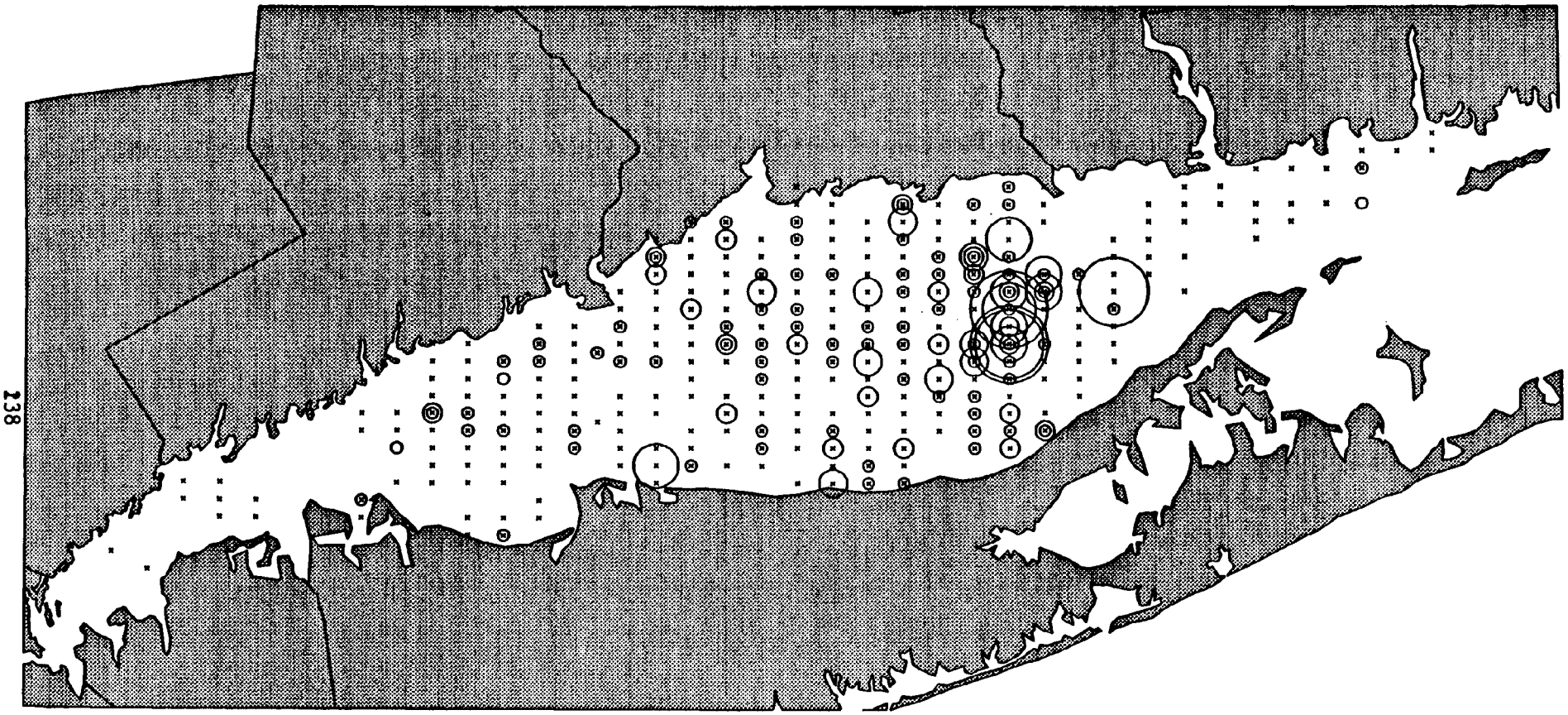
Figure 2.

BLACK SEA BASS NURSERY/FEEDING HABITAT DISTRIBUTION IN DELAWARE BAY

Source: Cole pers. comm.

Figure 3. **Connecticut Trawl Survey 1984 – 93**

Catch of Black Sea Bass



Source: Simpson pers. comm.

Largest circle represents 9 fish
Smallest circle represents 1 fish
Zero catches = x

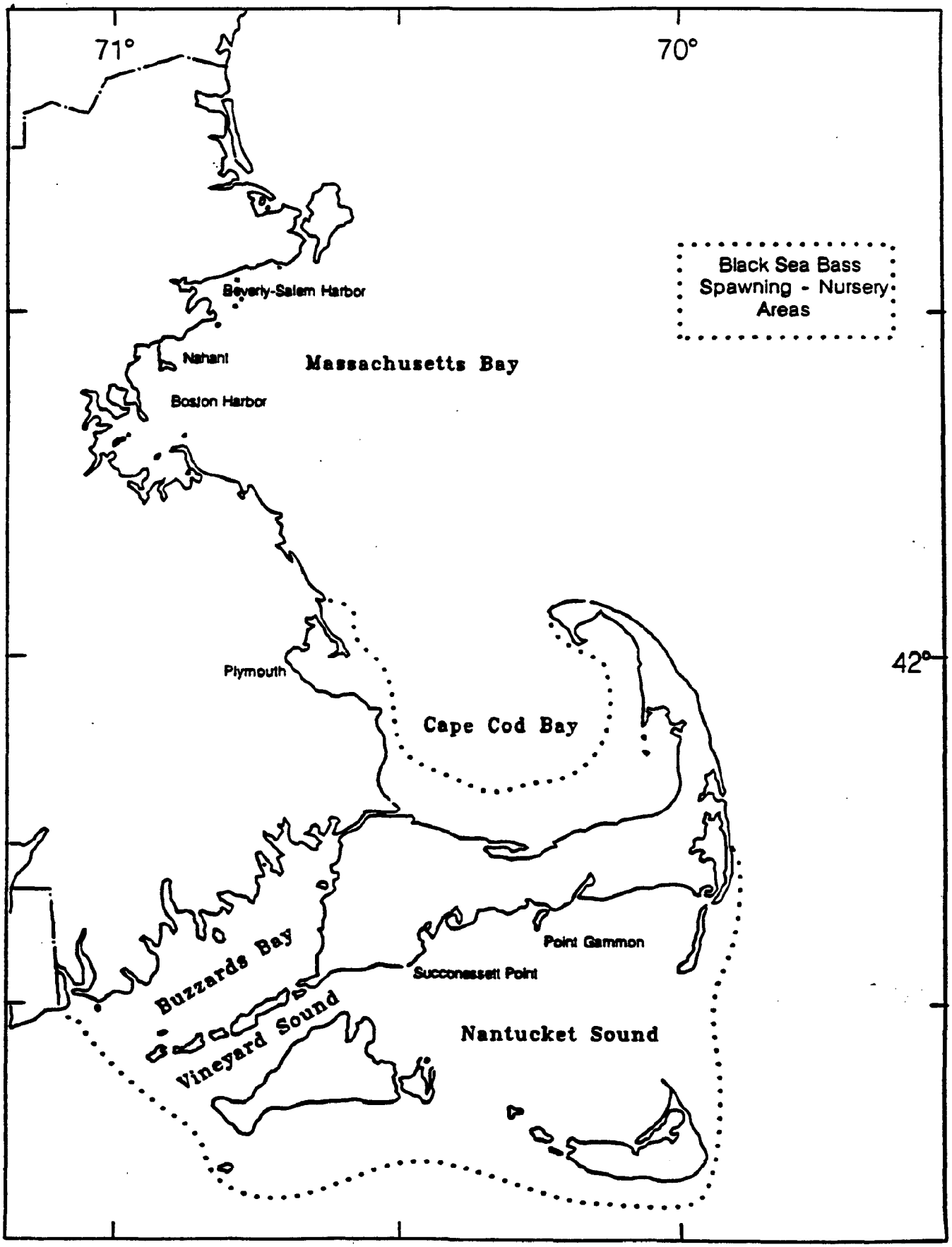


Figure 4. Black Sea Bass Spawning and Nuresery Areas in Massachusetts.

Source: Currier pers. comm.

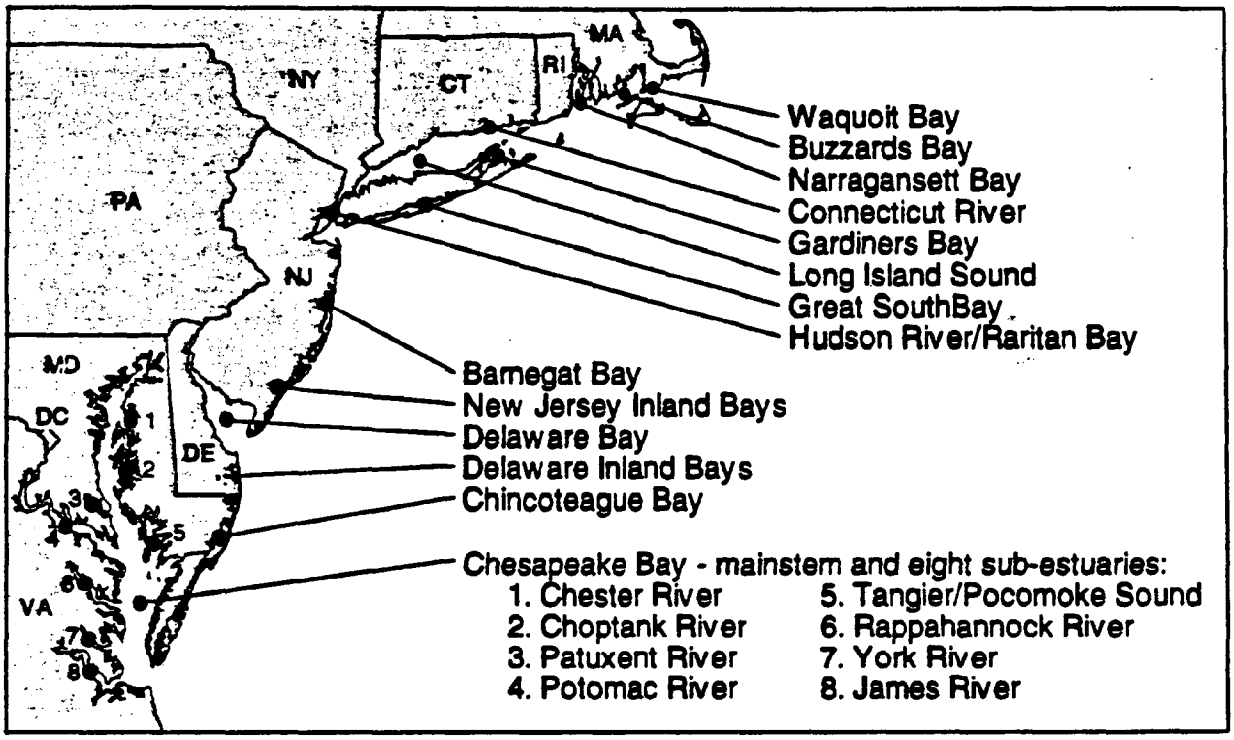


Figure 5. Location of estuaries in NOAA's Estuarine Living Marine Resources Program in the Mid-Atlantic.

Source: USDC 1994a.

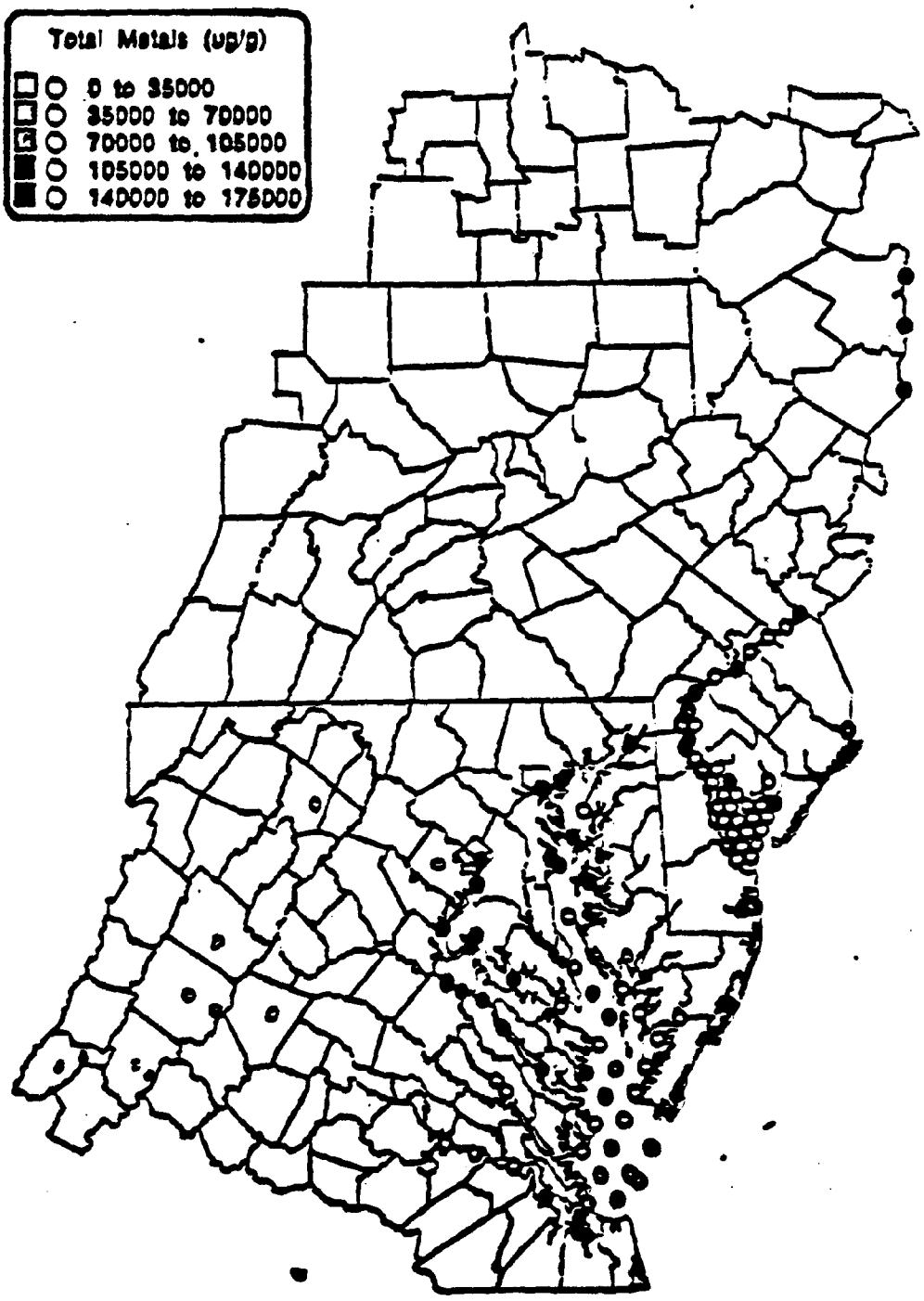


Figure 6. Total metals reported per gram sediment for Chesapeake Bay, Delaware Bay and DE & MD coastal bays by E-Map data (provided by NOAA/ORCA/SEA).

Source: MARMRP 1994.

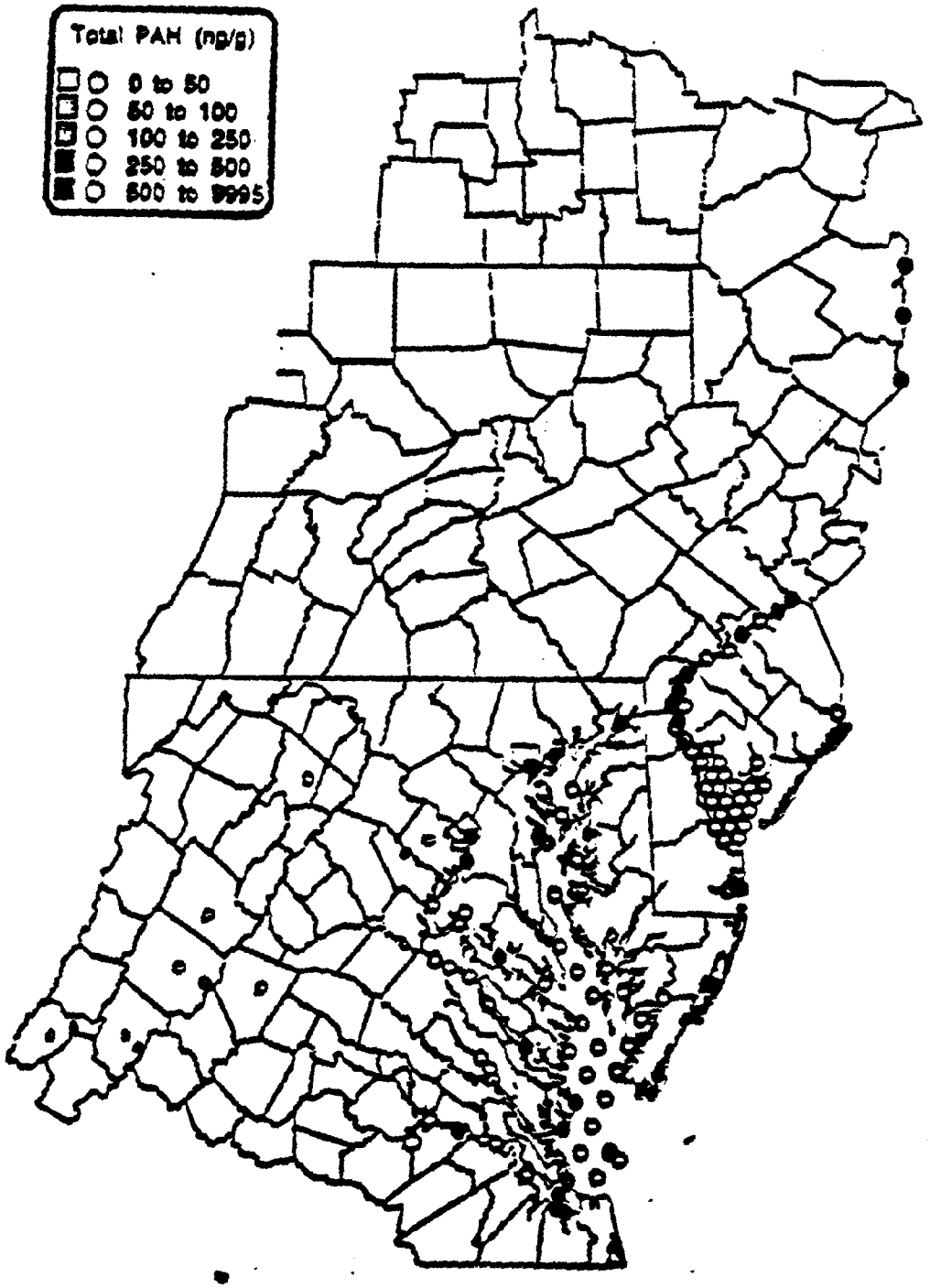


Figure 7. Total polycyclic aromatic hydrocarbons (PAHs) reported per gram sediment for Chesapeake Bay, Delaware Bay and DE & MD coastal bays by E-map data (provided by NOAA/ORCA/SEA).

Source: MARMRP 1994.

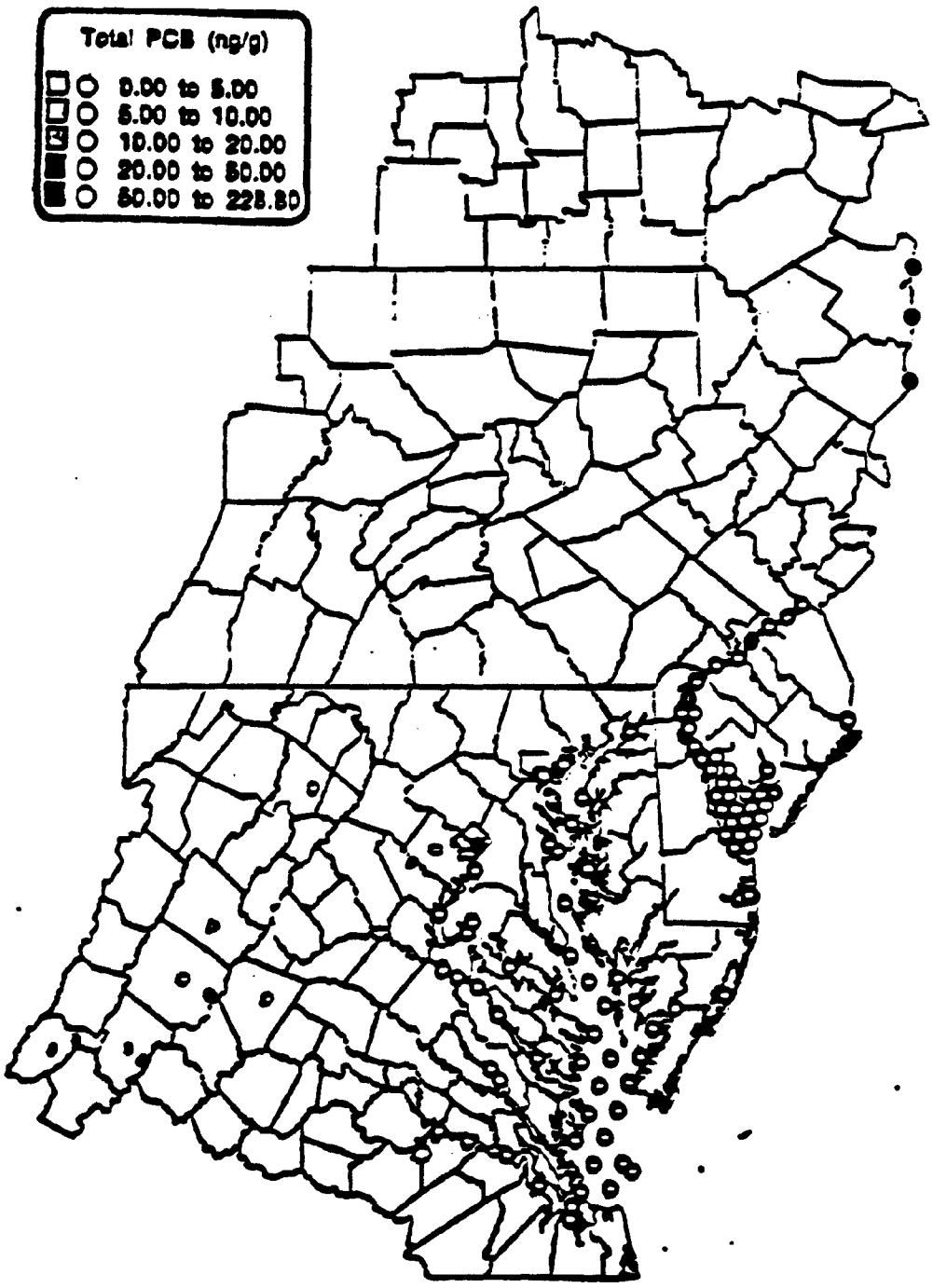


Figure 8. Total polychlorinated biphenyls (PCBs) per gram sediment reported for Chesapeake Bay, Delaware Bay and DE & MD coastal bays by E-map data (provided by NOAA/ORCA/SEA).

Source: MARMRP 1994.

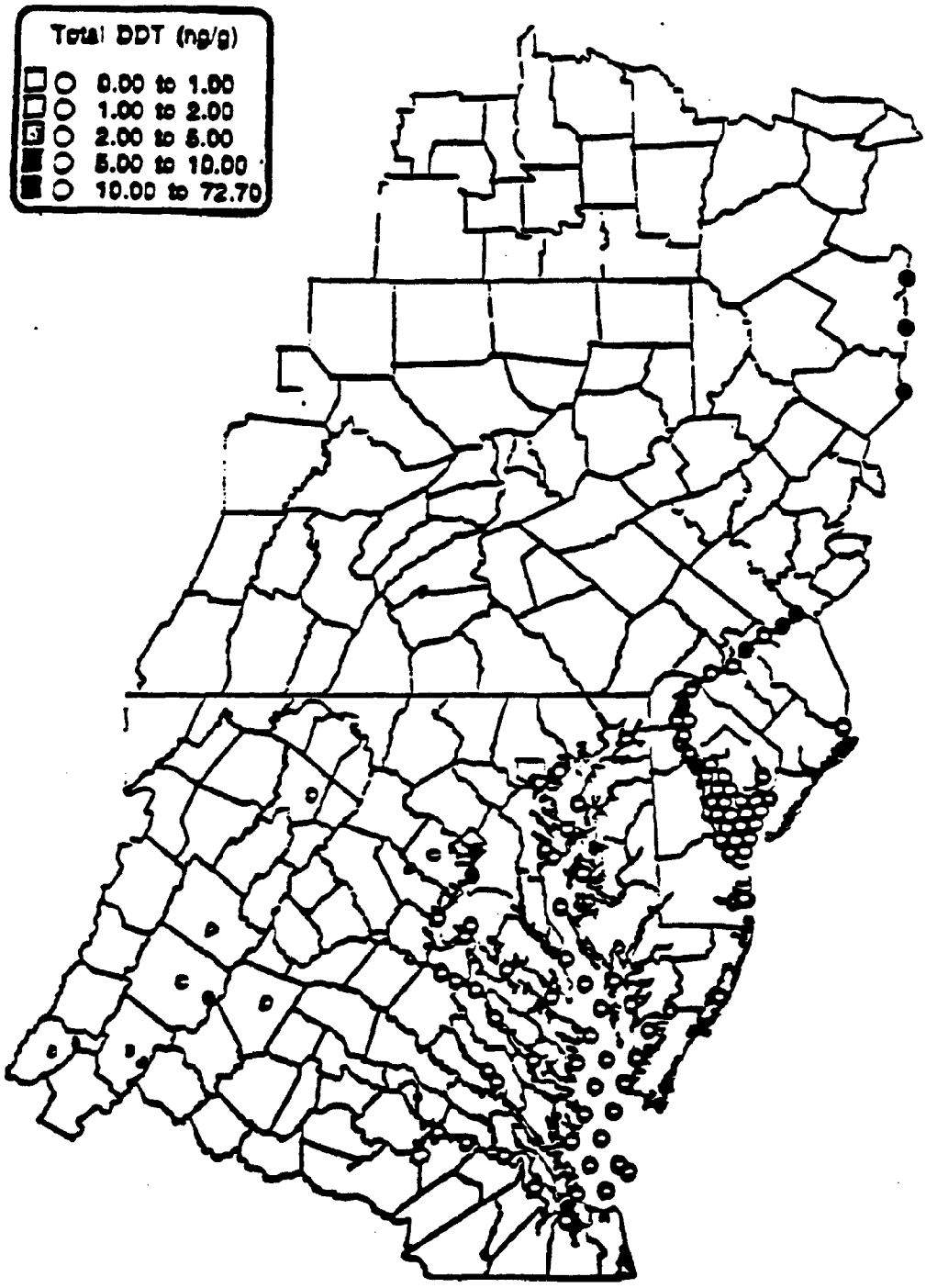


Figure 9.
Total DDT (dichloro-diphenyl-trichloroethane) and its metabolites per gram sediment for Chesapeake Bay, Delaware Bay and DE & MD coastal bays by E-map data (provided by NOAA/ORCA/SEA).

Source: MARMRP 1994.

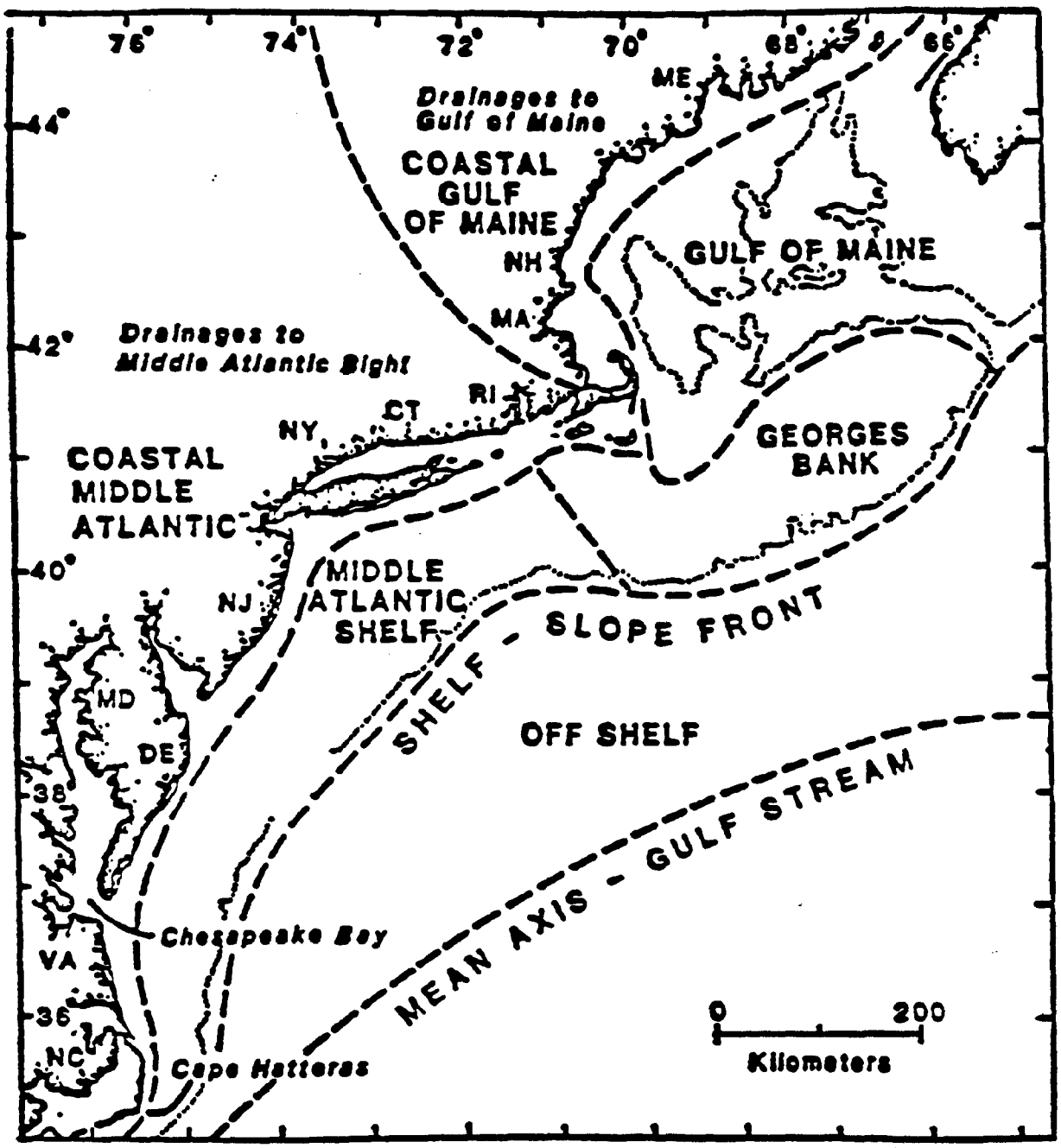


Figure 10. Northeast Regional Action Plan (RAP) Water Management Units.

Source: USDC, 1985 b

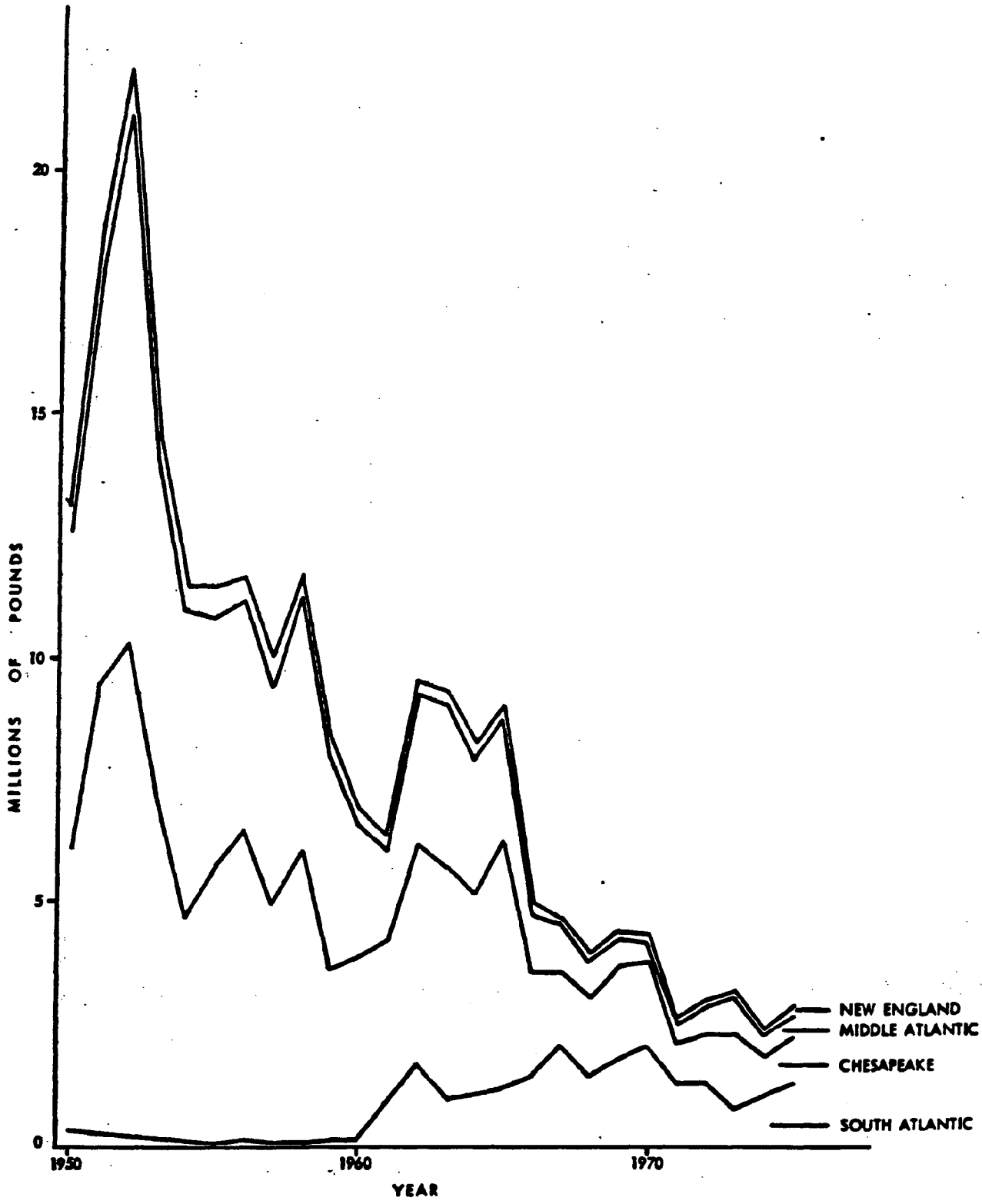


Figure 11. Commercial landings of black sea bass, 1950-1973.

Source: Kendall 1977.

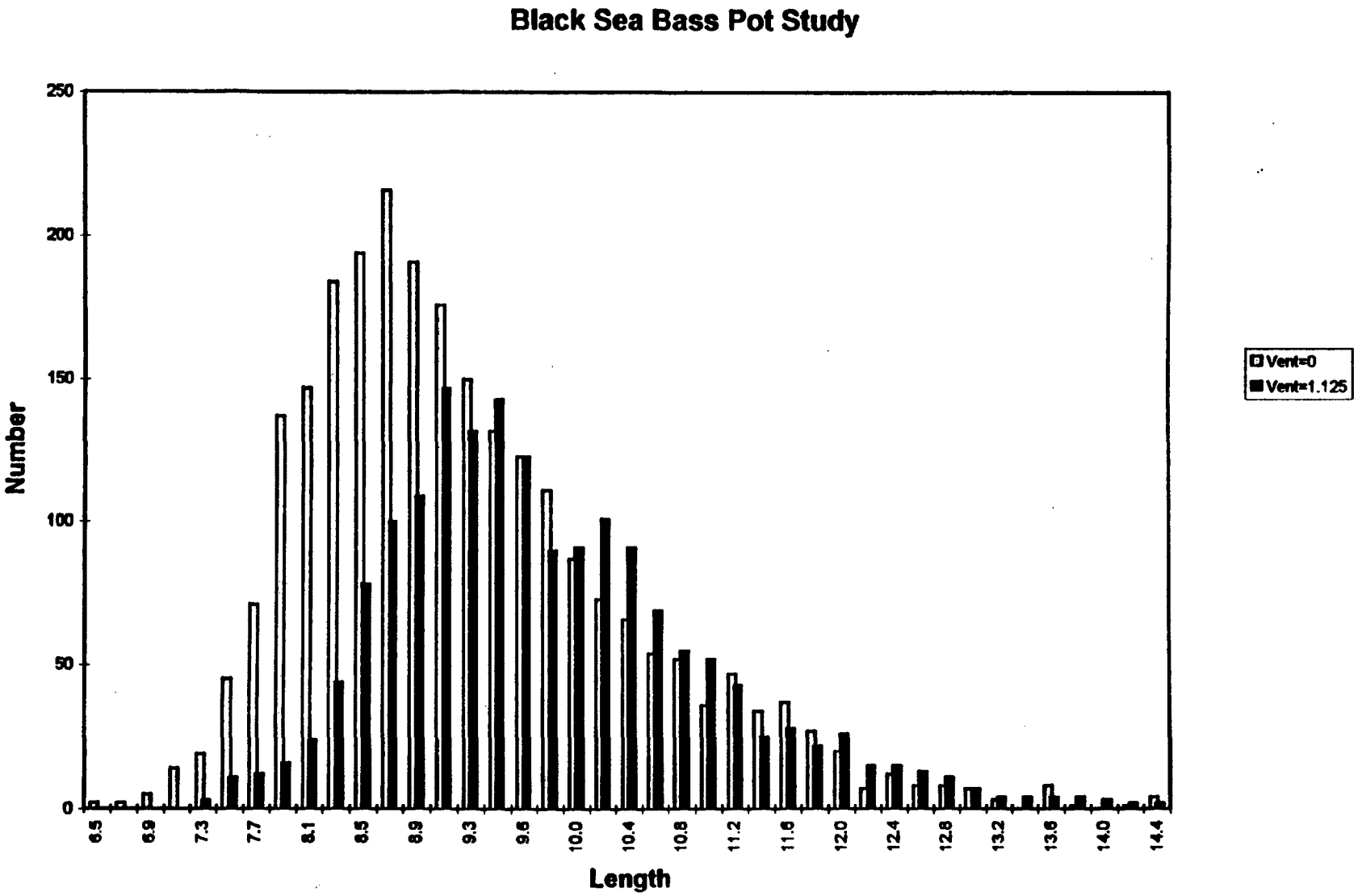


Figure 12. Total lengths of black sea bass from traps with escape vents of 1.125 x 6" and traps with no vents (control).

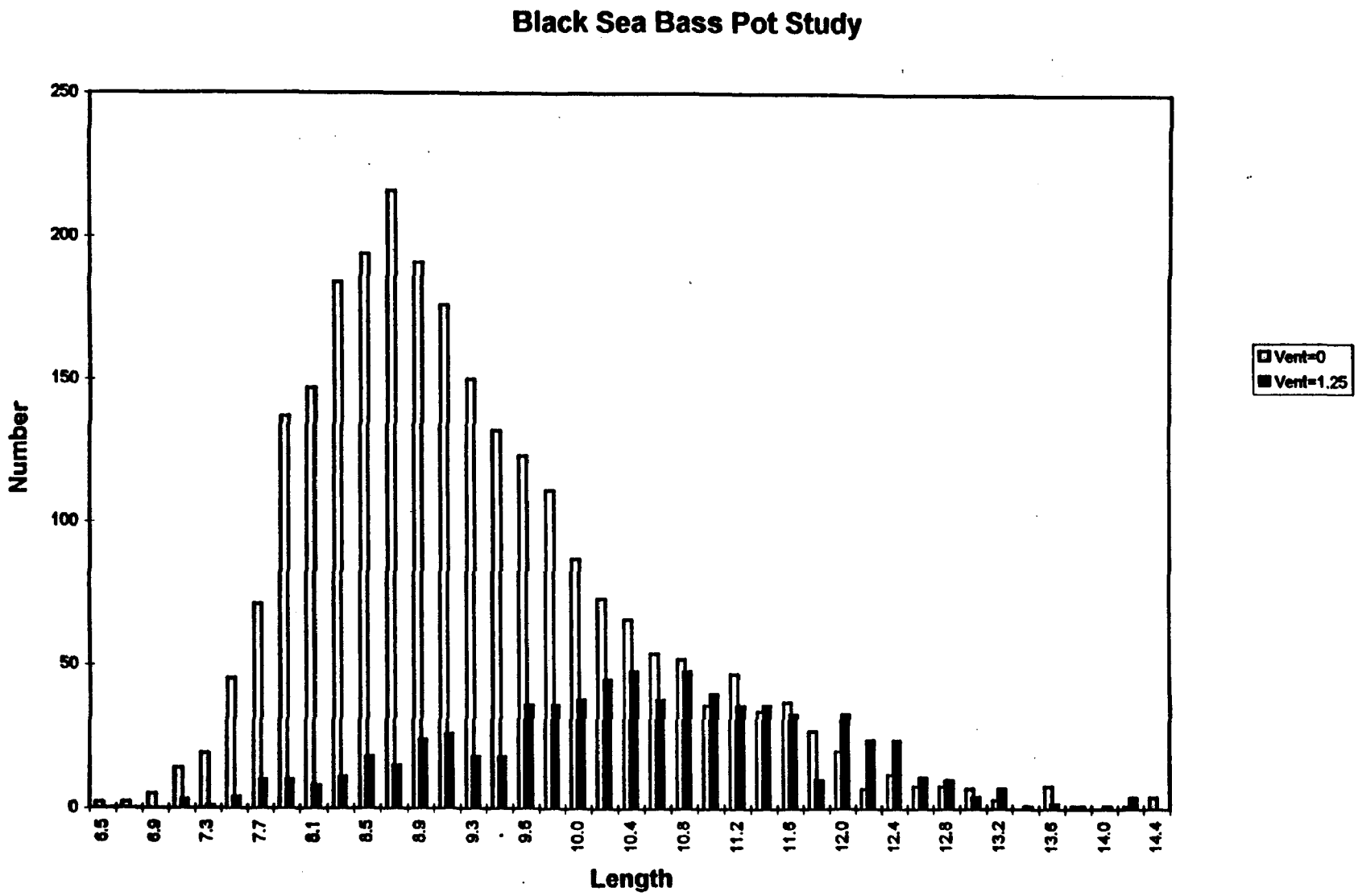


Figure 13 . Total lengths of black sea bass from traps with escape vents of 1.25 x 6" and traps with no vents (control).

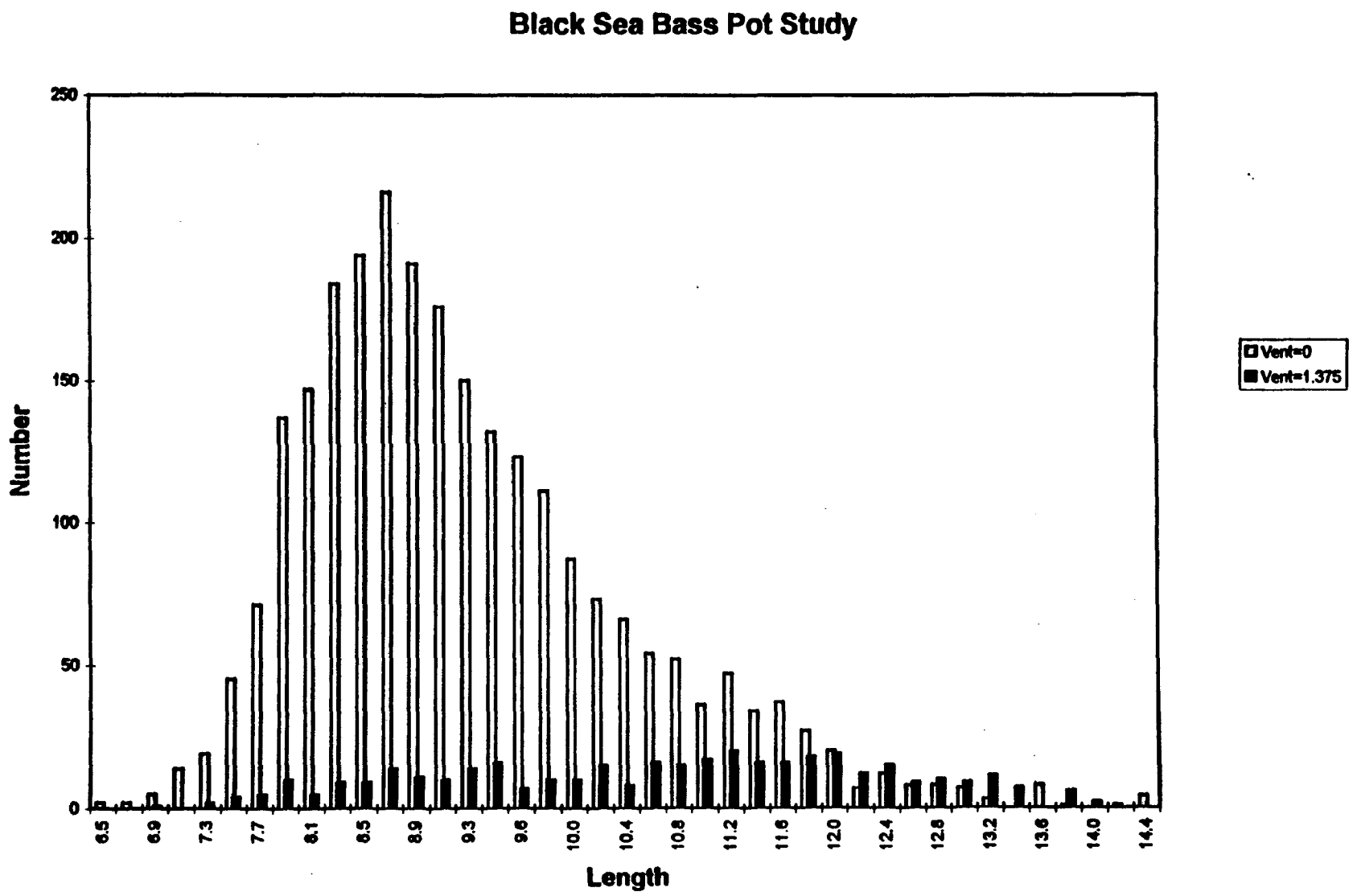


Figure 14. Total lengths of black sea bass from traps with escape vents of 1.375 x 6" and traps with no vents (control).

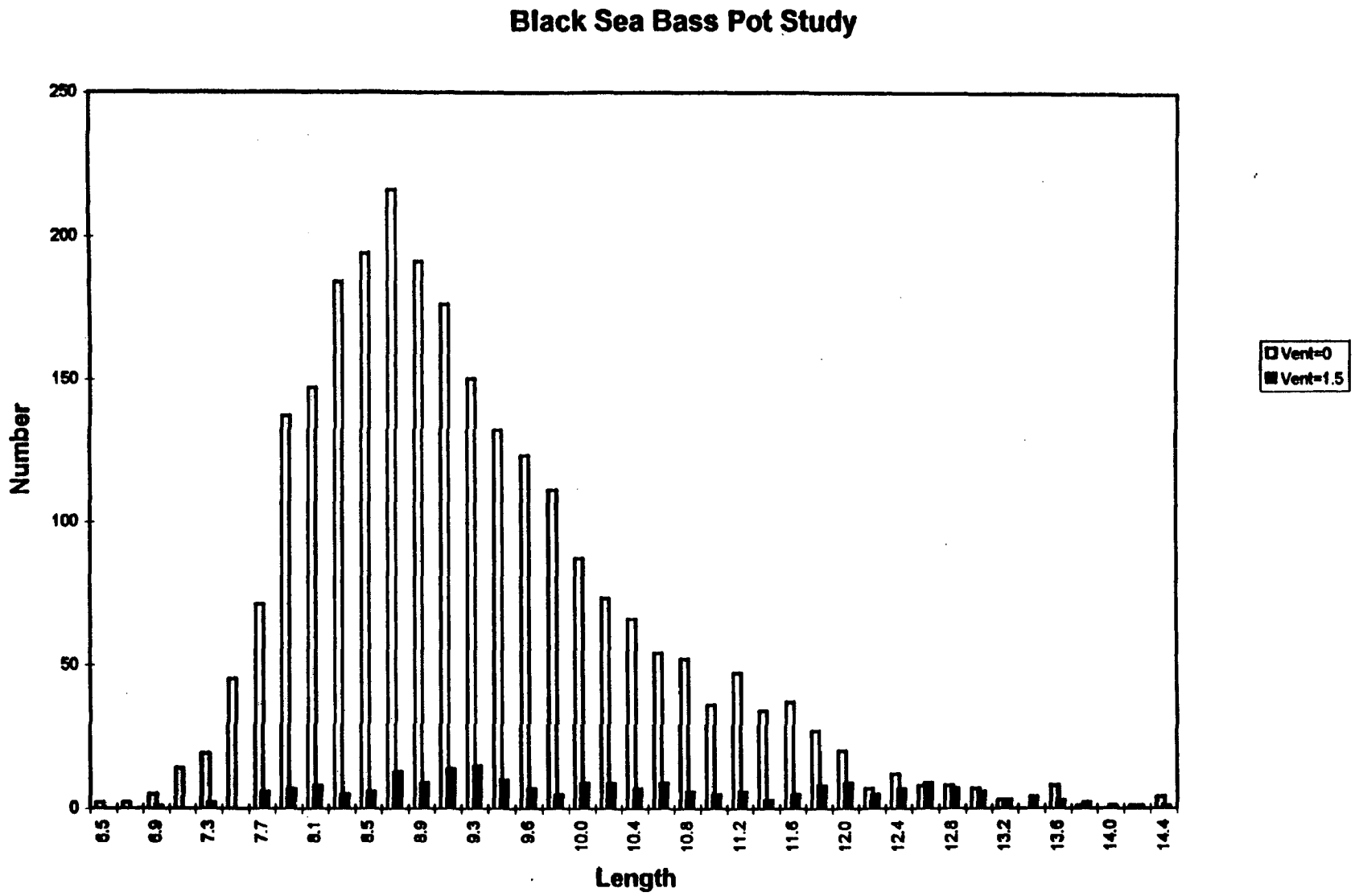


Figure 15. Total lengths of black sea bass from traps with escape vents of 1.5 x 6" and traps with no vents (control).

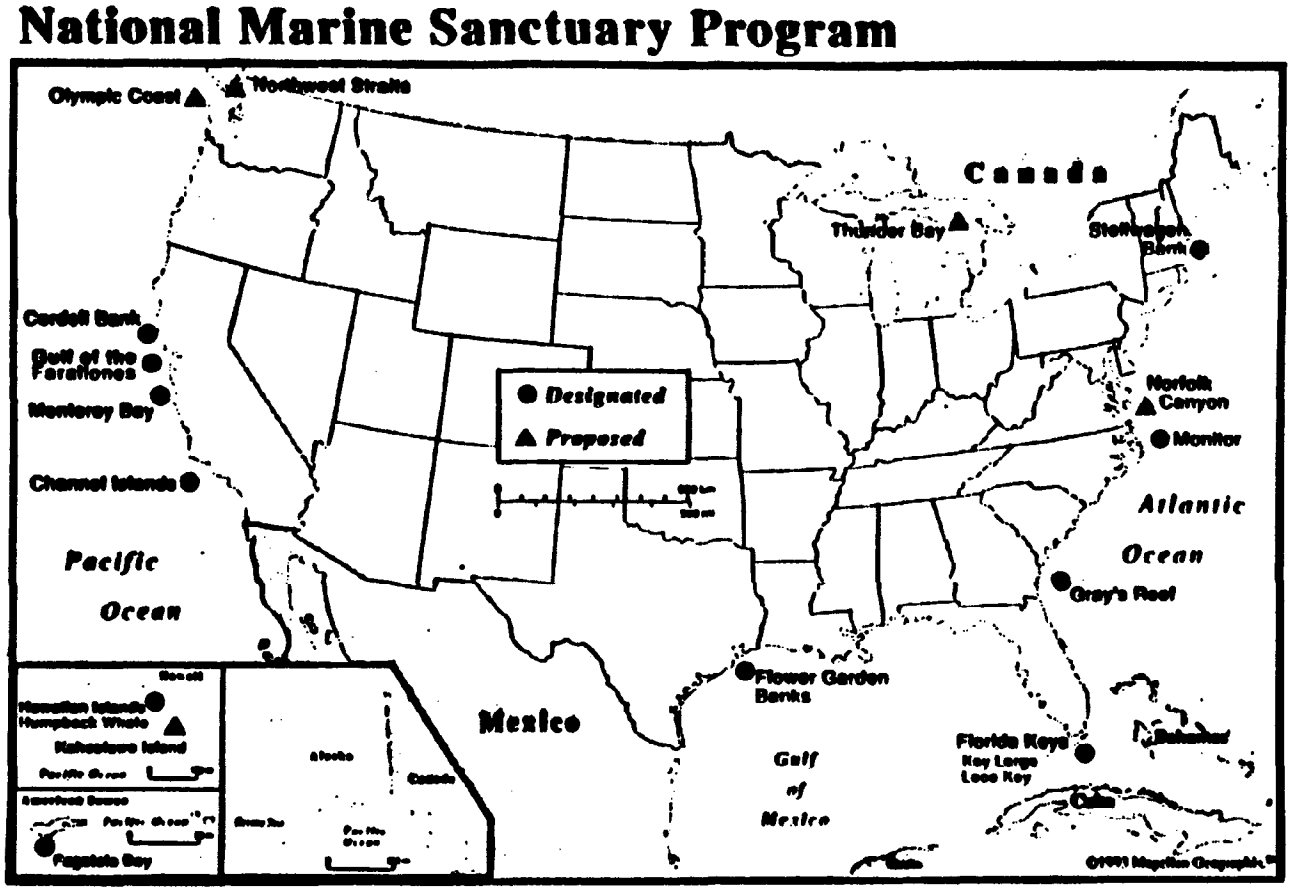


Figure 16. Designated and Proposed National Marine Sanctuaries.

Source: National Marine Sanctuary Program 1993.

APPENDIX 1. ALTERNATIVES TO THE FMP

1. TAKE NO ACTION AT THIS TIME

1.1. Description

No action would mean that the black sea bass fishery would not be managed under the Magnuson Act. The resource would continue to be overfished.

1.2. Evaluation

The "No Action" alternative would not solve the problems identified in section 4.

2. SEASONAL CLOSURES IN THE COMMERCIAL FISHERY FOR YEARS 3 AND BEYOND

2.1. Description

This alternative would achieve the fishing mortality rate reduction target in years three and beyond through a seasonal closure in conjunction with a minimum fish size and gear regulations.

The Monitoring Committee would annually estimate a mortality target from the fishing mortality rate reduction schedule. From this, a seasonal closure would be specified to assure that the mortality target was not exceeded. This would go through a review, comment, and approval process involving the Council, ASMFC Management Board, and NMFS Northeast Regional Director.

Gear-specific seasonal closures would be implemented to control fishing mortality in the commercial black sea bass fishery. During a seasonal closure all gear capable of catching black sea bass be removed from the water during the closed period. In addition, vessels would be required to carry and operate an electronic vessel tracking device that met NMFS specifications.

2.2. Evaluation

NMFS General Canvass Data from 1988 to 1992 were used to determine the potential impact of seasonal closures on commercial landings of black sea bass. The ASMFC technical committee decided that these years would be most representative of current conditions in the fisheries.

The committee decided that seasonal closures for black sea bass fishermen be applied on a coastwide basis. Calculations restricted the smallest unit of closure to one week. In addition, seasonal closures were derived assuming that fishermen would recoup 0% and 15% of their landings during the open season. The 15% level applied to all mobile gears, including hook and line. Because of the fixed nature of the pots and traps, only a 0% (no recoupment) level was used for these gears.

If a recoupment level was assumed, calculations were made using a simple algorithm that accounted for changes in landings per day (LPD) during the open and closed seasons. For example, for black sea bass landed by otter trawl fishermen, the time period from November 15 to January 31 accounted for 34% of the landings during 1982-1991. A closed season during these months would result in a fishing season that would be open for 8 ½ months (February through November 14) or approximately 288 days. The amount of discretionary time during this open period would be 43 days (15% x 288 days). Since 66% of the landings occurred during the open period, the LPD during the open period would be 66 divided by the days fished or 245 (288-43). This LPD multiplied times the discretionary time (43 days) would result in a recoupment of 12%. As a result, the realized reduction in landings for the closed period February through May would be 22% (34% - 12%).

Seasonal closures ranged from slightly more than one month to four months depending on location (north or south) and gear type (Table 61). Seasonal closures could achieve the desired reductions if the following criteria were met:

1. The level of discretionary time used to derive the reductions is realistic. The assumed value of 15% may be an underestimate for some gears, especially for the black sea bass trawl fisheries where there are few directed trips, i.e., most sea bass are caught incidentally with other species.

2. All gear capable of catching black sea bass be removed from the water during the closed period. Without such a provision, fishermen would continue to fish for other species during the closed period, catching and discarding black sea bass in the process. For trawl fisheries, the technical committee recommended that mesh sizes of 5.5" diamond mesh or larger could continue to operate and exemptions be required for squid and fly net fisheries.

3. Landings patterns do not vary much from one year to the next, i.e., anticipated landings in year three of the management program are similar to the landings observed for 1988-1992.

It is also important to note that fishermen could negate seasonal closure effects by increasing effort or efficiency during the open season. These increases could produce conditions in the stock that were equivalent to or worse than those before regulations.

Finally, any effective area/seasonal closure would require that NMFS be able to track commercial vessels on a real time basis to ensure a high level of compliance. Such a system could be comparable to the Vessel Monitoring System that will be implemented by NMFS for groundfish and scallops.

3. BIMONTHLY COMMERCIAL QUOTA

3.1. Description

This alternative would allocate the annual coastwide quota on a bimonthly basis. The Regional Director would be required to prohibit landings by federally permitted vessels when any bimonthly quota had been reached.

The quota setting process is specified in 9.1.2.2. Beginning in year 3, a quota would be allocated to the commercial fishery to control fishing mortality. The quota would be based on projected stock size estimates derived from stock assessment information for that year. Estimates of stock size coupled with the target fishing mortality rate would allow for a calculation of total allowable landings. Based on the historic proportions of commercial and recreational landings, 42% of the total target would be allocated to the commercial fishery (Note that this percentage will be modified to reflect the changes to the MRFSS data by the NMFS).

The annual commercial quota will be set at a range of between 0 and the commercial share of 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 black sea bass are caught with an otter trawl, pot, 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 Black Sea Bass 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 quota must apply throughout the management unit, that is, in both state and federal waters. All commercial landings during a bimonthly period would count toward the quota for that period. When the quota had been landed for a bimonthly period, fishing for and/or landing black sea bass would be prohibited for the remainder of the period.

Any landings in excess of the bimonthly quota would be subtracted from the following year's quota for the same period. For example, if the period 1 (January-February) quota was exceeded by 10,000 pounds, 10,000 pounds would be subtracted from the period 1 allocation the following year.

Using data collected through this FMP (section 9.1.3), NMFS will monitor the fishery to determine when a bimonthly quota will be reached. It is expected that the states will assist NMFS with data collection.

The Regional Director shall close the EEZ to fishing for black sea bass by commercial vessels when the bimonthly allocation has been landed.

The Regional Director may establish a system of trip limits to ensure an equitable distribution of the quota over the bimonthly period.

Annual quotas would be allocated on a bimonthly basis based on commercial landings for the period 1988-1992 (Table 62).

3.2. Evaluation

Beginning in year 3 a quota would be allocated to the commercial fishery to control fishing mortality. The quota would be based on stock assessment information on projected stock size estimates for that year. Estimates of stock size coupled with the target fishing mortality rate would allow for a calculation of total allowable landings. Based on the historic proportions of commercial and recreational landings for 1983 to 1992, 42% of the total target would be allocated to the commercial fishery.

To assess potential impacts of the quota, landings data were used from 1988-1992 to derive average landings for those years (3.275 million lbs). Based on these data, a 20% reduction in exploitation would equate to a commercial quota of 2.6 million lbs (80% x 3.275).

A bimonthly quota system could allow for an equitable allocation of the commercial quota to northern and southern participants as well as between the smaller day boats and larger offshore vessels. Due to the seasonal nature of the black sea bass fishery, the quota would have to be divided into bimonthly units. To minimize effects on traditional landings patterns, the allocation to each period would be based on past landings instead of a system that divided the quota equally over the six periods. Based on 1988-1992 data, 20.79% would be allocated to period 3 (May-June) and only 8.46% to period 4 (July-August) (Table 62). The bimonthly allocations would range from 219,960 lbs to 687,440 lbs based on a annual quota of pounds 2.6 million lbs (Table 62). Based on state data for those years, fishermen would be able to maintain traditional landings patterns in most states (Tables 63 and 64).

A coastwide system would allow fishermen to land in any port along the coast and all commercial landings during a bimonthly period would count toward that quota for that period. When the quota had been landed for a bimonthly period, fishing for and/or landing black sea bass would be prohibited for the remainder of the period. Landings in excess of the allocation for the period would be subtracted from the following years's quota for the same period. Trip limits would have to be implemented. Bimonthly allocations without trip limits would encourage derby-style fishing practices that would allow the quota to be landed by larger, more mobile vessels at the beginning of each period. As a result, supplies of black sea bass would be discontinuous and smaller boats would be disadvantaged.

Trip limits would be established and modified throughout the two-month period to allow for a continuous supply of product and equitable distribution of black sea bass to fishermen using both small and large vessels. For example, almost all of the landings in period 1 are attributable to fishermen using otter trawl vessels. A 5,000 pound trip limit could be established for the beginning of period 1. The limit would decrease to 2,500 lbs when 50% of the allocation was reached, 1,000 lbs when 75% of the quota was taken, and 500 lbs when 90% of the landings were reached.

Different trip limit systems could be designed for each period to ensure equitable distribution over each two-month period. Unlike a system where states have the flexibility to design their own systems, NMFS

would be responsible for implementing trip limits for each period.

4. STATE BY STATE QUOTAS

4.1. Description

This alternative would allocate the commercial quota on a state by state basis. States would have the responsibility for closures in their state and the Regional Director would be required to prohibit landings by Federally permitted vessels in any state that had reached its quota. States would be allowed to trade or combine quotas and the states could impose trip limits or other measures to manage their quotas. The system would be the same as that operating under the Summer Flounder FMP.

4.2. Evaluation

The quota setting process is specified in 9.1.2.2. Beginning in year 3, a quota would be allocated to the commercial fishery to control fishing mortality. The quota would be based on stock assessment information on projected stock size estimates for that year. Estimates of stock size coupled with the target fishing mortality rate would allow for a calculation of total allowable landings. Based on the historic proportions of commercial and recreational landings, 42% of the total target would be allocated to the commercial fishery (Note that this percentage will be modified to reflect the changes to the MRFSS data by the NMFS). To assess potential impacts of the quota, landings data were used from 1988-1992 to derive average landings for those years (3.275 million lbs). Based on these data, a 20% reduction in exploitation would equate to a commercial quota of 2.6 million lbs (80% x 3.275).

Quotas would be distributed to the states based on their percentage share of commercial landings for the period 1988-1992. Quotas would range from 1,300 lbs to 892,060 lbs based on these percentages (Table 65).

A state-by-state quota system could allow for the most equitable distribution of the commercial quota to fishermen. Specifically, states under this alternative would have the responsibility of managing their quota for the greatest benefit of the commercial black sea bass industry in their state. States could design allocation systems based on trip limits and seasons. States would also have the ability to transfer or combine quota increasing the flexibility of the system to respond to year to year variations in fishing practices or landings patterns.

However, state-by-state allocations could negatively affect fishermen who land in those states that do not have the capability of regulating a quota. Based on the quota system implemented for summer flounder, a few states have not been able to establish trip limit systems that ensure a continuous and steady supply of product over the season for producers and/or a fair an equitable distribution of flounder to all fishermen who have traditionally landed summer flounder in their state. In addition, some states have had problems coordinating their regulations with neighboring states to prevent large scale landings by fishermen in states with the most favorable trip limits. A similar situation could occur if a state-by-state system was implemented for black sea bass.

5. INDIVIDUAL TRANSFERRABLE QUOTAS

5.1. Description

An individual transferrable quota (ITQ) program would assign annual quotas to individual vessels. Qualifications to participate could be the same as participation under the vessel moratorium. Initial allocations could be made based on sales receipts for the most recent five years, but no vessel could be allocated more than some maximum percentage. Fishermen would be prohibited from fishing for or landing black sea bass after their annual allocations had been taken.

5.2. Evaluation

ITQs are a relatively new management technique where a total quota is divided into small parts and allocated to individual participants. Individual quotas or shares could be bought, sold or leased so that harvesters have flexibility in planning their fishing activities. Potential advantages of ITQs include increased profits, greater economic stability, improved product quality, improved safety, reduced gear conflicts and losses, elimination of derby-type fisheries, bycatch reduction, an improved investment climate, reduction of market gluts, and reduction in post-harvest waste (Anderson 1986). Potential disadvantages of ITQs include increased high-grading, under-reporting of catch, enforcement costs and problems, creation of a "rich mans club", changes in the makeup of the fishing fleet, and potential inequities of the initial allocation of quota shares due to lack of information (Anderson 1986).

An ITQ program could allow individual fishermen greater flexibility than any of the quota or seasonal closure based systems. That is, they could fish for black sea bass when they wanted to, rather than being controlled by quota or seasonal closures.

As with the other alternatives, fishermen could not fish for (catch and discard as well as catch and land) black sea bass after their allocations had been taken. This would require careful management of their allocations to assure that their participation in other small mesh fisheries did not violate their ITQ allocations.

An initial problem is associated with the initial allocation process. A great deal of time would be required to obtain and validate sales records to determine initial allocations. NMFS weighout data indicate a minimum of 460 vessels could be eligible for allocations. Since not all vessels are captured in the weighout data base, the number could be considerably larger. It might be preferable to initiate management of the black sea bass resource without ITQs to protect the resource and introduce an ITQ system subsequently.

6. SEASONAL DEPENDENT MINIMUM SIZES IN THE COMMERCIAL FISHERY: A 10" TL MINIMUM SIZE FROM OCT. 1 - APRIL 30 AND A 9" TL MINIMUM SIZE FOR THE REST OF THE YEAR

6.1. Description

This alternative would require that commercial fishermen not land for sale any black sea bass smaller than the 9" TL minimum size limit from May through September 30 and a 10" TL minimum size limit from October 1 through April 30. Gear regulations for otter trawl fishermen and pot/trap fishermen would correspond to the 10" TL minimum size as identified in the preferred alternative, i.e., a 4.5" minimum mesh size and 1 1/4" x 6" or 2.75" vents. A maximum of a 5% tolerance by weight of undersized black sea bass would be allowed on commercial vessels. Black sea bass less than the minimum size limit could not be sold. This alternative would be used in conjunction with other alternatives such as the quota or closed seasons beginning in year 3 of the management program.

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

6.2. Evaluation

This alternative recognizes the seasonal nature of the commercial black sea bass fisheries. Based on 1983 to 1992 monthly data, most black sea bass are harvested from state waters from May through June and from EEZ waters from January through June (Table 15).

Historic commercial length frequencies were used as an estimate of potential short-term impacts of length limits on the commercial black sea bass fisheries (Tables 41 to 44). Specifically, commercial length frequencies from the NMFS Weighout Data and North Carolina DMF from 1982 to 1991 were used to determine potential size limit effects. In general, size frequency data indicated that potential size limit effects increased from north to south, were gear dependent, and varied from one year to the next.

Based on NMFS weighout data, approximately 11% of the measured black sea bass were less than 9" TL for all otter trawl vessel with sampled landings (Table 43). A 9" TL minimum size regulation would have a slightly greater effect on landings from fish pots/traps, the other predominant gear in the black sea bass fishery. Based on NMFS weighout data, almost 26% of the measured fish were less than 9" TL for the sea bass obtained from this gear from 1983 to 1991 combined.

A 10" TL minimum size limit would have a significantly greater effect on both otter trawl landings and landings from fish pots/traps. Based on 1983 to 1992 NMFS weighout data, 30% and 59% of the fish measured from landings from otter trawls and pots/traps were less than 10" TL, respectively. In addition, almost 57% of the black sea bass measured from the North Carolina winter trawl fishery in 1991-1992 were less than 10" TL (Table 44).

Thus, it is probable that a 10" TL minimum size in the commercial fishery could significantly reduce landings in the short term. In, addition because gear regulations would apply to a 10" minimum size for the entire year, a significant amount of 9" TL black sea bass would escape from otter trawls and pots/traps reducing landings of 9" TL fish from May to November when 9" TL fish could be landed. A large reduction in landings could have large negative economic consequences to fishermen, processors, and the consuming public.

However, assuming that undersized fish are not caught and discarded, minimum size regulations have positive impacts on the stock. In general, because minimum sizes increase the size at full recruitment, yields are increased as fishermen catch larger, heavier fish. In addition, minimum size regulations can increase the resilience of the stock to overfishing, i.e., the biological reference points (F_{max}) can increase. Finally, minimum size regulations can increase spawning stock biomass by allowing more fish to spawn. Sexual maturity data for black sea bass indicate that 50% of the sea bass are mature by a size of 7.7" TL.

7. A THRESHOLD REQUIREMENT TO QUALIFY FOR A MORATORIUM PERMIT

7.1. Description

This alternative would require that a vessel have documented landings of black sea bass equal to, or in excess of, some minimum threshold amount in order to qualify for a moratorium permit to land and sell black sea bass under the moratorium program. The qualification period, 26 January 1988 to 26 January 1993, would remain identical to that proposed in the preferred alternative. However, this alternative differs from the preferred alternative in that the preferred alternative would require that any amount of black sea bass (i.e., greater than 0 pounds) be documented for sale between those dates to qualify for the permit.

7.2. Evaluation

The number of vessels landing a threshold amount of black sea bass on an annual basis was derived using 1992 NMFS weighout data (Table 28). These data indicate that the number of vessels landing black sea bass decrease as the threshold amount increases.

An appropriate threshold amount would be determined such that those fishermen whose livelihoods are dependent on black sea bass receive moratorium permits.

8. SEPARATE MANAGEMENT MEASURES FOR PARTY/CHARTER BOAT FISHERMEN

8.1. Description

This alternative would recognize that anglers fishing from party/charter boats form a distinct user group that is separate from other recreational or commercial fishermen. As such, beginning in year 3 of the fishery management program, management measures would be developed that were applicable only to this user group. These could include a coastwide harvest limit, minimum size limit, possession limit, and

season.

8.2 Evaluation

Based on 1983 to 1992 MRFSS data, anglers fishing from party/charter boats accounted for 71% of the recreational landings of black sea bass on a coastwide basis. Based on this data, 71% of the coastwide recreational harvest limit would be allocated to anglers fishing from party/charter vessels. A combination of size and possession limits with seasons could then be used to achieve the allocation on an annual basis.

9. A 9" TL MINIMUM FISH SIZE AND A 3.5" MINIMUM SQUARE MESH SIZE IN THE OTTER TRAWL FISHERY WHEN THE VESSEL HAS 100 POUNDS OR MORE OF BLACK SEA BASS ON BOARD

9.1. Description

This alternative would allow fishermen to use only nets that have a minimum mesh size of 3.5" square mesh when they had 100 pounds or more of black sea bass on board. The use of diamond mesh in the directed otter trawl fishery for black sea bass would be prohibited. In addition to the minimum mesh provisions, this alternative would require that fishermen not land for sale any black sea bass smaller than the 9" TL minimum size limit. A maximum of a 5% tolerance by weight of undersized black sea bass would be allowed on commercial vessels. Black sea bass less than 9" TL could not be sold. This alternative would be used in conjunction with other alternatives such as the quota or closed seasons.

This alternative would require that owners or operators of otter trawl vessels possessing 100 lbs or more of black sea bass, fish only with nets that have a minimum mesh size of 4.0" square, 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 more stringent net mesh regulation, the state regulation would prevail. States with minimum mesh regulations larger than those established by this alternative would be encouraged to maintain them.

In addition, this alternative would require that owners or operators of otter trawl vessels possessing 100 lbs or more of black sea bass not have available for immediate use any net, or any piece of net not meeting the minimum mesh size requirements, or mesh that is rigged in a manner that is inconsistent with the minimum mesh size. A net that conformed to one of the following specifications and that could be shown not to have been in recent use is considered to be not "available for immediate use":

(1) A net stowed below deck, provided:

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

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

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

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

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

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

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

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

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

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

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

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

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

This alternative would prohibit the owner or operator of a fishing vessel from using 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.

The minimum net mesh size could be changed annually, if appropriate, following the Black Sea Bass FMP Monitoring Committee process set forth in 9.1.2.2. Based on the recommendations of the Black Sea Bass Monitoring Committee and Council, the Regional Director, by regulatory amendment, shall implement regulations on gear other than otter trawls to achieve discards of black sea bass 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 gears currently not in significant use in the black sea bass fishery are developed as a way of avoiding the minimum otter trawl mesh rule.

9.2. Evaluation

If implemented, owners or operators of otter trawl vessels possessing 100 lbs or more of black sea bass would only be allowed to fish with nets that have a minimum mesh size of 3.5" square in the codend. Based on selectivity studies conducted for other round fish, the selectivity of a 3.5" square mesh should be equivalent to that of a 4.0" diamond mesh. The L_{25} (the length at which 25% of the black sea bass are retained) is 9.3 inches for this mesh size based on body measurements (Table 45).

Mesh selectivity studies have not been conducted for black sea bass. The relationship between body depth and total length as derived by Weber and Briggs (1983) was used to calculate the 50% retention lengths for black sea bass. A selection range of 2 inches (based on selectivity studies conducted on fish of similar shape) was then used to estimate 25% and 75% retention lengths.

Preliminary work conducted on other species indicates that square mesh may allow for increased survival of fish escaping from the codend of a net. Unlike diamond mesh, square mesh retains its shape as the net is fished (i.e., does not compress) allowing fish to escape with minimal loss of scales and body damage.

Landings of black sea bass represent only a portion of the fishing mortality experienced by the stock. Undersized black sea bass, those less than 9" 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.

Black sea bass are a component of the mixed trawl fishery in Southern New England and the Mid-Atlantic. Although Sea Sampling data indicate that fishermen may differentiate between species on a per tow basis (i.e., target a single species on a tow), fishermen land many different species on a per trip basis. Based on 1992 NMFS weighout data, black sea bass are most frequently landed with *Loligo* squid, silver hake, scup, and flounder. In fact, for trips landing a 100 or more pounds of black sea bass per trip, more Loligo squid were landed than black sea bass in 1992 (Table 29).

However, this predominance of *Loligo* may reflect reduced availability of other species in 1992. Based on 1983 to 1987 data, the landings of otter trawl vessels landings 100 lbs or more of black sea bass were composed primarily of scup (29%) and summer flounder (24%) (Table 46). *Loligo* accounted for only 17% of the landings.

The 100 pound threshold would effect 62% of the vessels and 34% of the trips that landed black sea bass in 1992. These trips accounted for 95% of the black sea bass landed by otter trawl vessel in 1992.

Regulations that allow multiple nets onboard would allow fishermen who traditionally targeted multi-species on a trip, to fish for and retain other species with small mesh until the 100 pound threshold of black sea bass was reached. These fishermen would then have to use the 3.5" square mesh if they decided to target more black sea bass. Once the threshold was reached fishermen would have to properly stow other cod ends for the remainder of the trip.

Landings of black sea bass by fishermen targeting *Loligo* squid and scup on the same trip could be effected by these regulations. Based on 1992 NMFS weighout data, 45% of the vessels and 29% of the trips landing 2,500 pounds or more of *Loligo* squid, landed over 95% of *Loligo* landed by all *Loligo* otter trawl fishermen (Tables 48 and 49). Based on this 2500 pound threshold, black sea bass comprise slightly less than 0.7% of the total fish landed on these trips (Table 54). However, the total pounds accounted for approximately 41% of all black sea bass landed by otter trawl fishermen in 1992.

Similarly, 52% of the vessels and 28% of the trips landing 1000 pounds or more of scup, landed over 95% of scup landed by scup otter trawl fishermen (Tables 52 and 53). Based on this 1000 pound threshold, black sea bass comprise slightly more than 1.1% of the total fish landed on these trips (Table 53). Because scup and *Loligo* squid are frequently landed on the same trip, the total pounds accounted for approximately the same amount of black sea bass landed by directed *Loligo* squid trips.

In general, these regulations would modify some traditional fishing practices. The fishermen most effected by these regulations would be those fishermen who targeted other species on a trip with small mesh net (squid, scup, or whiting) and had coincidental catches of black sea bass. If a fishermen had 100 lbs of black sea bass on board, and desired to continue fishing with a small mesh net, he would be required to discard any sea bass caught in tows directed to other species. Alternatively, if he desired to continue to fish for black sea bass, he would have to stow his other cod ends for the remainder of the trip perhaps losing an opportunity to catch and land valuable bycatch (i.e., summer flounder, squid, etc.).

However, these mesh provisions should have minimal effect on bycatch species. Most of the species caught with black sea bass are regulated, or have proposed regulations that require mesh sizes and/or minimum fish sizes that equal or exceed the black sea bass regulations. A 6" minimum mesh size is required for most of the New England groundfish species. The minimum mesh size for summer flounder is 5.5" with a minimum fish size of 13" TL. The proposed minimum size for black sea bass would require that fishermen use a 4.5" tail bag to reduce catch of sublegal fish, i.e. those less than 9" TL.

Minimum mesh provisions in conjunction with the minimum fish size will ensure that discards of sub-legal black sea bass will be reduced. Greater gains will accrue to fishermen through protecting black sea bass until they reach legal size. Discard mortality is extremely high for trawl caught fish and the problem is particularly acute when new year classes are abundant. The benefits of the proposed minimum fish size and mesh size regulations will be manifested through a more balanced age structure of the black sea bass stock. Further, waste will be reduced due to (1) lower total discards and (2) lower mortality of net encounter.

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

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: Draft Environmental Impact Statement (DEIS) and Fishery Management Plan for the Black Sea Bass Fishery (FMP)

LOCATION: The exclusive economic zone in the western Atlantic Ocean from Cape Hatteras, North Carolina, northward to the U.S.-Canadian border

SUMMARY: The draft FMP has objectives to reduce fishing mortality to assure that overfishing does not occur, reduce fishing mortality on immature black sea bass to increase spawning stock biomass, and improve yield from the fishery. Management measures contained in the draft FMP propose minimum fish sizes and commercial gear regulations in years 1 and 2. In years 3 to 5 target exploitation rates would be 48 percent, in years 6 and 7 it would be 37 percent, and in year 8 and subsequent years, the target exploitation rate would be based on F_{max} (about 23%). Measures include: (1) A minimum fish size, (2) minimum otter trawl mesh size and black sea bass pot specifications for the first 2 years, (3) ability to adjust minimum fish size annually on a framework basis, (4) operator permit requirements for commercial, party and charter boats, (5) vessel permits for party and charter boats, (6) vessel permits for commercial vessels under a moratorium, (7) dealer permit requirements, (8) reporting requirements for party and charter boats, commercial vessels, and dealers, (9) black sea bass pots or traps requirements, (10) size limitations for rollers used in roller rig trawl gear, and (11) process to develop special management zones around artificial reef areas.
An earlier version of this letter, dated January 25, 1996, contained several incorrect target exploitation rates. This letter to the public has the correct exploitation rates as contained in the DEIS/Draft FMP for the Black Sea Bass Fishery.

RESPONSIBLE OFFICIAL: Rolland A. Schmitten
Assistant Administrator for Fisheries
National Marine Fisheries Service
Silver Spring Metro Center #3
1315 East-West Highway
Silver Spring, Maryland 20910
Phone: 301-713-2239

A copy of the DEIS/FMP was enclosed for your information with the January 25, 1996, letter. Please send one copy of your comments to me in Room 5805, OPSP, U.S. Department of Commerce, Washington, D.C. 20230.

Sincerely,

Donna Wieting

Donna Wieting
Acting Director, Office of
Ecology and Conservation

APPENDIX 2. DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)

A. COVER SHEET

Responsible Agency
Mid-Atlantic Fishery Management Council

Cooperating Agencies
Atlantic States Marine Fisheries Commission
New England Fishery Management Council
South Atlantic Fishery Management Council
National Marine Fisheries Service/National Oceanic and Atmospheric Administration

Title of Action
Fishery Management Plan for the Black Sea Bass Fishery

Contact Person
David R. Keifer, Executive Director
Mid-Atlantic Fishery Management Council
Room 2115 Federal Building
300 South New Street
Dover, Delaware 19904-6790
302-674-2331

Designation of the Statement
Draft Environmental Impact Statement

Abstract
The proposed action, authorized under the Magnuson Fishery Conservation and Management Act of 1976, as amended (Magnuson Act), will institute management of the black sea bass fisheries 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. The proposed action will have no adverse impact on the physical environment and will strengthen efforts to work with other Federal and State agencies to conserve and manage black sea bass and their habitats. 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 April 2, 1996.

B. TABLE OF CONTENTS

C. SUMMARY

C.1. BACKGROUND.

This Fishery Management Plan for the Black Sea Bass Fishery (FMP), prepared by the Mid-Atlantic Fishery Management Council(), is intended to manage the black sea bass (*Centropristis striata*) fishery pursuant to the Magnuson Fishery Conservation and Management Act of 1976, as amended (MFCMA). The management unit is black sea bass in US waters in the western Atlantic Ocean from Cape Hatteras, North Carolina northward to the US-Canadian border. The objectives of the FMP are to:

1. Reduce fishing mortality in the black sea bass fishery to assure that overfishing does not occur.

2. Reduce fishing mortality on immature black sea bass 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 for black sea bass is defined as fishing in excess of the F_{max} level. Based on current conditions in the fishery, F_{max} is 0.29. The fishing mortality reduction strategy calls for minimum fish sizes and commercial gear regulations in year 1 and 2. In years 3 to 5, target exploitation rates would be 48% for black sea bass. In years 6 and 7, the target exploitation rates would be 37% and in year 8 and subsequent years, the target exploitation rate would be based on F_{max}.

The Council has adopted the following management measures for this FMP for purposes of public hearings. Beginning in year 1 of the management program, the following management measures would be implemented:

1. Operator permits for commercial and party and charter boats.

2. Vessel permits for party and charter boats.

3. Vessel permits for commercial vessels (permits to sell) under a moratorium on entry of additional vessels into the fishery. Vessels with documented landings of black sea bass for sale between 26 January 1988 and 26 January 1993 qualify for a moratorium permit to land and sell black sea bass under this moratorium program.

4. Dealer permits (permits to purchase).

5. Permitted vessels may only sell to permitted dealers and permitted dealers may only buy from permitted vessels.

6. Party and charter boat, commercial vessel, and dealer reports.

7. The hinges and fasteners of one panel or door in black sea bass pots or traps must be made of one of the following degradable materials:

   a. untreated hemp, jute, or cotton string of 3/16" (4.8 mm) diameter of smaller;

b. magnesium alloy, timed float releases (pop-up devices) or similar magnesium alloy fasteners; or

c. ungalvanized or uncoated iron wire of 0.062" (1.6 mm) diameter or smaller.

8. A maximum size of 18" diameter for rollers used in roller rig trawl gear.

9. Special management zones around artificial reef areas.

The Council has adopted the following management measures for years 1 and 2 of the management program:

1. A 9" total length (TL) minimum fish size in all fisheries.

2. The minimum otter trawl mesh size for vessels retaining more than 100 lbs of black sea bass would be 4.0" (stretch mesh inside measure).

3. Black sea bass pots would be required to have a minimum escape vent of 1 - 1/8" X 6" or 2.5" in diameter. The escape vent provision would be implemented at the start of the first calendar year following FMP approval so the fishermen would not be required to pull their pots and rebuild them in the middle of the season.

The Council has adopted the following management measures for year 3 and subsequent years of the management program:

1. A 10" total length (TL) minimum fish size in all fisheries which may be adjusted annually on a framework basis.

2. Black sea bass pots would be required to have a minimum escape vent of 1 - 1/4" X 6" or 2.75" in diameter.

3. The minimum mesh size for vessels retaining more than 100 lbs of black sea bass would be 4.5" (stretch mesh inside measure). The minimum mesh size may be adjusted annually on a framework basis.

4. Prior to year three and annually thereafter, the Council, working through a Monitoring Committee, would evaluate the success of the FMP relative to the overfishing reduction goal and propose adjustments to the management system. Beginning with year three, additional measures would be implemented by the Regional Director based on the recommendations of the Council. Additional management measures could be any or all of the following:

a. Commercial: A coastwide commercial quota with Federal permit holders being prohibited from landing (selling) after the quota had been landed. Quota overruns would be deducted from the subsequent year. All states would need to prohibit black sea bass sales following federal sales prohibition.

b. Recreational: A coastwide possession limit, season, and recreational harvest limit. Landings in excess of the limit would be deducted from the harvest limit for the subsequent year.

Alternatives Considered but not Adopted

1. Take no action at this time. This would mean that black sea bass would not be managed pursuant to the MFCMA.

2. Seasonal closures for the commercial fishery.

3. Bimonthly commercial quotas with possible trip limits established by the NMFS Regional Director to reduce the length of closures.

4. State by state commercial quotas with possible trip limits established by the states to reduce the length of closure.

5. Individual transferrable quotas.

6. Seasonal dependent minimum sizes in the commercial fishery: A 10" TL minimum size from Oct. 1 - April 30 and a 9" TL minimum size for the rest of the year.

7. A threshold requirement to qualify for a moratorium permit.

8. Separate management measures for party/charter boat fishermen.

9. A 9" TL minimum fish size and a 3.5" minimum square mesh size in the otter trawl fishery when the vessel has 100 pounds or more of black sea bass on board.

The preferred alternative is described and evaluated in section 9. The alternatives considered but not adopted are described and evaluated in Appendix 1.

C.2. MAJOR CONCLUSIONS.

C.2.1. Implications of Overfishing Definitions and Need to Reduce Fishing Mortality Rate.

The cost/benefit analysis must be considered with regard to the guidelines established 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 an overfishing definition for black sea bass. The Council has also determined that black sea bass are currently overfished and has adopted an eight year strategy to reduce fishing mortality to prescribed levels in order to end the overfished condition.

This eight-year strategy reflects the pressure now being placed on fishermen by other FMPs. Although the black sea bass resource should be rebuilt as quickly as possible, black sea bass management measures can be implemented over an eight-year time frame to minimize the short term economic burden placed on fishermen and still reduce the overfished condition of the stocks.

The excessive take of black sea bass will cease when fishing mortality is at the F_{max} level, which current analyses indicate is F = 0.29. The current fishing mortality rates is 1.05. Thus, there is at least a three 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 60%.

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. The fishing mortality reduction strategy calls for minimum fish sizes and commercial gear regulations in year 1 and 2. In years 3 to 5, target exploitation rates would be 48% for black sea bass. In years 6 and 7, the target exploitation rates would be 37% and in year 8 and subsequent years, the target exploitation rate would be based on F_{max}. Based on current conditions in the fishery, F_{max} is 0.29 and the associated exploitation rate is 23%. The recovery schedule is as follows:

	Exploitation Rates
Current	60%
Year 3	48%
Year 6	37%
Year 8	23%

C.2.2. Recreational Fishery Constraints.

The proposed minimum size limits would effect recreational landings of black sea bass in all States with landings of black sea bass. In 1991, almost 100% of the sea bass were landed in States from New York to North Carolina (Table 22). In States north of New York, landings were relatively small. In fact, during most years from 1983-92, landings in North Carolina exceeded the landings in all the North Atlantic States combined.

Analysis of 1990-92 intercept data for States from New York through North Carolina indicated that 14 to 38% of the measured sea bass were less than 9" TL (Table 36). On a coastwide basis, Maine to Cape Hatteras, NC approximately 28% of the black sea bass were less than 9" TL. Assuming a post-release mortality of 25%, the percent reduction in the number of black sea bass killed by anglers associated with a 9" TL minimum size limit would be 21% (Table 37).

These assumed level of post-release mortality (hooking and handling mortality) used in the above calculations is based on several studies. Bugley and Shepherd (1991) conducted a hooking mortality study on black sea bass caught by hook and line in Nantucket Sound, MA. They estimated a hooking mortality of 4.7% based on their sample size of 64 fish. However, these fish were caught in water depths of 6-12 m. Rogers et al. (1986) found severe trauma in black sea bass caught by hook and line in relatively deep water (37 m) due to oral protrusions of the swim bladder. Of the 169 black sea bass collected by angling, 45 or 27% had protrusions of the swim bladder. Based on these studies and hooking mortality studies conducted for other fish, the ASMFC technical committee assumed a 25% hooking mortality for black sea bass caught by recreational fishermen.

Beginning in year 3, the same minimum size of 10" TL would apply to the recreational fishery throughout the management unit. Based on 1990-92 intercept data, 45.9% of the sea bass landed during these years were less than this size (Table 36). However, increased survival of smaller fish due to minimum size regulations and reduced discards in years 1 and 2 of the management program should allow larger fish to become more available to recreational fishermen in year 3. As a result, the short term effect of the 10" TL minimum size to the fishermen in these states would be less than the 45.9% reduction associated with 1990-92 landings.

Based on the fishing mortality reduction schedule adopted by the Council and Commission, exploitation would have to be reduced 20% in year 3 to achieve the target F. MRFSS data for 1990-92 indicate that catch frequencies for black sea bass ranged from 1 to 150 fish per day on a coastwide basis (Table 38). Based on these data, the reductions in exploitation associated with various possession limits for 1 to 50 black sea bass per trip were calculated (Table 39). The coastwide possession limit associated with a 20% reduction in exploitation is 16 fish. The possession limit would increase when combined with size limits and/or seasons.

Analysis of black sea bass recreational data indicated that nearly 30% of the annual landings occurred from September through October for the years 1990 to 1992 combined (Table 40). Seasons based on this MRFSS data could be established on a coastwide basis to reduce exploitation. A season could be combined with the size limit to allow for higher possession limits.

C.2.3. Commercial Fishery Constraints.

C.2.3.1. Moratorium on Commercial Vessels.

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 system, the Council and the Secretary take into account six factors:

A. Present participation in the fishery.

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

C. The economics of the fishery.

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

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

F. Any other relevant considerations.

These six factors are fully addressed in section 9.2 of this FMP.

C.2.3.2. Minimum fish size.

Historical commercial length frequencies were used as an estimate of potential short-term impacts of length limits on the commercial black sea bass fisheries (Tables 41 to 44). Specifically, commercial length frequencies from the NMFS Weighout Data and North Carolina DMF from 1982 to 1992 were used to determine potential size limit effects. In general, size frequency data indicated that potential size limit effects increased from north to south, were gear dependent, and varied from one year to the next.

Based on NMFS weighout data, approximately 11% of the measured black sea bass were less than 9" TL for all otter trawl vessels with sampled landings (Table 43). This gear is associated with most of the commercial landings coastwide; otter trawl vessels accounted for over 56% of the coastwide landings based on 1983-1992 General Canvass data (Table 10).

A 9" TL minimum size regulation would have a slightly greater effect on landings from fish pots/traps, the other predominant gear in the black sea bass fishery (this gear accounted for 33% of the landings from 1983-92). Based on NMFS weighout data, almost 26% of the measured fish were less than 9" TL for the 4,592 black sea bass obtained from this gear from 1983 to 1991 combined (Table 43).

Size limit effects varied annually in North Carolina landings from the winter trawl fishery (Table 44). From 1983 to 1992, the amount of measured fish less than 9" TL ranged from 17.1% to 38.9%. North Carolina accounted for 11% of the coastwide commercial landings on average from 1983-1992.

Assuming that undersized fish are not caught and discarded, minimum size regulations have positive impacts on the stock. In general, because minimum sizes increase the size at full recruitment, yields are increased as fishermen catch larger, heavier fish. In addition, minimum size regulations can increase the resilience of the stock to overfishing, i.e., the biological reference points (F_{max}) can increase. Finally, minimum size regulations can increase spawning stock biomass by allowing more fish to spawn. Sexual maturity data for black sea bass indicate that 50% of the black sea bass are mature by a size of 7.7" TL.

C.2.3.3. Minimum mesh size.

Owners or operators of otter trawl vessels possessing 100 lbs or more of black sea bass would only be allowed to fish with nets that have a minimum mesh size of 4.0" diamond (3.5" square) in the codend. The L_{25} (the length at which 25% of the black sea bass are retained) is 9.3 inches for this mesh size (Table 45).

Mesh selectivity studies have not been conducted for black sea bass. The relationship between body depth and total length as derived by Weber and Briggs (1983) was used to calculate the 50% retention lengths for black sea bass. A selection range of 2 inches (based on selectivity studies conducted on fish of similar shape) was then used to estimate 25% and 75% retention lengths.

Landings of black sea bass represent only a portion of the fishing mortality experienced by the stock. Undersized black sea bass, those less than 9" 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.

Black sea bass are a component of the mixed trawl fishery in Southern New England and the Mid-Atlantic. Although Sea Sampling data indicate that fishermen may differentiate between species on a per tow basis (i.e., target a single species on a tow), fishermen land many different species on a per trip basis. Based on 1992 NMFS weighout data, black sea bass are most frequently landed with *Loligo* squid, silver hake, scup, and flounder. In fact, for trips landing a 100 or more pounds of black sea bass per trip, more *Loligo* squid were landed than black sea bass in 1992 (Table 29).

However, this predominance of *Loligo* may reflect reduced availability of other species in 1992. Based on 1983 to 1987 data, the landings of otter trawl vessels landings 100 lbs or more of black sea bass were composed primarily of scup (29%) and summer flounder (24%) (Table 46). *Loligo* accounted for only 17% of the landings.

The 100 pound threshold would effect 62% of the vessels and 34% of the trips that landed black sea bass in 1992 (Table 47). These trips accounted for 95% of the black sea bass landed by otter trawl vessel in 1992.

Regulations that allow multiple nets onboard would allow fishermen who traditionally targeted multi-species on a trip, to fish for and retain other species with small mesh until the 100 pound threshold of black sea bass was reached. These fishermen would then have to use the 4.0" mesh if they decided to target more black sea bass. Once the threshold was reached fishermen would have to properly stow other cod ends for the remainder of the trip.

Landings of black sea bass by fishermen targeting *Loligo* squid and scup on the same trip could be effected by these regulations. Based on 1992 NMFS weighout data, 45% of the vessels and 29% of the trips landing 2500 pounds or more of *Loligo* squid, landed over 95% of *Loligo* landed by all *Loligo* otter trawl fishermen (Tables 48 and 49). Based on this 2500 pound threshold, black sea bass comprise slightly less than 0.7% of the total fish landed on these trips (Table 50). However, the total pounds accounted for approximately 41% of all black sea bass landed by otter trawl fishermen in 1992.

Similarly, 52% of the vessels and 28% of the trips landing 1000 pounds or more of scup, landed over 95% of scup landed by scup otter trawl fishermen (Tables 51 and 52). Based on this 1000 pound threshold, black sea bass comprise slightly more than 1.1% of the total fish landed on these trips (Table 53). Because scup and *Loligo* squid are frequently landed on the same trip, the total pounds accounted for approximately the same amount of black sea bass landed by directed *Loligo* squid trips.

In general, these regulations would modify some traditional fishing practices. The fishermen most effected by these regulations would be those fishermen who targeted other species on a trip with small mesh net (squid, scup, or whiting) and had coincidental catches of black sea bass. If a fishermen had 100 lbs of black sea bass on board, and desired to continue fishing with a small mesh net, he would be required to discard any sea bass caught in tows directed to other species. Alternatively, if he desired to continue to fish for black sea bass, he would have to stow his other cod ends for the remainder of the trip perhaps losing an opportunity to catch and land valuable bycatch (i.e., summer flounder, squid, etc.).

However, these mesh provisions should have minimal effect on bycatch species. Most of the species caught with black sea bass are regulated, or have proposed regulations that require mesh sizes and/or minimum fish sizes that equal or exceed the black sea bass regulations. A 6" minimum mesh size is required for most of the New England groundfish species. The minimum mesh size for summer flounder is 5.5" with a minimum fish size of 13" TL. The proposed minimum size for black sea bass would require that fishermen use a 4.5" tail bag to reduce catch of sublegal fish, i.e. those less than 9" TL.

Minimum mesh provisions in conjunction with the minimum fish size will ensure that discards of sub-legal black sea bass will be reduced. Greater gains will accrue to fishermen through protecting black sea bass until they reach legal size. Discard mortality is extremely high for trawl caught fish and the problem is particularly acute when new year classes are abundant. The benefits of the proposed minimum fish size and mesh size regulations will be manifested through a more balanced age structure of the black sea bass stock. Further, waste will be reduced due to (1) lower total discards and (2) lower mortality of net

encounter.

C.2.3.4. Maximum roller diameter.

It would be illegal for owners or operators of vessels issued moratorium permits to use roller rig trawl gear equipped with rollers greater than 18" in diameter. A 18" diameter corresponds to the maximum roller diameter limitation imposed by the state of Massachusetts to regulate this gear in state waters.

Roller diameter is correlated with vessel size and the ability of vessels to fish rough, hard bottom areas. Larger roller sizes require larger engine sizes to pull the net. An engine size with an associated horsepower of 800-900 hp is required to tow a net with 18" to 24" rollers whereas 10" to 12" rollers can be pulled by a boat using a 175-200 hp engine (D. Simpson pers. comm.).

Information is lacking as to the relationship between roller diameter and the size of obstruction that it can clear. In general, 10-12" diameter rollers can be used for fishing over rough bottom that can include ledges and cliffs. Limitations on roller size will make some areas of the ocean inaccessible to trawls by preventing fishermen from trawling in the harder, rough bottom areas. As a result, black sea bass associated with these areas would be protected from harvest allowing more fish to grow to maturity and spawn increasing stock biomass and yields.

C.2.3.5. Minimum escape vent requirement.

Black sea bass pots are required to have a minimum escape vent of 1 1/8" x 6" or 2.5" in diameter. The escape vent provision would be implemented at the start of the first calendar year following FMP approval so that fishermen would not be required to pull their pots and add vents in the middle of the season.

During the development of this plan, Council staff proposed that black sea bass pots or traps have escape vents that would allow for the release of undersized fish. Although there were a number of studies that indicated that escape vents release fish from pots and traps, there were a lack of specific studies on black sea bass. MAFMC staff initiated a project in 1994 to determine the size selectivity of traps fitted with vents of various sizes. The objective of the study was to determine the vent size which allowed 50% escapement of black sea bass below the proposed minimum size limits of 9" and 10" TL.

In the study, the catch and size distribution of black sea bass taken in commercial sea bass pots fitted with escape vents was compared to catches from unvented traps. Four strings of 25 traps (100 traps) were fished from May through October, 1994 on commercial fishing grounds in areas offshore from Cape May, NJ to Ocean City, MD. A total of 9 trips were made to haul the traps.

A total of 100 traps were assigned a vent size of 1 1/8" x 6", 1 1/4" x 6", 1 3/8" x 6", 1 1/2" x 6", or no vent (control). The traps with the various vent sizes were randomly placed in groups of five on the four strings. The vents were made from aluminum and were patterned after the vents used in lobster traps. Vents were placed vertically in the door of the trap such that they would allow fish to escape from the lower corner of the parlor portion of the trap. The lower corner location was used as the result of aquarium studies that indicated sea bass almost always tried to escape from a lower corner after they were placed in a trap (G. Shepherd pers. comm.).

Traps were fished under normal commercial fishing conditions. Soak time, the period between hauls, averaged 14 days. The catch from each trap was retained separately and all black sea bass were measured to the nearest half cm TL.

Length frequency distributions were constructed for black sea bass from each of the treatment vent sizes and control. Proportions retained at length were computed as the ratio between the number of fish taken in vented traps and the number taken at that length in the control traps. The length at 50% retention for each vent size was estimated by fitting a logistic curve to the proportion retained at length data for each vent size.

A total of 5574 black sea bass were measured from the 100 traps from April through October. Black sea bass ranged in size from 16.5-36.5 cm. The control traps caught the largest number of sea bass (n=1534) followed in descending order by traps with the experimental vents: 1 1/8" (n=1164), 1 1/4" (n=644) 1 3/8" (n=397) and 1 1/2" (n=305).

Result indicate that vents do release undersized black sea bass. Length frequency histograms for black sea bass from each vent size compared to the control are presented in Figures 12 - 15. Based on these length frequencies, the L_{50} derived for traps fitted with the 1 1/8" and 1 1/4" vents was 8.7" TL and 10.1" TL, respectively (Table 54). Based on these results, a 1 1/8" x 6" vent will be required for traps during the first two years of the management program when the size limit will be 9" TL and 1 1/4" x 6" when the size limit is 10" TL.

Studies were not conducted to determine the selectivity of traps fitted with circular escape vents. A body length/depth relationship (Weber and Briggs 1983) was used to derive the minimum sizes of black sea bass that would be retained by fish traps fitted with these escape vents (Table 55).

Pots and traps accounted for approximately 33% of the total commercial landings for the period 1983-1992. However, in recent years the proportion of the landings attributable to this gear has generally increased. In 1991, this gear accounted for almost 62% of the landings. The escape vents will allow for a significant proportion of undersized fish to escape alive. Currently, relatively few sea bass fishermen in the Mid-Atlantic have escape vents in their pots and traps. This gear is fished at varying depths and hauled to the surface quickly with hydraulic or electric pot hauler. As a result, fish may experience internal trauma due to changes in pressure and a significant portion may not survive (Rogers *et al.* 1986). Although many pot fishermen use sorters on deck to release nonmarketable fish, the escape of these fish from the traps before they are hauled will significantly increase survival.

In addition, fishermen are encouraged to use sorting devices that allow for undersized fish to be returned quickly to the water. Combined, the escape vent provisions and sorting devices will significantly reduce the number of undersized fish that are killed by pot fishermen. This reduction in sublegal mortality will increase yields and the amount of mature fish in the stock.

C.2.3.6. Degradable fasteners in traps.

Black sea bass pots would be required to have hinges and fasteners of one panel or door made of degradable materials. These materials would allow the door or panel of a trap to fall away from an unattended trap. This would prevent lost traps from "ghost fishing", i.e., continuing to catch and retain fish that could not be removed from the trap. Thus black sea bass and other species of fish and invertebrates typically caught by these traps could escape preventing waste and lost yields in a number of fisheries.

C.2.3.7. Commercial quota.

Beginning in year 3 a quota would be allocated to the commercial fishery to control fishing mortality. The quota would be based on stock assessment information on projected stock size estimates for that year. Estimates of stock size coupled with the target fishing mortality rate would allow for a calculation of total allowable landings. Based on the historic proportions of commercial and recreational landings for 1983 to 1992, 42% of the total target would be allocated to the commercial fishery. Note that this percentage would change to reflect the revisions to the MRFSS data set that will be available in 1995.

To assess potential impacts of the quota, landings data were used from 1988-1992 to derive average landings for those years (3.275 million lbs). Based on these data, a 20% reduction in exploitation would equate to a commercial quota of 2.6 million lbs (80% x 3.275).

The gear restrictions and minimum fish size regulations will reduce discard and escape mortality of undersized black sea bass. However, decreases in mortality would occur only with the smaller fish; reductions in mortality would not occur for black sea bass once they reached the legal size of 10" TL.

Essentially the fish that contribute the most to the spawning population, fish 10" 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.

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 black sea bass will allow for an increase in yield or harvest as small fish that were previously killed grow larger and add weight to the stock.

Combined, these management measures, the minimum size regulation and the commercial quota, will prevent overfishing and reduce waste. As the stock rebuilds, commercial quotas would increase.

C.2.4. Special Management Zones.

The intent of a SMZ is to enhance management of fishery resources on or around artificial reefs while optimizing fishing opportunities that would not otherwise exist. Artificial reefs are costly and provide benefits that can be easily nullified by the use of certain types of fishing gear. In addition, certain types of gear pose various threats to the reef structure and associated fishery resources, including: a) entanglement of other boating and fishing gear, b) entanglement in the reef structure ("ghost gear"), and c) damage to or movement of reef structure.

Many artificial reefs, including those constructed by State governments, are located in the EEZ. If management measures are needed to control fishing on and around those artificial reefs, they must be developed through a fishery management plan. Providing a process through which the Council can develop these measures on a case by case basis is an efficient way of achieving this control.

However, such a system must be coupled with a process that provides the Council an opportunity to comment, in a timely manner, on the location of artificial reefs before they are constructed. Industry advisors report that on occasion artificial reefs are constructed in existing black sea bass habitat areas, thereby possibly accomplishing a *de facto* allocation of a portion of the fishing grounds from the pot or trawler fishery to the hook and line fishery. While such allocations may be appropriate from time to time, they should be made only after all potentially affected interests are aware of the proposal and have an opportunity to comment.

C.2.5. 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 and the minimization of 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.

The adopted management measures are considered the most reasonable 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. It will also provide 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.

In terms of the consultative requirement of this provision of the Magnuson Act, since the management unit of the FMP is black sea bass in US waters in the western Atlantic Ocean from Cape Hatteras, North Carolina northward to the US - Canadian border, the South Atlantic and New England Councils were invited and did designate members of their Councils to the Mid-Atlantic Council's Demersal Species Committee, the oversight committee for this FMP. Additionally, both Councils were invited to appoint industry advisors to the Mid-Atlantic Council Black Sea Bass Advisory Panel.

The impacts of the proposed actions on participants in the black sea bass fisheries including analyses of biological, economic, and social impacts are described in section 9.2 (Analysis of Beneficial and Adverse Impacts of Adopted Management Measures), in Appendix 1 (Alternatives to the Amendment) and in Appendix 2 (Regulatory Impact Review) of the FMP. The Mid-Atlantic Fishery Management Council commissioned two reports to assess the probable socio-economic impacts of management options identified in the draft FMP. The first report titled "Part 2, Phase I, Fishery Impact Statement Project, Mid-Atlantic Fishery Management Council" by McCay *et al.* (1993), described the people and communities involved in the region's fisheries. The second report titled "Social and Economic Impacts of the Draft Management Plans for Black Sea Bass and Scup" by Finlayson and McCay (1994), assessed the probable socio-economic impacts of management options identified in the draft FMP. These reports are summarized in section 9.2.2.7 of the FMP.

C.2.6. Summary.

The above items are the major measures for this FMP. This resource has become over-exploited and over-capitalized. This FMP is intended to reduce exploitation and to make certain that the resource is there on a long term basis to provide high, long-term yields. If no management is undertaken and the resource continues to be overfished, catch per effort will continue to decline, the resource biomass will continue to decline, and the potential for stock collapse will be higher. The lack of effective management could drive the fishery to the brink of commercial extinction, as has happened with New England groundfish.

C.3. AREAS OF CONTROVERSY.

There were a number of controversial issues associated with this FMP during its development. The preferred alternative includes an immediate moratorium. The commercial quota and minimum mesh regulations were also controversial on the commercial side while the minimum fish size has generated a lot of discussion from recreational fishermen. It is believed that additional areas of controversy can be resolved by the Council following the public hearing process. The Hearings will be summarized and included with the final FMP when it is submitted.

C.4. ISSUES TO BE RESOLVED.

Given the condition of the resource, the Council knew when it began work on the FMP that stringent management measures would be required to address overfishing. The alternatives were developed after extensive public discussion and debate, and all parties acknowledge that the adoption of these management measures would have significant impact on the fisheries and the associated human environment. Several proposed management measures were revised in response to impacts identified during the course of the public discussion of the proposed management measures. If the proposed management scheme is adopted and reveals unforeseen negative impacts, these will be evaluated and responded to in future amendments.

C.5. MITIGATION.

There are no issues in the proposed management measures for this FMP that require mitigation at this time. The NMFS was asked in the spring of 1994 to initiate the Endangered Species Act Section 7 consultation for this FMP and they responded that they needed to review the drafted FMP first. Both NMFS (marine mammals, sea turtles, and shortnose sturgeon) and Fish and Wildlife Service (birds) were asked to initiate the Endangered Species Act Section 7 consultation process as soon as the FMP is available for public hearings.

D. PURPOSE AND NEED

D.1. BLACK SEA BASS ARE OVEREXPLOITED.

Commercial landings of black sea bass have declined dramatically from the peak landings of 22 million pounds reported in the 1950's. In fact, commercial landings in 1992 were about 3 million pounds, slightly less than the 1983-1992 average of 3.6 million pounds. However, recreational landings in 1992, at 3.3 million pounds, were nearly 2 million pounds lower than the 1983-1992 average of 4.9 million pounds.

Landings-per-unit-effort (LPUE) from the Mid-Atlantic trawl fishery has been used as an index of abundance for black sea bass. Standardized LPUE, defined as metric tons per days fished for trips landing more than 25% black sea bass, peaked at 11.3 in 1984, and then declined to a low of 1.6 in 1992. Standardized LPUE increased slightly to 3.2 in 1993 (NEFSC 1995).

The NEFSC has conducted a spring and autumn offshore survey for a number of species, including black sea bass, since 1972. The spring offshore survey has been used as index for black sea bass recruits (fish longer than 20 cm SL) and the autumn inshore survey data as an index of pre-recruits (fish less than 11 cm SL). The spring recruit index was generally high in the late 1970's, ranging from 2.0 to 6.1 fish per tow. The spring index declined from 6.1 fish per tow in 1977 to a low of 0.2 per tow in 1982. More recently the spring index was 0.9 in 1993 and declined to 0.3 in 1994 (NEFSC 1995). The fall pre-recruit indices show a similar trend (i.e., relatively low recent values compared to the mid-1970's).

Analyses conducted by the NEFSC indicate a strong correlation between the fall pre-recruit index and commercial catch per unit effort in the trawl fishery (NEFSC 1993). The index for pre-recruits indicated that above average year classes were produced in 1977, 1982, and 1986. Recruitment for 1992 and 1993, based on this index, was well below average (NEFSC 1995). Recruitment was above average in 1994 (Shepherd, pers. comm.)

Based on current conditions in the fishery, yield per recruit analysis indicates that F_{max} for black sea bass is 0.29 (NEFSC 1992). Based on results of a virtual population analysis, the current fishing mortality rates is 1.05. This indicates that black sea bass are overexploited.

D.2. MIXED SPECIES FISHERY.

The Mid-Atlantic mixed species trawl fishery relies principally on summer flounder, *Loligo* squid, scup, and whiting, but also harvests significant quantities of black sea bass, 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 these species as they make annual migrations from south to north and from offshore to inshore waters. 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 by larger vessels. Although the majority of landings are taken by otter trawls, black sea bass are landed by many other types of fishing gear: midwater trawls, pots and traps, pound nets and hand lines. 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.

The occurrence of black sea bass 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.

The Council has included no measures in this FMP at this time to specifically address the mixed trawl fishery problem, although the Council considered the implications of the mixed trawl fishery when developing the proposed measures. The Council is working to develop a mixed trawl fishery management strategy and the framework management measures put in place through this FMP could be used to implement the measures developed through this process.

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 1990). 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 black sea bass, 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 black sea bass fishery.

D.4. LACK OF UNIFORM MANAGEMENT.

The highly migratory nature of black sea bass complicate the development of management strategies since fishing activities in the EEZ or waters of a few states could adversely impact the stocks. The SAFMC Snapper/Grouper FMP contains a 8" TL minimum size limit for black sea bass in the South Atlantic EEZ, but no regulations for black sea bass exist for the New England or Mid-Atlantic EEZ. In addition, although several states have minimum size limits for black sea bass, no unified approach currently exists to protect this valuable species in state waters.

D.5. INCONSISTENT AND INADEQUATE ENFORCEMENT.

There is a lack of uniform regulations affecting the black sea bass 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 led to confusion and 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 are insufficient to encourage conformity to state and federal laws. Permit sanctions combined with fines are likely to be a more effective deterrent than fines alone.

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. LACK OF DATA.

National Standard 2 states that "measures shall be based upon the best scientific information available". Although recreational and commercial catch data for black sea bass 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.

D.7. HABITAT DEGRADATION.

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

E. ALTERNATIVES INCLUDING THE PROPOSED ACTION

E.1. DESCRIPTION OF PROPOSED MANAGEMENT MEASURES.

The Council has adopted the following management measures for this FMP for purposes of public hearings. Beginning in year 1 of the management program, the following management measures would be implemented:

1. Operator permits for commercial and party and charter boats.

2. Vessel permits for party and charter boats.

3. Vessel permits for commercial vessels (permits to sell) under a moratorium on entry of additional vessels into the fishery. Vessels with documented landings of black sea bass for sale between 26 January 1988 and 26 January 1993 qualify for a moratorium permit to land and sell black sea bass under this moratorium program.

4. Dealer permits (permits to purchase).

5. Permitted vessels may only sell to permitted dealers and permitted dealers may only buy from permitted vessels.

6. Party and charter boat, commercial vessel, and dealer reports.

7. The hinges and fasteners of one panel or door in black sea bass pots or traps must be made of one of the following degradable materials:

   a. untreated hemp, jute, or cotton string of 3/16" (4.8 mm) diameter of smaller;

   b. magnesium alloy, timed float releases (pop-up devices) or similar magnesium alloy fasteners; or

   c. ungalvanized or uncoated iron wire of 0.062" (1.6 mm) diameter or smaller.

8. A maximum size of 18" diameter for rollers used in roller rig trawl gear.

9. Special management zones around artificial reef areas.

The Council has adopted the following management measures for years 1 and 2 of the management program:

1. A 9" total length (TL) minimum fish size in all fisheries.

2. The minimum otter trawl mesh size for vessels retaining more than 100 lbs of black sea bass would be 4.0" (stretch mesh inside measure).

3. Black sea bass pots would be required to have a minimum escape vent of 1 - 1/8" X 6" or 2.5" in diameter. The escape vent provision would be implemented at the start of the first calendar year following FMP approval so the fishermen would not be required to pull their pots and rebuild them in the middle of the season.

The Council has adopted the following management measures for year 3 and subsequent years of the management program:

1. A 10" total length (TL) minimum fish size in all fisheries which may be adjusted annually on a framework basis.

2. Black sea bass pots would be required to have a minimum escape vent of 1 - 1/4" X 6" or 2.75" in diameter.

3. The minimum mesh size for vessels retaining more than 100 lbs of black sea bass would be 4.5" (stretch mesh inside measure). The minimum mesh size may be adjusted annually on a framework basis.

4. Prior to year three and annually thereafter, the Council, working through a Monitoring Committee, would evaluate the success of the FMP relative to the overfishing reduction goal and propose adjustments to the management system. Beginning with year three, additional measures would be implemented by the Regional Director based on the recommendations of the Council. Additional management measures could be any or all of the following:

a. Commercial: A coastwide commercial quota with Federal permit holders being prohibited from landing (selling) after the quota had been landed. Quota overruns would be deducted from the subsequent year. All states would need to prohibit black sea bass sales following federal sales prohibition.

b. Recreational: A coastwide possession limit, season, and recreational harvest limit. Landings in excess of the limit would be deducted from the harvest limit for the subsequent year.

E.1.1. General Management Measures Applicable to All Alternatives.

Included in this section, are the general management measures that are applicable to all the alternatives. These include descriptions of the specification of OY, overfishing definition, fishing mortality rate reduction strategy, permits and fees, the Black Sea Bass Monitoring Committee, experimental fishing, enforcement recommendations, and specification and sources of pertinent fishery data. These are described in 9.1 of the FMP.

E.1.2. Commercial Fishery Measures.

The preferred alternative includes a combination of commercial quotas, minimum fish sizes, minimum mesh sizes, maximum diameter for rollers on roller rig gear, minimum escape vent requirements, degradable fasteners in traps and a moratorium on new entrants. Many of these measures are frameworked and can be adjusted annually based upon the target fishing mortality reduction schedules. The preferred alternatives are described in section 9.1.2.3 of the FMP.

E.1.3. Recreational Fishery Measures.

Recreational fishery constraints include the possibility of minimum size, bag limits and seasonal restrictions, all of which can be adjusted annually to achieve the target fishing mortalities.

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. Beginning in year 3, 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 were required for the following year or if the fishery needed to be closed for certain periods.

E.1.4. Non-preferred alternatives to the proposed management measures.

There are currently nine alternatives that differ from the preferred action alternative described in section E.1.2 and E.1.3. These alternatives are described and evaluated in Appendix 1 of the FMP. Some of these nine alternatives are single item specific while others combine multiple management measures. There are nine specific alternative because the Council has considered them as separate entities over time. There is no belief that all of the alternatives will have the same reduction in fishing mortality, or that some of these may not become part of the final preferred combination of alternatives. The Council is soliciting public

comments on all of the non-preferred alternatives. Of course, the overall sociological characterization of the various ports and fisheries that are described in the Fishery Impact Statement of the FMP are applicable to these non-preferred alternatives. The public hearing process will also provide significant input as to the sociological impacts of the various alternatives.

E.2. EVALUATION OF THE PROPOSED ACTION.

The preferred management measures are evaluated in section 9.2 of the FMP.

E.3. ALTERNATIVES TO THE PROPOSED ACTION.

The non-preferred management measures are evaluated in Appendix 1 of the FMP.

F. AFFECTED ENVIRONMENT

The distribution and habitat requirements of black sea bass are described in section 6 of the FMP. The description of the fishery can be found in section 7 of the FMP. The economics of the black sea bass fisheries are described in section 8 of the FMP. The social characterization of the black sea bass fisheries can be found in the Fishery Impact Statement of the FMP which is section 9.2.2.7.

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 ALTERNATIVES BE REASONABLY EXPECTED TO JEOPARDIZE THE LONG-TERM PRODUCTIVE CAPABILITY OF ANY STOCKS THAT MAY BE AFFECTED BY THE ACTION?

G.1.1. Proposed Action (moratorium on commercial vessels, reduction in overfishing, recreational constraints frameworked to allow for minimum fish sizes, seasonal restrictions and bag limits, special management zones (SMZ) around artificial reefs, as well as, commercial constraints frameworked to allow for minimum fish sizes, minimum mesh sizes, maximum roller diameters, minimum escape vents, degradable fasteners for traps, and a commercial quotas).

Black sea bass are significantly overfished and have an extremely truncated age distribution. The reduction in fishing mortality that will occur during the next eight years of proposed management measures will be highly beneficial to this resource.

Minimum mesh size and minimum fish size will encourage fishermen from targeting on schools of small individuals that would need to be discarded. Minimum size and mesh size requirements should generally increase yields and spawning stock biomass. It is hoped that the capability for creation of special management zones around artificial reefs can assist in the reduction of fishing mortality and the reefs can serve as somewhat as sanctuaries for black sea bass. The scientific community is undecided on the value of artificial reefs and SMZs because there is the potential that fishing effort becomes concentrated and thus fishing mortality can actually increase without successful management of the SMZ. The Council is eagerly following the scientific debate on SMZs.

The proposed actions of this FMP will place the black sea bass resource under management. Overfishing will be reduced and the fisheries will eventually be maintained at maximum sustainable yield levels. Other proposed actions provide for the acquisition of critical data and information to improve future management. A framework adjustment procedure is incorporated in the FMP to allow changes to be made in the management measures as new and better information is acquired. The Monitoring Committee will meet annually to recommend measures that are frameworked which will allow the target fishing levels to be

attained. It is important to note that the cooperation of State governments is essential if black sea bass are to be successfully managed throughout their range.

Historical commercial length frequencies were used as an estimate of potential short-term impacts of length limits on the commercial black sea bass fisheries (Tables 41 to 44). Specifically, commercial length frequencies from the NMFS Weighout Data and North Carolina DMF from 1982 to 1992 were used to determine potential size limit effects. In general, size frequency data indicated that potential size limit effects increased from north to south, were gear dependent, and varied from one year to the next.

Based on NMFS weighout data, approximately 11% of the measured black sea bass were less than 9" TL for all otter trawl vessels with sampled landings (Table 43). This gear is associated with most of the commercial landings coastwide; otter trawl vessels accounted for over 56% of the coastwide landings based on 1983-1992 General Canvass data (Table 10).

A 9" TL minimum size regulation would have a slightly greater effect on landings from fish pots/traps, the other predominant gear in the black sea bass fishery (this gear accounted for 33% of the landings from 1983-92). Based on NMFS weighout data, almost 26% of the measured fish were less than 9" TL for the 4,592 black sea bass obtained from this gear from 1983 to 1991 combined (Table 43).

Size limit effects varied annually in North Carolina landings from the winter trawl fishery (Table 44). From 1983 to 1992, the amount of measured fish less than 9" TL ranged from 18.3% to 40.7%. North Carolina accounted for 11% of the coastwide commercial landings on average from 1983-1992.

Assuming that undersized fish are not caught and discarded, minimum size regulations have positive impacts on the stock. In general, because minimum sizes increase the size at full recruitment, yields are increased as fishermen catch larger, heavier fish. In addition, minimum size regulations can increase the resilience of the stock to overfishing, i.e., the biological reference points (F_{max}) can increase. Finally, minimum size regulations can increase spawning stock biomass by allowing more fish to spawn. Sexual maturity data for black sea bass indicate that 50% of the black sea bass are mature by a size of 7.7" TL.

Owners or operators of otter trawl vessels possessing 100 lbs or more of black sea bass would only be allowed to fish with nets that have a minimum mesh size of 4.0" diamond (3.5" square) in the codend. The L_{25} (the length at which 25% of the black sea bass are retained) is 9.3 inches for this mesh size (Table 45).

Mesh selectivity studies have not been conducted for black sea bass. The relationship between body depth and total length as derived by Weber and Briggs (1983) was used to calculate the 50% retention lengths for black sea bass. A selection range of 2 inches (based on selectivity studies conducted on fish of similar shape) was then used to estimate 25% and 75% retention lengths.

Landings of black sea bass represent only a portion of the fishing mortality experienced by the stock. Undersized black sea bass, those less than 9" 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.

Black sea bass are a component of the mixed trawl fishery in Southern New England and the Mid-Atlantic. Although Sea Sampling data indicate that fishermen may differentiate between species on a per tow basis (i.e., target a single species on a tow), fishermen land many different species on a per trip basis. Based on 1992 NMFS weighout data, black sea bass are most frequently landed with *Loligo* squid, silver hake, scup, and flounder. In fact, for trips landing a 100 or more pounds of black sea bass per trip, more Loligo squid were landed than black sea bass in 1992 (Table 29).

However, this predominance of *Loligo* may reflect reduced availability of other species in 1992. Based on 1983 to 1987 data, the landings of otter trawl vessels landings 100 lbs or more of black sea bass were composed primarily of scup (29%) and summer flounder (24%) (Table 46). *Loligo* accounted for only 17% of the landings.

The 100 pound threshold would effect 62% of the vessels and 34% of the trips that landed black sea bass in 1992 (Table 47). These trips accounted for 95% of the black sea bass landed by otter trawl vessel in 1992.
Regulations that allow multiple nets onboard would allow fishermen who traditionally targeted multi-species on a trip, to fish for and retain other species with small mesh until the 100 pound threshold of black sea bass was reached. These fishermen would then have to use the 4.0" mesh if they decided to target more black sea bass. Once the threshold was reached fishermen would have to properly stow other cod ends for the remainder of the trip.

Landings of black sea bass by fishermen targeting *Loligo* squid and scup on the same trip could be effected by these regulations. Based on 1992 NMFS weighout data, 45% of the vessels and 29% of the trips landing 2500 pounds or more of *Loligo* squid, landed over 95% of *Loligo* landed by all *Loligo* otter trawl fishermen (Tables 47 and 48). Based on this 2500 pound threshold, black sea bass comprise slightly less than 0.7% of the total fish landed on these trips (Table 50). However, the total pounds accounted for approximately 41% of all black sea bass landed by otter trawl fishermen in 1992.

Similarly, 52% of the vessels and 28% of the trips landing 1000 pounds or more of scup, landed over 95% of scup landed by scup otter trawl fishermen (Tables 51 and 52). Based on this 1000 pound threshold, black sea bass comprise slightly more than 1.1% of the total fish landed on these trips (Table 53). Because scup and *Loligo* squid are frequently landed on the same trip, the total pounds accounted for approximately the same amount of black sea bass landed by directed *Loligo* squid trips.

In general, these regulations would modify some traditional fishing practices. The fishermen most effected by these regulations would be those fishermen who targeted other species on a trip with small mesh net (squid, scup, or whiting) and had coincidental catches of black sea bass. If a fishermen had 100 lbs of black sea bass on board, and desired to continue fishing with a small mesh net, he would be required to discard any sea bass caught in tows directed to other species. Alternatively, if he desired to continue to fish for black sea bass, he would have to stow his other cod ends for the remainder of the trip perhaps losing an opportunity to catch and land valuable bycatch (i.e., summer flounder, squid, etc.).

These mesh provisions may have minimal effect on bycatch species. Most of the species caught with black sea bass are regulated, or have proposed regulations that require mesh sizes and/or minimum fish sizes that equal or exceed the black sea bass regulations. A 6" minimum mesh size is required for most of the New England groundfish species. The minimum mesh size for summer flounder is 5.5" with a minimum fish size of 13" TL. The proposed minimum size for black sea bass would require that fishermen use a 4.5" tail bag to reduce catch of sublegal fish, i.e. those less than 9" TL.

Minimum mesh provisions in conjunction with the minimum fish size will ensure that discards of sub-legal black sea bass will be reduced. Greater gains will accrue to fishermen through protecting black sea bass until they reach legal size. Discard mortality is extremely high for trawl caught fish and the problem is particularly acute when new year classes are abundant. The benefits of the proposed minimum fish size and mesh size regulations will be manifested through a more balanced age structure of the black sea bass stock. Further, waste will be reduced due to (1) lower total discards and (2) lower mortality of net encounter.

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.

The NMFS contracted with the Manomet Bird Observatory to place observers on US boats beginning in 1989 to collect a variety of data on the vessels, personnel, and catch. Unfortunately sea sampling data on these fisheries are limited. There are no observer data available for the catch and discard from the large freezer-trawlers.

In general, the species that coexist with black sea bass were also the species that commonly appeared in the directed fisheries. The landings data that are summarized above reflect market value and not necessarily the actual catch from a specific trawl. The ecological niche that black sea bass inhabit includes their prey and predators.

Black sea bass are opportunistic bottom feeders that eat crustaceans, fish, mollusks, echinoderms, and plants (Hildebrand and Schroeder 1928, Miller 1959, Cupka et al. 1973, Link 1980, Steimle and Ogren 1982). The primary diet items for adult black sea bass are crabs and fish whereas young black sea bass eat shrimp, isopods, and amphipods (Kendall 1973). Food consumption varies seasonally in association with spawning activity. Feeding slows during the spawning season (Cupka et al. 1973) and is heaviest in the 6-month period following spawning (Hoff 1970).

Specific predators of black sea bass have not been identified in detailed food habits studies. However, it is probable that black sea bass are eaten by large piscivores (e.g., bluefish) whose range overlaps that of black sea bass (Kendall 1977).

Black sea bass share common food resources and habitat preferences with a number of fish that comprise the hard bottom reef fish community of the Mid Atlantic Bight (Ekluund and Targett 1991).

The creation of special management zones around artificial reefs is also part of the proposed preferred alternative that may have positive environmental benefits. The intent of an SMZ is to enhance management of fishery resources on or around artificial reefs while optimizing fishing opportunities that would not otherwise exist. Artificial reefs are costly and provide benefits that can be easily nullified by the use of certain types of fishing gear. In addition, certain types of gear pose various threats to the reef structure and associated fishery resources, including: a) entanglement of other boating and fishing gear, b) entanglement in the reef structure ("ghost gear"), and c) damage to or movement of reef structure.

Many artificial reefs, including those constructed by State governments, are located in the EEZ. If management measures are needed to control fishing on and around those artificial reefs, they must be developed through a fishery management plan. Providing a process through which the Council can develop these measures on a case by case basis is an efficient way of achieving this control.

However, such a system must be coupled with a process that provides the Council an opportunity to comment, in a timely manner, on the location of artificial reefs before they are constructed. Industry advisors report that on occasion artificial reefs are constructed in existing black sea bass habitat areas, thereby possibly accomplishing a *de facto* allocation of a portion of the fishing grounds from the pot or trawler fishery to the hook and line fishery. While such allocations may be appropriate from time to time, they should be made only after all potentially affected interests are aware of the proposal and have an opportunity to comment.

The proposed action will also address problems of species diversity and abundance that have been increasing over the past decade. The proposed action will enable black sea bass to maintain themselves, and will hopefully prevent the type of species replacement (by less desirable species like skates and rays) that has occurred on Georges Bank and elsewhere after major targeted species have been cropped by fishing pressure. The problem of species replacement is becoming a great concern. The 1994 autumn bottom trawl survey conducted by NEFC showed a continuing dominance of cartilaginous fish (dogfish, skates, and rays). Nearly three fourths of the survey's total weight was of cartilaginous species whereas catches of the three "traditional" groundfish species (cod, haddock, and yellowtail flounder) comprised only 3% of the total (USDC 1994a).

The importance of biological diversity cannot be understated. The synergistic effects of the sum of the world's biota is directly responsible for maintaining the gaseous composition of the atmosphere, regulating the world's hydrology, generating and maintaining soils and nutrients, detoxifying wastes, driving biogeochemical cycles, controlling pest epidemics, and providing plant pollination, thus making human life on Earth possible. In addition, select species are used by humans to enhance the quality of life. For example, many plants contain active ingredients which are used in pharmaceuticals. Humans also use

species for food and shelter. Almost all of these "ecosystem services" are at present irreplaceable by technology. Technologies to replace lost elements of biological diversity are extremely limited if not non-existent (Atlantic Biodiversity Center 1994).

At this moment, human activities are inadvertently forcing species and populations into extinction at an unprecedented rate. How fast is this diversity disappearing? Harvard's Cradoord Laureate ecologist E. O. Wilson, conservatively estimated that the annual extinction rate in 1990 was 4,000 to 6,000 species per year. To put this into perspective, this rate of extinction is 10,000 times faster than the "background" or normal rate of extinction. Moreover, this may even be faster than the rate of extinction that occurred during the Cretaceous-Triassic extinctions (i.e. the dinosaur extinctions) over 65 million years ago. Biodiversity is in a constant state of being created and destroyed through the process of extinction and speciation. But speciation, a process which takes thousands of years, is not keeping pace with extinction. The result is our present stat of increasing global biotic impoverishment (Atlantic Biodiversity Center 1994).

The issue of biological diversity, or biodiversity, is a general term referring to an extremely complex ecological issue. It is often defined simply as "the variety and variability of life" or "the diversity of genes, species, and ecosystems" (Council on Environmental Quality 1993). In fact, biodiversity does comprise the variation between and among major ecological elements, but the significance of that diversity is not communicated by these definitions.

Biodiversity is a new and more explicit expression of one of the fundamental concepts of ecology, popularly stated as "everything is connected to everything else." Emerging concern about biodiversity reflects an empirically based recognition of the fundamental interconnections within and among various levels of ecological organization. Ecological organization, and therefore biodiversity, is a hierarchically arranged continuum, and reduction of diversity at any level will have effects at the other levels (CEQ 1993).

Fundamental to our understanding of biodiversity is the recognition that the biological world is not a series of unconnected elements, and that the richness of the mix of elements and the connections between those elements are what sustains the system as a whole (CEQ 1993).

In the past, biologists relied upon measurements of species diversity or species richness -- simple measures of the number or distribution of species in a given area -- to describe biodiversity. However, these measures do not consider the issues of ecosystem and genetic diversity and typically treat all species alike, whether native or introduced, common or rare (CEQ 1993).

Concern for biodiversity is often misinterpreted as a desire to maximize the diversity (usually species diversity) of every area. In fact, managing for maximum diversity might actually impoverish natural biodiversity. For example, introducing small-scale habitat disturbances might increase local biodiversity by favoring the spread of opportunistic, "weedy" species. However, the same activity may decrease the available habitat for species at risk regionally, and regional or global biodiversity may be diminished (CEQ 1993).

The CEQ (1993) report list six main factors the contribute to the decline of biodiversity. These six main factors are: physical alteration, pollution, overharvesting, introduction of exotic species, disruption of natural processes, and global climate change. Of course, these six factors all have the overpopulation problem (section F.3) at their root.

This FMP is designed to prevent the overharvesting of black sea bass. The prevention of overfishing is the requirement of the first National Standard of the MFCMA and the only real factor that affects biodiversity that the Fishery Management Councils can control. The Councils make recommendations to the Secretary of Commerce in the FMPs (section 6.6) for ways to minimize or stop the effects of pollution on the species managed. However at this time these are only recommendations. It is hoped that with reauthorization of the MFCMA in 1995, that Congress will give more authority to the Councils and NMFS for ways to conserve fishery habitats and reduce the impacts of pollution. The other four factors are really out of the

purview of the fishery management process.

G.1.2. No Action.

The no action alternative will jeopardize the long-term productive capability of black sea bass. The NMFS does not have an estimate of the long-term potential yield (USDC 1993), however commercial landings of up to 22 million pounds occurred in the early 1950's (section 7). Black sea bass need to be rebuilt, in that they are heavily over-exploited. Commercial black sea bass landings have declined substantially since peak landings in the 1950's. Since 1983, commercial black sea bass landings have averaged approximately 3.6 million pounds per year or 42% of the total landings, recreational and commercial landings combined (Table 9). In 1992, fishermen landed approximately 6.3 million pounds of black sea bass of which commercial landings accounted for approximately 3 million pounds. This represents a decline from 4.3 million pounds, the largest amount of black sea bass landed by commercial fishermen during the period 1983 to 1992.

Landings-per-unit-effort (LPUE) from the Mid-Atlantic trawl fishery has been used as an index of abundance for black sea bass. Standardized LPUE, defined as metric tons per days fished for trips landing more than 25% black sea bass, peaked at 11.3 in 1984, and then declined to a low of 1.6 in 1992. Standardized LPUE increased slightly to 3.2 in 1993 (NEFSC 1995).

The NEFSC has conducted a spring and autumn offshore survey for a number of species, including black sea bass, since 1972. The spring offshore survey has been used as index for black sea bass recruits (fish longer than 20 cm SL) and the autumn inshore survey data as an index of pre-recruits (fish less than 11 cm SL). The spring recruit index was generally high in the late 1970's, ranging from 2.0 to 6.1 fish per tow. The spring index declined from 6.1 fish per tow in 1977 to a low of 0.2 per tow in 1982. More recently the spring index was 0.9 in 1993 and declined to 0.3 in 1994 (NEFSC 1995). The fall pre-recruit indices show a similar trend (i.e., relatively low recent values compared to the mid-1970's).

Analyses conducted by the NEFSC indicate a strong correlation between the fall pre-recruit index and commercial catch per unit effort in the trawl fishery (NEFSC 1993). The index for pre-recruits indicated that above average year classes were produced in 1977, 1982, and 1986. Recruitment for 1992 and 1993, based on this index, was well below average (NEFSC 1995). Recruitment was above average in 1994 (Shepherd, pers. comm.)

Overfishing for black sea bass is defined as fishing in excess of the F_{max} level. Based on current conditions in the fishery, yield per recruit analysis indicates that F_{max} for black sea bass is 0.29. Current estimates of fishing mortality indicate that the current mortality rate is 1.05. This, coupled with the above information, that is, the decrease in landings, reduced CPUE, and low survey indices, indicate that black sea bass are overexploited, and the no action alternative will jeopardize the long-term potential of the stock.

The no action alternative will also have negative impacts on other species and habitat. The purpose and need section (D) of this EIS identifies problems of the mixed species fishery, the increasing fishing pressure, and habitat degradation, all problems that will be beneficially helped by implementation of management measures for black sea bass.

G.1.3. Other Alternatives.

Adoption of the alternatives other than the proposed action may increase the likelihood that management measures may jeopardize the long-term productive capability of this resource and reduce biodiversity. In general, the other alternatives could be combined in order to meet the FMP objectives, especially the overfishing objective (objective 1), the reduction of fishing mortality on immature black sea bass objective (objective 2), and the improvement of yield objective (objective 3), but it is not a requirement since most of the alternatives being considered are perceived as "stand-alone" alternatives. From the commercial fishing segment, it is possible that a restrictive quota, or specific mesh or specific fish size measures could each be used to meet the objectives but it is the Councils belief that the specific combination of commercial measures adopted as the preferred alternative will do the least environmental harm. For example, if only a quota was imposed, it is highly likely that there would be a rush to harvest, with more small fish and more

of other species bycatch occurring. All the preferred management measures identified for years three and after are frameworked so that the specific target exploitation rates can be achieved. The commercial fishery has a minimum fish size, a minimum mesh size and a coastwide quota, all of which are frameworked, in the preferred alternative. The recreational fishery has a minimum fish size, a possession limit, a season, and a coastwide recreational harvest limit combination in the preferred alternative. Annually a Monitoring Committee will evaluate the fishery relative to the target exploitation rates (29% in year three, 21% in year six, and 14% in year eight and thereafter) and make recommendations for the frameworked management measures. The frameworked management measures are the key to successful exploitation rate reductions and are the items that will protect the long-term productive capability of the black sea bass.

It is anticipated that improved data collection, including the permitting and reporting requirements of the FMP, will allow such a study to be conducted in future amendments. It must also be recognized that all alternatives (including most particularly, the no action alternative) may have negative economic impacts. However, it is believed that the preferred frameworked alternatives will have the least negative impacts in the short term and the greatest benefits (in the form of the rebuilt resource) in the long term in a reasonable time frame (10 years).

G.1.3.1. List of Non-Preferred Alternatives.

1. Take no action at this time. This would mean that black sea bass would not be managed pursuant to the MFCMA.

2. Seasonal closures for the commercial fishery.

3. Bimonthly commercial quotas with possible trip limits established by the NMFS Regional Director to reduce the length of closures.

4. State by state commercial quotas with possible trip limits established by the states to reduce the length of closure.

5. Individual transferrable quotas.

6. Seasonal dependent minimum sizes in the commercial fishery: A 10" TL minimum size from Oct. 1 - April 30 and a 9" TL minimum size for the rest of the year.

7. A threshold requirement to qualify for a moratorium permit.

8. Separate management measures for party/charter boat fishermen.

9. A 9" TL minimum fish size and a 3.5" minimum square mesh size in the otter trawl fishery when the vessel has 100 pounds or more of black sea bass on board.

The preferred alternative is described and evaluated in section 9 of the FMP. The alternatives considered but not adopted are described and evaluated in Appendix 1.

G.2. WILL THE ALTERNATIVES 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 healthy stocks of black sea bass. While there is no information proving that harvest does affect habitats, there is ample evidence that other human activities affect black sea bass and their essential habitats. On that basis, this EIS and the FMP anticipates a closer working relationship with State and Federal agencies empowered to make decisions that could affect the habitat of black sea bass. That Council and NMFS responsibility is especially important in nearshore waters. Black sea bass are dependent on estuaries and coastal bays, which are often the same waters affected by dredging, discharges, run-off, water diversions, and other

permitted and unpermitted actions by the 60 million people living in the Atlantic coastal region.

There is considerable awareness of the potential impact of otter trawling on the ocean bottom habitat. However, quantification of specific gear types on various bottom types is poorly understood. The South Atlantic Council (1988) in its Amendment 1 for the snapper/grouper fishery prohibited the use of trawl gear to harvest snapper/grouper in the directed fishery south of Cape Hatteras and north of Cape Canaveral. That Council based the trawl prohibition on habitat destruction and the desire to prevent overfishing of vermillion snapper. Their main concern was the destruction of sponge-coral habitat and did not address the effect of trawling on other types of ocean environment.

There are no known coral-sponge habitats north of Cape Hatteras which is where these fisheries are prosecuted. The issue of ocean bottom habitat degradation caused by trawling is largely an unknown at this time. The very few published papers that do exist deal with specific habitats. It is important to note that when habitat damage is described it is often from as little as one tow of trawl gear through the study area (Van Dolah *et al.* 1987 and SAFMC 1988). Under commercial fishing conditions, the bottom would be fished over and over until the catches from such an area become unprofitable. Under such conditions, habitat damage could be expected to be much greater than would occur with towing through the area once. Obviously, more research efforts are likely to be directed towards this issue in the future.

National marine sanctuaries are allowed to be established under the National Marine Sanctuaries Act of 1973. Currently there are 11 designated marine sanctuaries (Figure 12) that creates a system that protects over 14,000 square miles (National Marine Sanctuary Program 1993).

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

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

NOAA/NOS issued a proposed rule on 8 February 1991 (56 FR 5282) proposing designation under MPRSA of the Stellwagen Bank National Marine Sanctuary, in Federal waters between Cape Cod and Cape Ann, Massachusetts. On 4 November 1992, the Sanctuary was Congressionally designated. Implementing regulations (15 CFR 940) became effective March 1994. Commercial fishing is not specifically regulated by Stellwagen Bank regulations. The regulations do however call for consultation between Federal agencies and the Secretary of Commerce on proposed agency actions in the vicinity of the Sanctuary that "may affect" sanctuary resources. The process for consultation is currently (late 1995) being worked out between the Regional office of NMFS, the Sanctuary, and NEFMC for Amendment 7 to groundfish. Correspondence for this sanctuary should be addressed to: Stellwagen Bank NMS, 14 Union Street, Plymouth, MA. 02360.

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

In June of 1995 the Council adopted the following five policy statements in regard to artificial reefs:

1). Each new EEZ artificial reef site proposal must have a stated conservation and management objective.

2). The MAFMC endorses the National Artificial Reef Plan (1985) and encourages staff to work with ASMFC, NMFS, and the States in the updating of plan.

3). Only materials identified and acceptable in either the National Artificial Reef Plan (1985) or the Reef Material Criteria Handbook (1992) or revisions thereof should be used for the creation of artificial reefs.

4). No fishery management regulations may be implemented for any artificial reef in the EEZ without concurrence by the MAFMC.

5). The Council will attempt to facilitate communication on the siting of any new artificial reef in the EEZ with various user groups of the proposed site.

These five policy statements should help facilitate Federal, State, and local activities in the Mid-Atlantic and can only be beneficial to the ocean and coastal habitats.

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

G.2.2. No Action.

The no action alternative will allow larger roller gear to be introduced into the fishery and thus will have more damage to the ocean and coastal habitat because the gear can fish bigger rock piles and will do more environmental damage. The no action alternative will not require black sea bass pots and traps to have degradable materials. The no action alternative does not provide for special management zones around artificial reefs.

Roller diameter is correlated with vessel size and the ability of vessels to fish rough, hard bottom areas. Larger roller sizes require larger engine sizes to pull the net. An engine size with an associated horsepower of 800-900 hp is required to tow a net with 18" to 24" rollers whereas 10" to 12" rollers can be pulled by a boat using a 175-200 hp engine (D. Simpson pers. comm.).

Information is lacking as to the relationship between roller diameter and the size of obstruction that it can clear. In general, 10-12" diameter rollers can be used for fishing over rough bottom that can include ledges and cliffs. Limitations on roller size will make some areas of the ocean inaccessible to trawls by preventing fishermen from trawling in the harder, rough bottom areas. Thus, black sea bass associated with these areas would be protected from harvest allowing more fish to grow to maturity and spawn increasing stock biomass and yields.

Black sea bass pots would be required to have hinges and fasteners of one panel or door made of degradable materials. These materials would allow the door or panel of a trap to fall away from an unattended trap. This would prevent lost traps from "ghost fishing", i.e., continuing to catch and retain fish that could not be removed from the trap. Thus black sea bass and other species of fish and invertebrates typically caught by these traps could escape, preventing waste and lost yields in a number of fisheries.

G.2.3. Other Alternatives.

None of the other alternatives are expected to allow substantial damage to the ocean and coastal habitats. The preferred alternative is the most desirable because of the frameworked measures designed to achieve the target exploitation rates. Most of the preferred and non-preferred management measures (i.e. permitting, reporting, fish size, possession limit, season and harvest limits) simply do not affect ocean and

coastal habitats. The possibility of SMZs around artificial reefs is only part of the preferred alternative.

G.3. WILL THE ALTERNATIVES BE REASONABLY EXPECTED TO HAVE A SUBSTANTIAL ADVERSE IMPACT ON PUBLIC HEALTH AND SAFETY?

None of the alternatives are expected to have an adverse impact on public health or safety. Obviously, scup are afflicted with various parasites and disease. Fin rot disease may be the most common among fish and is most often associated with stressful environmental conditions. Fish from polluted waters are subject to increased prevalence of disease. Black sea bass 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 (FMP section 6.2). Most research on the toxicological effects of various contaminants in fish in general, and scup, in particular is recent and ongoing. While more research is certainly necessary on toxicological effects associated with these species (EIS section F.4.2.) none of the alternatives are expected to have a differential adverse impact on public health or safety. In fact, heightened awareness and improved data collection will occur with the implementation of this FMP. The alternatives will not create situations that would have an adverse impact on public health and safety.

G.4. WILL THE ALTERNATIVES BE REASONABLY EXPECTED TO ADVERSELY AFFECT AN ENDANGERED OR THREATENED SPECIES OR MARINE MAMMAL POPULATION?

G.4.1. Proposed Action.

The proposed action, because of the control placed on continued unrestricted growth of fishing activity will tend to reduce contacts with endangered and threatened sea turtle species, shortnose sturgeon, and marine mammals. Activities conducted under this Fishery Management Plan have not yet been considered for their impacts on endangered species in order to do a Section 7 of the Endangered Species Act, as amended, consultation. The NMFS will be performing a Section 7 consultation while the FMP is out for public review during the next few months. They were requested to perform a consultation last spring, but felt they could not until the fisheries were adequately described. We will request that Fish and Wildlife Service also perform a Section 7 consultation on any seabirds that may be impacted by this FMP. The Fish and Wildlife Service has responded that the FMP will not affect any listed seabirds.

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 59). 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.

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

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

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

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

G.4.1.1. Sea Turtles.

Attempts were made to put these fisheries/sea turtle interaction into perspective of other sources of mortality for these endangered turtle species. The Congressionally mandated report *Decline of the Sea Turtles: Causes and Prevention* (NRC 1990) states that "Of all the known factors, by far the most important source of deaths was the incidental capture of turtles (especially loggerheads and Kemp's ridleys) in shrimp trawling. This factor acts on the life stages with the greatest reproductive value for the recovery of sea turtle populations."

Mortality associated with other fisheries and with lost or discarded fishing gear is much more difficult to estimate than that associated with shrimp trawling, and there is a need to improve these estimates (NRC 1990). This report identified possible turtle losses from the winter trawl fishery north of Cape Hatteras (about 50-200 turtles per year); the historical Atlantic sturgeon fishery, now closed, off the Carolinas (about 200 to 800 turtles per year); and the Chesapeake Bay passive-gear fisheries (about 25 turtles per year). Considering the large numbers of fisheries from Maine to Texas that have not been evaluated and the problems of estimating the numbers of turtles entangled in the 135,000 metric tons of plastic nets, lines, and buoys lost or discarded annually, it seems likely that more than 500 loggerheads and 50 Kemp's ridleys are killed annually by nonshrimp fisheries (NRC 1990). These other fishery operations, lost fishing gear, and marine debris are known to kill sea turtles, but the reported deaths are only about 10% of those caused by shrimp trawling. Dredging, entrainment in power-plants intake pipes, collisions with boats, and the effects of petroleum-platform removal all are potentially and locally serious causes of sea turtle deaths. However these collectively amount to less than 5% of the mortality caused by shrimp trawling (NRC 1990).

The NRC report (1990) concludes that all species of marine turtles need increased protection under the Endangered Species Act and other relevant legislation. While the report does not recommend specific conservation measures for these fisheries, the recommendations for the shrimp trawling are germane. The

NRC report (1990) recommended TEDs, 60 minute winter tow-time limits, and limited time/area closure for turtle "hot spots". Currently, there are 5 sea turtle recovery plans in place, these include plans for the loggerhead (1991), the green sea turtle (1991), the leatherback (1992), the Kemp's ridley sea turtle (1992), and the hawksbill sea turtle (1993). Of the six "Actions Needed" that are identified by the Recovery Plan to achieve recovery of loggerheads is item 5: "minimize mortality from commercial fisheries."

G.4.1.2. Shortnose Sturgeon.

Shortnose sturgeon (*Acipenser brevirostrum*) is an additional endangered species that may be caught incidentally in the trawl fisheries. Sturgeon will be included in the Incidental Take Statement of the pending Biological Opinion. As shortnose sturgeon are generally associated with the estuarine environment, rather than the truly marine environment, it is anticipated that the gear and fishing locations of these scup fisheries will rarely encounter shortnose sturgeon.

G.4.1.3. Marine Mammals.

Marine mammals are managed under the Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973. Marine mammals have been historically important in the US both as targets for commercial harvests and in ecological interactions with commercial fisheries. Some scientific attention was given to marine mammals as early as 1851 when Matthew F. Maury of the US Navy's Depot of Charts and Instruments published his whale charts based upon whaler's logs and records of sightings. The US Fish Commission, after its creation in 1871, gave more attention to marine mammals, commissioning, for example, Starbuck's 1878 "History of the American Whale Fishery". The omnibus series entitled "The Fisheries and Fishery Industries of the United States" by G. B. Goode and Associates in 1884 described fisheries for the great whales as well as smaller whales (e.g. pilot whales, bottlenose dolphins and bottlenose whales) in the North Atlantic (USDC 1993).

In addition to these direct fisheries, there was also interest in the indirect effects of marine mammals on other fisheries. Goode also described the destructiveness of marine mammals to fisheries, a theme the US Commissioner of Fisheries used in 1889 in supporting a fish meal factory to be built in Woods Hole. The commissioner speculated that the 20 tons of predators such as porpoises, skates, and dogfish that the proposed factory would process annually "should present a marked influence upon the supply of edible fishes". The interest of the US Fish Commission was primarily in terms of fisheries, and little biological study appears to have been done of marine mammals in this region beyond the taxonomic studies of Frederick True starting in the 1880's. For example, he provided written instructions to the lighthouse keepers on "the best means of collecting and preserving specimens of whales and porpoises" (USDC 1993).

With the declining importance of the US harvests of east coast species of marine mammals in the late 1800's and early 1900's, the incentive for systematic scientific study of the species inhabiting northeastern US waters declined. In the 1930's and 1940's, Remington Kellogg at the Smithsonian and William Schevill at Harvard undertook taxonomic studies, but it was not until the late 1940's that cetacean biology began to be investigated more systematically. Then Schevill began a series of investigations at the Woods Hole Oceanographic Institution of cetacean acoustics that are still continuing. In the early 1970's, several other researchers began studying marine mammals in this region. The results of this earlier work was addressed in 1979 when the US Marine Mammal Commission sponsored a workshop to help define research needed for the study of marine mammals on the US east and Gulf coasts and in 1989 at a NMFS-sponsored workshop on Gulf of Mexico marine mammal research needs (USDC 1993).

These workshops set a research agenda that was immediately addressed by agencies such as the Minerals Management Service and the NMFS. During the 1980's, several institutions in the northeast developed active research programs which have resulted in a body of knowledge that is being drawn upon in developing management approaches for several critical marine mammal issues in the region. In the 1990's, increased attention has been focused on the characterization of marine mammal fauna of the US Gulf of Mexico and the Mid-Atlantic Bight (USDC 1993).

Thirty-five species of marine mammals range the US Atlantic and Gulf of Mexico waters (32 whales, dolphins and porpoises, two seal species and one manatee). Their status is poorly known, but some, like the right whale, Mid-Atlantic coastal bottlenose dolphin, and harbor porpoise, are under stresses that may affect their survival (USDC 1993). Brief summaries below for selected species give data on distribution, current and historical abundance and population trends.

Bottlenose Dolphin.

The number of discrete stocks of bottlenose dolphins is unknown, although there appear to be offshore and coastal types, possibly forming two distinct populations. There are no comprehensive population estimates, but abundance in the Gulf of Mexico is 35,000 - 40,000 in waters of 100 fathoms or less. Nearshore aerial surveys between Cape Hatteras and Nova Scotia in 1979 -82 suggest a northeast US total of 10,000 - 13,000 individuals. However, a large die-off of bottlenose dolphins in 1987 - 88 may have resulted in a 50% or greater decline in the nearshore and offshore types. An offshore survey from New Jersey to Cape Hatteras in 1987 found about 1,050 - 7,500 which were assumed to be of the coastal type (USDC 1993).

Pilot Whale.

Two species of pilot whales occur in the North Atlantic, the shortfin pilot whale in the south and the longfin in the north. The range of the two species overlaps seasonally in the Mid-Atlantic region of the western North Atlantic. The longfin pilot whale occurs northward into Canadian and the Greenland waters and eastward to Europe: it is subject to an ongoing harvest around the Faroe Islands and incidental capture in several fisheries in the US and Canadian waters. The shortfin pilot whale may be subject to a low level of bycatch in several US fisheries. Population structure and general life history of both species is very poorly known. Abundance has been estimated for the longfin pilot whale in the eastern North Atlantic (750,000) and for the continental shelf region of the western North Atlantic (roughly 11,000; USDC 1993).

Fin Whale.

Fin whales, listed as endangered under the ESA, are probably the most numerous large cetaceans in temperate waters of the western North Atlantic Ocean. They range widely throughout the continental shelf in all seasons, but most sightings occur from the Great South Channel on Cape Cod, north throughout the southwest Gulf of Maine. Stock structure and total abundance are unknown. An estimate of abundance off the northeast coast in 1979 - 82 was 5,200 in spring and 1,500 in winter. Important research and management questions are whether separate stocks exist, the location of calving grounds and annual calf production, and the location of the wintering grounds for the northwest Atlantic population.

Humpback Whale.

The humpback whale is listed as endangered. Reasonably discrete summer stocks occur in the Gulf of Maine, Gulf of St. Lawrence, and the waters of Newfoundland-Labrador, west Greenland, Iceland, and Norway. The estimated population is about 5,100 whales. Along the northeast coast, humpbacks frequent the Great South Channel, Georges Bank, Stellwagon Bank, and Jeffreys Ledge during summer. A minimum estimate of the population prior to commercial whaling (about 1865) was 4,400 - 4,700 humpbacks. Entanglement with fishing gear and sporadic toxin-induced die-offs are problems for the species. In recent years the number of sightings of young humpbacks in the Mid-Atlantic region has increased, generally in the areas of the Chesapeake and Delaware Bays (USDC 1993). There is a recovery plan for this species.

Right Whale.

Northern right whales occur on the continental shelf from Florida to Nova Scotia. The endangered western Northern Atlantic stock is the only northern hemisphere right whale population with a significant number of individuals (300 - 350) -- the other stocks being virtually extinct. The pre-eighteenth century population

may have been as high as 10,000, and, if so, the current population is more than 95% depleted. Individual identification, satellite tagging, genetic analysis, and the use of video cameras to document behavior are new research methods that have been applied in recent years. Many questions, however, remain. Among them are the location of the summering grounds for 30% of the population and wintering grounds for 80% of the population. Human impacts (net entanglements and ship strikes) are affecting some 60% of the population and may be inhibiting recovery. Two areas important to the northern right whale, the summer feeding grounds off the New England coast and the winter calving area along the Georgia and northern Florida coast, have been proposed as critical habitat (USDC 1993). There is a recovery plan for this species. A final rule was published in June 1994, designating right whale critical habitat for summer feeding grounds in New England and winter calving grounds off the Georgia and Florida coasts.

Harbor Porpoise.

The northwestern Atlantic harbor porpoise is found from Newfoundland, Canada, to Florida. It is hypothesized that there are three populations: Newfoundland, Gulf of St. Lawrence, and Gulf of Maine-Bay of Fundy. However, there is not enough evidence to test this hypothesis against the alternative of a single population. Summer aggregations occur in the Gulf of Maine, Gulf of St. Lawrence, and the east coast of Newfoundland. The winter distribution is poorly understood. The 1991 - 92 population estimate of the Gulf of Maine population is 47,200 (95% CI 32,800 - 68,000). No useful estimates of abundance for the other populations exist. The average estimate of annual mortality by the US Gulf of Maine sink gillnet fishery from 1990 and 1992 is about 1,700 (range 900 - 2,400). These estimates do not include bycatch from fisheries south of Cape Cod or north of the US border. The estimated bycatch of the other two populations is largely unknown, though some new data do exist for the Bay of Fundy, which are currently being analyzed (USDC 1993).

Harbor Seal.

Harbor seals, year-round residents of Maine and eastern Canada, are seasonal-winter residents in southern New England. Harbor seal numbers have apparently increased in recent years, due primarily to protection under the MMPA. Recent surveys suggest that 26,000 harbor seals occur in the Gulf of Maine, and they are increasing. Bycatch levels are relatively low, and major concerns are competition with fisheries and periodic disease outbreaks (USDC 1993).

Beaked Whales.

There are four species of beaked whales in the northwest Atlantic, however little is known on their distribution, biology, and population structure. Based on cetacean surveys conducted during the early 1980's and 1990's, these species are distributed along the shelf edge (2,000 m), principally along the southern edge of Georges Bank and associated with oceanographic fronts and Gulf Stream meanders. Population estimates for this species are not available. Determination of minimum abundance estimates will require substantial survey effort in shelf-edge waters and waters seaward to at least the Gulf Stream off the northeast US and eastern Canada coasts (USDC 1993).

The gears managed under this FMP are all in the third category or not listed at all for the final List of Fisheries for 1994 for the taking of marine mammals by commercial fishing operations under section 114 of the Marine Mammal Protection Act (MMPA) of 1972 (*Federal Register* 43818-43826). Section 114 of the MMPA establishes an interim exemption for the taking of marine mammals incidental to commercial fishing operations and requires NMFS to publish and annually update the List of Fisheries, along with the marine mammals and the number of vessels or persons involved in each fishery, arranging them according to categories, as follows:

1. A fishery that has a frequent incidental taking of marine mammals;

2. A fishery that has an occasional incidental taking of marine mammals; or

3. A fishery that has a remote likelihood, or no known incidental taking, of marine mammals.

In Category I there is documented information indicating a "frequent" incidental taking of marine mammals in the fishery. "Frequent" means that it is highly likely that more than one marine mammal will be incidentally taken by a randomly selected vessel in the fishery during a 20-day period. No scup fisheries are in this category.

In Category II there is documented information indicating an "occasional" incidental taking of marine mammals in the fishery, or in the absence of information indicating the frequency of incidental taking of marine mammals, other factors such as fishing techniques, gear used, methods used to deter marine mammals, target species, seasons and areas fished, and species and distribution of marine mammals in the area suggest there is a likelihood of at least an "occasional" incidental taking in the fishery. "Occasional" means that there is some likelihood that one marine mammal will be incidentally taken by a randomly selected vessel in the fishery during a 20-day period, but that there is little likelihood that more than one marine mammal will be incidentally taken. No scup fisheries are in this category.

In Category III there is information indicating no more than a "remote likelihood" of an incidental taking of a marine mammal in the fishery or in the absence of information indicating the frequency of incidental taking of marine mammals, other factors such as fishing techniques, gear used, methods used to deter marine mammals, target species, seasons and areas fished, and species and distribution of marine mammals in the area suggest there is no more than a remote likelihood of an incidental take in the fishery. "Remote likelihood" means that it is highly unlikely that any marine mammal will be incidentally taken by a randomly selected vessel in the fishery during a 20-day period. The mixed species trawl fishery (where most scup are caught) is considered a Category III fishery. This fishery has greater than 1000 vessels. This fishery had no documented marine mammal species involved, according to the *Federal Register* notice. With the limitations on new vessel entry into the scup fisheries in the preferred alternative, there should be a beneficial impact of the preferred alternative management on the marine mammal populations of the east coast.

This final list will remain in effect until the interim exemption established under section 114 of the MMPA becomes obsolete. The MMPA was amended on 30 April 1994 and section 118 was created to govern the taking of marine mammals incidental to commercial fishing operations. The provisions of section 118 will replace the current interim exemption system (section 114), when regulations are put into effect, no later than 1 September 1995. Included in the implementation will be a revised List of Fisheries, a revised set of classification criteria, and new implementing regulations, based on the provisions of section 118, to replace those provisions currently in effect.

G.4.1.4. Seabirds.

Pelagic seabirds may also come into contact with black sea bass fisheries. Total densities of seabirds over the continental shelf and slope in the mid-Atlantic region are relatively low compared to the shelf and shelf break area off New England (Milliman and Wright 1987). Most of the following information is taken from the Mid-Atlantic Research Plan (1994) and Peterson (1963). Fulmars occur as far south as Virginia in late winter and early spring. Shearwaters, storm petrels (both Leach's and Wilson's), jaegers, skuas and some terns pass through this region in their annual migrations. Gannets and phalaropes occur in the Mid-Atlantic during winter months. Eight gulls breed in eastern North America and occur in shelf waters off the northeastern US. These gulls include: glaucous, Iceland, great black-backed, herring, laughing, ring-billed, Bonaparte's and Sabine's gulls and black-legged caduceus. Royal and sandwich terns are coastal inhabitants from Chesapeake Bay south to the Gulf of Mexico. The Roseate tern is listed as endangered under the ESA, while the Least tern is considered threatened (Safina pers. comm.). Of course, our national symbol, the bald eagle is listed as endangered under the ESA, and is a bird of aquatic ecosystems. Literally translated, its Latin name, *Haliaeetus leucocephalus*, means white-headed sea eagle (*Federal Register* 1994, 35584). Prey of estuarine inhabiting bald eagles may include black sea bass (D'Amico pers. comm.)

Black sea bass are not important prey for the Common and Roseate terns (Safina 1987, Safina *et al.* 1988, and Safina *et al.* 1990). Safina *et al.* (1988) note that few other seabird studies have measured ambient food levels among foraging birds, but many studies which have examined food provisioning to chicks and reproductive performance in seabirds have found results similar to theirs. Laying dates, clutch sizes, growth, and fledgling success of seabirds have been linked to food availability by a number of workers. Safina *et al.* (1988) recorded that prey fish were more abundant in 1984 than it was in 1985 and noted that reproductive productivity of terns was greater in 1984 for most parameters measured. Although they studied productivity for only two seasons, the results suggest that prey population fluctuations may limit reproductive success in the terns they studied.

Safina *et al.* (1990) noted that observing prey deliveries at nests cannot address the question of how foraging birds select prey or foraging habitat from the range of possibilities. However, the variability they found show that either prey availability or birds' selection criteria changes, and that prey availability or selection varies differently between the two tern species, Common and Roseate, they studied. Some prey species may have their own consistent internal rhythms (or influencing factors) which make them differentially susceptible to tern predation on a daily time scale.

A definitive analyses of the importance of black sea bass for the diets of pelagic seabirds and marine mammals has not yet been conducted. Alaska Sea Grant (1994) sponsored a workshop in 1993 entitled *Is It Food* which addressed the importance of Alaskan fish prey for marine mammal and seabird declines. A similar workshop for Northwest Atlantic interactions would be quite germane.

G.4.2. No Action.

No action may jeopardize the continued existence of the threatened or endangered species mentioned above because there will be uncontrolled, unlimited fishing pressures on the species managed by the FMP. As noted earlier, black sea bass may be important in the diets of some seabirds, marine mammals, and various fishes. Since the resource is currently overfished and the biomass is greatly reduced, the availability of black sea bass for food for these other populations is also greatly reduced. Preventing overfishing of black sea bass thus will be beneficial to some seabirds and certain species of marine mammals.

G.4.3. Other Alternatives.

It is likely that none of the non-preferred alternatives will pose a direct substantial damage to threatened or endangered species. Adoption of some of the non-preferred alternatives other than the proposed action could possibly inhibit the continued existence of any of the threatened or endangered species mentioned above because there will be uncontrolled, unlimited fishing pressures on black sea bass. Only the preferred alternative has all the various commercial and recreational measures frameworked to allow the achievement of the target exploitation rates. More fishermen (i.e. without the moratorium) rushing for limited resources may definitely have negative impacts on threatened and endangered marine life. The black sea bass resource needs significant conservation which in turn will be beneficial to seabirds, marine turtles, and marine mammals in general.

G.5. WILL THE ALTERNATIVES BE REASONABLY EXPECTED TO RESULT IN CUMULATIVE ADVERSE EFFECTS THAT COULD HAVE A SUBSTANTIAL EFFECT ON THE TARGET RESOURCE SPECIES OR ANY RELATED STOCKS THAT MAY BE AFFECTED BY THE ACTION?

G.5.1. Proposed Action

The proposed action will be expected to result in cumulative beneficial effects on the target resource and other associated non targeted species that are greatly overfished. Given the Congressional mandate (National Standard 1 of the MFCMA) to prevent overfishing, the conservation and management of this resource must occur. The increasing level of fishing mortality that has been occurring during the past decade, and which could greatly increase with the addition of numerous New England groundfish boats could drive this resource to a level where the spawning stock biomass is reduced so low, that a stock

collapse could occur. The maximum sustainable yield would then not be achievable. Unquestionably, the human impacts may be significant in the short term, if the resource is not used for short term economic gain. However, with the population rebuilt, and harvesting occurring around MSY, the maximum long term economic gains to the Nation, will be achieved.

As stated above, some switching of target species may occur and the prediction of the fishermen's behavior is very difficult. However, species of fish which are truly caught as a bycatch with black sea bass may also sustain a decrease in fishing effort as effort is stabilized at the effort level associated with MSY. Very few trawl-targeted species in the Northwest Atlantic are underfished, but it is the underfished species like Atlantic mackerel, skates, and dogfish which may be targeted by fishermen as efforts increase to reduce overfishing on many presently targeted species.

The proposed action has been selected to reduce short and long term impacts on the resource. The management measures will reduce excessive mortality and improve stock health. Related activities directed to State and Federal regulatory agencies may offer both direct and indirect benefits to essential habitats for black sea bass.

G.5.2. No Action.

No action would allow the overfishing of black sea bass to continue. The overfished condition of the resource requires management. Reductions in fishing mortality will benefit the resource and the entire ecosystem (especially species that prey on black sea bass, section G.4) that black sea bass are a part of, as well as the human environment that would be more profitable under effective fishery management.

G.5.3. Other Alternatives.

The critical aspect of the preferred management measure is the frameworked nature of the commercial and recreational measures that allow the achievement of the target exploitation rates. The cumulative adverse effects for the black sea bass resource and other related species that may be affected by the proposed management will be minimized with the preferred alternative. Obviously, the black sea bass resource is rebuilt the fastest, and thus the beneficial aspects of abundant black sea bass (i.e. prey) for other species is greatest with the frameworked preferred measures. Most of the non-preferred alternatives will not allow direct substantial damage to occur to the environment on a cumulative basis.

G.6. ADDITIONAL ENVIRONMENTAL CONSEQUENCES OF MANAGEMENT ALTERNATIVES.

There are six objectives for this FMP:

1. Reduce fishing mortality in the black sea bass fishery to assure that overfishing does not occur.

2. Reduce fishing mortality on immature black sea bass 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.

All six of these objectives will contribute to positive environmental benefits, in that they will contribute towards a rebuilding of the black sea bass resource which will also contribute towards a well-balanced, healthy ecosystem. Overfishing for black sea bass is defined as fishing in excess of F_{max}. The fishing mortality reduction strategy calls for minimum fish sizes and commercial gear regulations in years 1 and 2. Beginning in year 3, exploitation rates would be reduced until a level of 14% is reached in year 8.

The Council has adopted the following management measures for this FMP for purposes of public hearings. Beginning in year 1 of the management program nine management measures would be implemented as described is section E.1.

Permitting (items 1, 2, 4 and 5 above) and reporting (item 6) should have no environmental consequences. The moratorium on entry of new commercial vessels (item 3) will have only beneficial environmental consequences. The implementation of management measures 7 (degradable material for traps and pots), 8 (regulating a maximum roller rig size), and 9 special management zones around artificial reefs will definitely have beneficial environmental consequences in that they will reduce ghost fishing of lost gear and provide refugia for natural resources.

For years 1 and 2 only of the management program the Council adopted a 9" total length (TL) minimum fish size in the commercial fishery in Federal and State waters. There is also a minimum otter trawl 4.0" mesh size for vessels retaining 100 lbs of black sea bass. Black sea bass pots would also be required to have a minimum escape vent size. These three management measures will have significant conservation and environmental benefits.

Prior to year three and annually thereafter, the Council, working through a Monitoring Committee, would evaluate the success of the FMP relative to the overfishing reduction goal and propose adjustments to the management system. Beginning with year three, additional measures would be implemented by the Regional Director based on the recommendations of the Council as described in section E.1.

Beginning in year 3, the minimum commercial mesh size will be increased which would have major beneficial environmental consequences. Many more small black sea bass and other fishes will escape with a minimum mesh than are currently being caught and discarded with the 2 inch mesh nets currently in use. Increased survival of small black sea bass will not only contribute to objectives 1 through 3 of the FMP that will be directly benefitting black sea bass but will also be quite advantageous to the overall ecosystem to which black sea bass are often an important prey item. Fishermen have indicated that they will use larger mesh to harvest black sea bass. Other species that are part of the mixed trawl catch that are discarded dead also will benefit as the mesh is increased from the current size.

The creation of special management zones around artificial reefs as part of the preferred alternative should be quite beneficial to certain ocean environment. Generally, artificial reefs are physically restricted to certain gear types (i.e. pots, traps, and hook and line) and preclude the more physically destructive gear (otter trawls). The additional opportunity to impose specific management measures around artificial reefs can only contribute in a positive way towards the conservation of the ocean environment.

The commercial quota, as well as the recreational measures all will contribute to the mortality reduction schedule but should have little positive or negative direct environmental consequences. For example, it is impossible to quantify the direct environmental benefit in year three of an 10" minimum fish size versus the 9" size imposed in year one.

Of the nine non-preferred alternatives identified in FMP Appendix section 1, only the no action alternative and the individual transferable quota would have significantly different environmental consequences to those measures in the preferred alternative package.

Clearly the no action alternative is indefensible from a biological or environmental point of view. The black sea bass resource would continue greatly overfished with negative ecosystem consequences. The environment would also be further harmed through increased ghost fishing from pots and traps. Structured habitat that is currently difficult to fish would also become more vulnerable to larger roller rigs.

The ITQ alternative would have significant positive environmental consequences. Paramount among these benefits is the incentive to conserve and shepherd a natural resource because an individual has a stake in its future. The importance of this motivation cannot be overemphasized given the depleted condition in which so many of our living marine resources exist. Incentives under most existing management systems are simply to harvest as much as possible today, for tomorrow the resource may be gone, or harvested by

someone else. Issuing harvest rights which last indefinitely engenders a corresponding concern among users that the health of the fishery resource be maintained indefinitely.

G.7. ECONOMIC EFFECTS OF THE ALTERNATIVES.

G.7.1. Proposed Action.

The economic characteristics of the fishery are presented in section 8 of the FMP. The benefits and costs of the proposed actions addressed in this FMP and DEIS are evaluated in section 9.2 (Analysis of Beneficial and Adverse Impacts of Adopted Management Measures), in Appendix 1 (Alternatives to the Amendment), and in Appendix 3 (Regulatory Impact Review).

G.8. FEDERAL AGENCIES THAT MAY BE AFFECTED.

The Federal Agencies that may be affected by this proposed Amendment include:

Dept. of Army Civil Works: scheduling of dredging projects, discharge of dredged materials, identification of aquatic borrow sites.

Dept. of Army Regulatory 1404 Program: issuing of permits for water development projects (e.g. dredging, filling, bulkheading, construction of piers, and installation of piles).

Environmental Protection Agency: Section 401 -- individual state review of 404 discharges, Section 402 -- point source discharges, Section 404 -- discharge of dredge or fill into waters of the U.S., Section 208 -- 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

The Amendment was prepared by a team of fishery managers and scientists with special expertise in the scup resource including:

Mid-Atlantic Council Demersal Committee - Mid-Atlantic Council members: Rick Cole (Chair, DE), Dr. Brian Rothschild (Vice Chair, MD), Dr. James Gilford (MD), Pete Jensen (MD), Jack Travelstead (VA), Bruce Freeman (NJ), Gordon Colvin (NY), Alan Weiss (PA), Bob Hamilton (NY), Jack Dunnigan (ASMFC), South Atlantic Council members Dennis Spitsbergen and Gerald Schill, and New England Council member James McCauley.

Mid-Atlantic Council Black Sea Bass Industry Advisory Committee - Jack Ferrera (NY), Thomas Marconi (NY), Joe Wagner (NJ), William Egerter (NJ), Ron Vansant (NJ), Albert Adams (DE), Harry Lecates (DE), David Martin (MD), Jim Swagler (MD), Charles Amory (VA), Fred Feller (VA), Eric Burnley (VA), Harry Doernte (VA), and New England representative Robert Smith (RI).

MAFMC staff - David R. Keifer, Dr. Christopher M. Moore, Dr. Thomas B. Hoff, Clayton E. Heaton, Richard J. Seagraves, and José L. Montañez.

I. REFERENCES, TABLES, AND FIGURES ARE ALL FROM THE FMP.

J. AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES OF THE EIS WERE SENT.

(Appendix A)

Last Name	First Name	Address 1	Address 2	City	State	Zip
& Johnson, Inc.	Axelsson	P.O. Box 180		Cape May	NJ	08204
& P.Barbera	N.Clark	Town Dock, Inc.	P.O. Box 608	Narragansett	RI	02882
(011)5th C.G. Dis	Cmdr.,	Federal Bldg. Room 401	431 Crawford St.	Portsmouth	VA	23705
Abrams	Robert	520 Davie St.		Westbury	NY	11590-5908
Ackert	Jim	577 Washington St		Gloucester	MA	01930-1743
Adams	Albert	RD 1 Box 406		Milford	DE	19963
Affairs Library	Marine	Washburn Hall	Univ. of RI	Kingston	RI	02881
Agnello	Richard	Economics Dept.	Univ. of Delaware	Newark	DE	19711
Agric. Counselor		Embassy German Fed. Rep.	4645 Reservoir Rd.,NW	Washington	DC	20007-1998
Allen	Kenneth	448 N. Connecticut Ave.		Atlantic City	NJ	08401
Allen	Richard	35 Bliss Rd.		Wakefield	RI	02879
Allen	Rick	Borden Clam Products	Box 994 Ocean Drive	Cape May	NJ	08204
Alley	Dick	The Fisherman	121 So. Compo Rd	Westport	CT	06880
Alspach	Thomas	295 Bay St., Suite One	PO Box 1358	Easton	MD	21601
Ambrico	Donald	3030 Emmons Ave.		Brooklyn	NY	11235
Amory	Charles	L.D. Amory Seafood Co.	101 South King Street	Hampton	VA	23669
Anderson	Eric	Dept. of Economics	Old Dominion Univ.	Norfolk	VA	23529
Anderson	Lee	College of Marine Studies	University of Delaware	Newark	DE	19716
Anderson	Tom	705 Tall Oaks Dr		Brick	NJ	08724
Andrae	John	PO Box 358		Port Republic	NJ	08241
Ardolino	Fred	2345 Knapp St.		Brooklyn	NY	11229
Armani	Jerry	393 Stanhope St.		Brooklyn	NY	11237
Asbury Park Press		703 Mill Creek Rd		Manahawkin	NJ	08050
Asbury Park Press		John Geiser, Out. Writer	Box 1550	Neptune	NJ	07754
Ascoli	Capt. Fred	3 Rabbit Run		Cape May	NJ	08204
Atl.Fish.Mgt.Coun	South	Southpark Bldg.,Suite 306	1 Southpark Circle	Charleston	SC	29407
Auld	Don	MD Sportfish Advisory Com	11501 Crows Nest Road	Clarksville	MD	21019
Auletta	Thomas	43 Idolstone Ln		Matawan	NJ	07747
Axelsson	Harry	738 Shunpike Road		Cape May	NJ	08204
Axelsson	Lars	705 Hughes Ave		N. Cape May	NJ	08204
Aza de Martinez	Carmen	Int. Trading & Shipping	1382 Thrid Ave #365	New York	NY	10021
Bacek	Tracy	PO Box 202		Barnegat Light	NJ	08006
Bader	D.	1442 East 13th St		Brooklyn	NY	11230
Bain III	Claude M	Suite 102 Hauser Bldg.	968 Oriole Dr. South	Virginia Beach	VA	23451
Baird	Charles	RD 2 Box 321		Milton	DE	19968
Baker, Town Mngr.	Stewart	Town Office	4026 Main St.	Chincoteague	VA	23336
Balcom	Nancy	Sea Grant Marine Adv. Prg	1084 Shennecossett Rd	Groton	CT	06340-6097
Bandes	Bruce	Bandes & Byrnes	Main Street	Oakdale	NY	11769
Bannick	Bruce	7 Galley Street		Jamestown	RI	02835
Barnes	John	Ampro Fisheries Company	PO Box 319	Reedville	VA	22539
Barr	Capt. E.W.	PO Box 866		Urbanna	VA	23175
Basmajian	Don	228 St. John Ave.		Erma	NJ	08204
Bates	Robert G.	Seafood Industrial Park	34 Jefferson Ave.	Newport News	VA	23607

Last Name	First Name	Address 1	Address 2	City	State	Zip
Beal	Kenneth	NOAA Fisheries - F/NER5	One Blackburn Drive	Gloucester	MA	01930
Beckwith, Jr.	Ernest E.	Dept of Env. Protection	State Office Bldg, Rm 255	Hartford	CT	06115
Behlmen	Wade	59 Audreys Lane		Marstons Mills	MA	02648
Beideman	Terri L.	PO Box 579		Barnegat Light	NJ	08006
Beideman	Nelson R	10th St. & Bay Ave.		Barnegat Light	NJ	08006
Bennett	Al	Bridgeport Post	341 Fairland Dr.	Fairfield	CT	06430
Bennett	Scott	Box AX		Amagansett	NY	11930
Berens	Raymond	Philadelphia Press	One East Penn Sq., Ste813	Philadelphia	PA	19107-2708
Berg	Erling	1235 Lafayette		Cape May	NJ	08204
Bergmann	Charlie	969 Shirley Ave.		Cape May	NJ	08204
Bermudez	Linda	1415 East 16th Street		Brooklyn	NY	11230
Bezanson	Scott	152 Indian Trail		Wakefield	RI	02879
Birke	R.	216 E. Shore Drive		Massapequa	NY	11758
Blakeslee	Jerry	117 Morris Ave.		Milton	DE	19968
Blount	Willis	F/V Ruthie B	56 Vesper Lane	Nantucket	MA	02554
Bochenek, PhD	Eleanor	Sea Grant Marine Adv Serv	1623 Whitesville Rd	Toms River	NJ	08755
Bogan	Howard	7 Kings Path		Brielle	NJ	08730
Bogan	Raymond	605 Beacon Blvd.		Sea Girt	NJ	08750
Borden	David	Div. of Fish & Wildlife	Government Center	Wakefield	RI	02879
Bovykin	Yu.	Fisheries Attache	1609 Decatur St., NW	Washington	DC	20011
Boyce	Leo	108 Moriches Ave		Mastic	NY	11950
Boyd	David M	Commonwealth of VA	PO Box 756	Newport News	VA	23607
Boyle	Paul	Deputy Director	Aquarium for Wildlife Con	Brooklyn	NY	11224
Bozek	Robert	Atl Pro Boatmans Assn.	154 Hendrickson Ave.	Rockville Centre	NY	11570
Brame	Dick	ACCA	1994 Eastwood Road	Wilmington	NC	28403
Bramhall	David	106 Chicago Blvd.		Sea Girt	NJ	08750
Brancaleone	Joseph	4 Flume Rd		Magnolia	MA	01930
Branin	Joseph	172 Linden Ave	P.O. Box 53	Highlands	NJ	07732
Branstetter	Steve	1957 Arvis Circle		Clearwater	FL	34624
Branstetter, Ph.D	Steve	2816 Eagle Run Circle		Clearwater	FL	34620
Braun	Erik	National Marine Fish Serv	62 Newtown Ln, Room 203	E.Hampton	NY	11937
Breitweiser	Charles	677 Snow Drop Ct.		Morgansville	NJ	07751
Brennan	William	Dept of Marine Resources	State House Station 21	Augusta	ME	04333-0021
Bright	William	615 Goshen Rd.		Cape May Crthse	NJ	08210-1501
Brindley	Jim	PO Box 52		West Creek	NJ	08092
Brodziak	Dr. John	NMFS/NEFC	166 Water Street	Woods Hole	MA	02543
Brooks	Priscilla	Cons. Law Foundation	62 Summer St.	Boston	MA	02110-1008
Brown	Jed	MSRC SUNY Stony Brook		Stony Brook	NY	11794-5000
Brown, Director	Dr. Brad	Southeast Fisheries Cntr.	75 Virginia Beach Dr	Miami	FL	33141
Brunishotz	Robert	PO Box 441		Califon	NJ	07830
Bryant	LtCMDR Ross	US Coast Guard 5th Dist.	431 Crawford St.	Portsmouth	VA	23704-5004
Bryson	John	40 McBry Dr.		Dover	DE	19901
Buck	Eugene	Cong. Resrch Service-ENR	Library of Congress	Washington	DC	20540-7450

Last Name	First Name	Address 1	Address 2	City	State	Zip
Buckmaster	Linda	National Fisherman	PO Box 908	Rockland	ME	04841
Bullard	Buddy	805 West Fifth St.		Hampton	SC	29924
Bunting	David	307 Dorchester St.		Ocean City	MD	21842
Burger	John	PO Box 428		Dover	DE	19901
Burgess	Robert D.	Snow's Doxsee Inc.	994 Ocean Drive	Cape May	NJ	08204
Burkland	Richard	Montauk Fish Dock	PO Box 2048	Montauk	NY	11954
Burnett-Kurie	Karen	IPSSR, UNH	Hood House, 89 Main St	Durham	NH	03824-3577
Burnley	Eric	2408 Hayloff Lane		Virginia Beach	VA	23456
Butowski	Nancy	MD DNR	Tawes State Ofc. Bldg C2	Annapolis	MD	21401
Calos, PAF	Angela	Public Affairs Officer	1335 East-West Highway	Silver Spring	MD	20910
Cangialosi	Carl	28 Lawrence Ave		Holbrook	NY	11741
Cantwell	Maria	1520 Longworth HOB	ATTN: Amy Robins	Washington	DC	20515
Cape Fisheries	Atlantic	P.O. Box 555		Cape May	NJ	08204
Caputi	Gary	118 Harding Drive		Bricktown	NJ	08724
Carlson	Sten	Box 445		Wellfleet	MA	02667
Carmines	George S	103 Rens Road		Poquoson	VA	23662-1611
Carpenter	Steve	Burlington Co. Times	Route 130	Willingboro	NJ	08046
Carr	Sam	50 Broadview Drive		Tiverton	RI	02878
Carrington	Floyd	20 Ocean Ave.	PO Box 3016	East Quogue	NY	11942
Carroll	Bill	Seafood Processing Co, RI	55 State Street	Narragansett	RI	02882
Carvalho	Tony	8 East Lake Side Ave		N. Dartmouth	MA	02747
Casey	Jack	120 Knowles Way Ext	Suite 101	Narragansett	RI	02882
Cassell	Jodi	World Wildlife Fund	1250 24th Street, NW	Washington	DC	20037
Castoro	Nicholas	Cerullo Brothers Fishing	Bay Avenue	East Moriches	NY	11940
Castro	Kathy	URI Fisheries Center	East Farm	Kingston	RI	02881
Cerbone	Dominick	168 Fordham St		City Island	NY	10464
Champlin	Timothy	61 South Ferry Rd		Saund	RI	02874
Chandler	LeeAnne	300D Robinson Hall	University of Delaware	Newark	DE	19716
Chiles	David	128 East North st		Bethlehem	PA	18018
Chincoteague		Chamber of Commerce	MADDOX Blvd	Chincoteague	VA	23336
Clairmont	Robert	U.S. Small Business Adm.	409 3rd St., Suite 7800	Washington	DC	20416-3110
Clam Co.	Eastern	Sam Barrington	255 MacArthur Drive	New Bedford	MA	02740
Coastal Law Cntr.	Ocean &	School of Law-Librarian	Univ. of Oregon	Eugene	OR	97403-1221
Coates	Philip	Div. of Marine Fisheries	100 Cambridge St.	Boston	MA	02202
Coble	Howard	403 Cannon Building	ATTN: Ed Lee	Washington	DC	20515
Coble	Capt. Larry	1231 Cherry Hill Rd		Mocksville	NC	27028
Cocoros	Raymond	2127 35th St.		Long Isl. City	NY	11105-2101
Coffman	Danny G	RT #1 Box 2	Chapel View	Lewes	DE	19958
Cohen	Daniel	PO Box 555		Cape May	NJ	08204
Cohen	Max	21 Locust Lane		Cape May Crthse	NJ	08210
Colabella	Joe	602 Green Ave.		Bielle	NJ	08730
Cole	John	Fishermen's Co-op Dock	P.O. Box 1314	Pt.Pleasnt Bch	NJ	08742
Cole	Richard	Dept Nat'l Res.&Env.Cont.	PO Box 1401	Dover	DE	19903

Last Name	First Name	Address 1	Address 2	City	State	Zip
Cole	Willard	US Fish & Wildlife	PO Box 972	Morehead City	NC	28557
Collins & Sons	Jack	37 Hawley Ave		West Islip	NY	11795
Colvin	Gordon	Dept. of Env. Cons.	SUNY Bldg. #40	Stony Brook	NY	11790
Connelly	John	25 Jacksonville Rd		Towaco	NJ	07082
Conner	Charles	MA Div. of Marine Fish.	790 Fisher Rd.	N. Dartmouth	MA	02749
Connolly	Jerry	PO Box 1932		Gloucester	MA	01930
Conover	Dr. David	Marine Science Res. Cntr.	State Univ. of NY	Stony Brook	NY	11790-5000
Conti	Carmen	216 43rd St.		Sea Isle City	NJ	08243
Cookingham	Russell	P.O. Box 1037		Monument Beach	MA	02553
Cooney	John T.	Admiral Abatement Inc	60 Gansevoort St	New York	NY	10014
Cooper	Robert	9 Osprey Nest Rd.	P.O. Box 131	Greenport	NY	11944
Coppa	Michael	600 Millman Blvd.		Del Haven	NJ	08251
Cordes	Albert	1036 Idaho Ave		Cape May	NJ	08204
Corey	Roger	Agri.;Div.	US Int'l Trade Comm.	Washington	DC	20436
Corp of Engineers	US Army	Reg. Branch, Norfolk Dist	803 Front St	Norfolk	VA	23510-1096
Corps of Engineer	US Army	Wanamaker Building	100 Penn Square East	Philadelphia	PA	19107-3390
Creed	Carolyn	220 Burlington Court		Flemington	NJ	08822
Crossman	Ken	USDC/NOAA Enforcement	1 Blackburn Drive, Rm.206	Gloucester	MA	01930
Crowell	Peter F.	P.O. Box 362		Scituate	MA	02066
Csulak	Frank	NMFS, Sandy Hook Lab	74 McGruder Rd.	Highlands	NJ	07732
D'Amico	Mike	PO Box 160		Nassau	DE	19969
D'Anna	S.A.	9 Nightingale Way		Lutherville	MD	21095
D.B.W.A.		28 S Market St.	PO Box 527	Port Norris	NJ	08349-0527
Daily Press		Skip Miller	7505 Warwick Blvd.	Newport News	VA	23607
Daniels	Joey	PO Box 369		Wanchese	NC	27981
Davis	Tom	2 Avon Ct		Dix Hills	NY	11746
Dawson	James	3008 Haucks Mill Rd		Monkton	MD	21111
DeMaula, Jr.	Anthony	22600 Main Rd		Cutchogue	NY	11935-1265
DeVito	Larry	Caleb & Haley	#14 Futon Fish Market	New York	NY	10038
Deem	Jeff	Po Box 6274		Springfield	VA	22150
Degener	Richard	The Press & Sunday Press	1 South Main Street	Cape May Crthse	NJ	08210
Delanoy	Neil	90 Cedar Point Dr.		West Islip	NY	11795
Denney	John P.	5 Blackhawk Rd.		Billerica	MA	01821
Desfosse	Joseph	VA Inst. of Marine Scienc	PO Box 1346	Gloucester Pt.	VA	23062
Devnew	Jack	Flagship Group Ltd	PO Box 3670	Norfolk	VA	23514
Di Vincenzo	Mark	Daily Press, Inc.	PO Box 746	Newport News	VA	23607
DiCosimo	Jane	North Pacific Fish Coucil	PO Box 103136	Anchorage	AK	99510
DiDanielle	Danny	P.O. Box 787		Montauk	NY	11954
DiLernia, Prof.	Anthony	Ofce of Marine Education	Kingsborough College	Manhattan Bch	NY	11235
Dickel	Barry	Bahia Marina, Inc.	2107 Herring Way	Ocean City	MD	21842
Dickerson	Gary	446 Crestview Terrace		Brick	NJ	0872
Dickson	Gary	4 Bergen Ave		Hampton Bays	NY	11946
Dodson	Donald K	National Westminster Bank	1 N. Main Street	Cape May Crthse	NJ	08210

Last Name	First Name	Address 1	Address 2	City	State	Zip
Doernte	Harry	5 Saunders Dr		Poquoson	VA	23662
Dominion Lobster	Old	c/o Carl Meixner	3166 S. Main Street	Chincoteague	VA	23336
Dorman	Robert	Rt. 3, Box 258		Lewes	DE	19958
Dorsey	Ellie	Conservation Law Found.	62 Summer St.	Boston	MA	02110
Doss	Ken M.	211 Choctaw Rd.		Brunswick	GA	31525-9265
Douglas	Jim	Marine Resource Comm	PO Box 756	Newport News	VA	23607
Doxsee, Jr.	Robert L	Doxsee Sea Clam Co.	50 Bayside Dr.	Point Lookout	NY	11569
Drew	Steve	Fisheries Observer Prog.	Manomet Bird Ob. Box 1770	Manomet	MA	02345
Drewer, Jr.	Vernon			Saxis	VA	23427
Drury	Lt. C.L.	New York State DEC	Region 2-Law Enf. Box 251	E.Nassau	NY	12062
DuPaul	William	Dept. of Advisory Serv.	VIMS	Gloucester Pt.	VA	23062
Duke	Emmett	521 Washington Ave		Chestertown	MD	21620
Dulemba	John	Seafood Network Inc.	94 Heritage Lane	Chatham	MA	02633
Dunlop	Bob	59 Lincoln Rd		Montauk	NY	11954-5007
Dunnigan	Jack	ASMFC	1776 Mass. Ave, NW, #600	Washington	DC	20036
Durkas	Susan	131 East Prospect Ave.		Woodbridge	NJ	07095
Dyer	Larry	PO Box 2407		Amagansett	NY	11930
Dykstra	Jacob	1001 Nicholwood Dr.	Apt. 205	Raleigh	NC	27605-3220
Eakes	Bob	PO Box 98		Buxton	NC	27920
East Hampton Star		153 Main St		East Hampton	NY	11937
Eastlake	Gordon	P.O. Box 197		Wachapreague	VA	23480
Eckhardt	Dr. Ronald	Brooklyn College	2900 Bedford Ave	Brooklyn	NY	11210
Egerter	Bill	1107 St. Louis Ave.		Pt. Pleasant	NJ	08742
Egerter	William	208 Harvard Ave		Pt.Pleasant Bch	NJ	08742
Eldredge	Ernest	Chatham Fisheries	PO Box 1407	West Chatham	MA	02669
Ellen W. Corp.		Eastern Shore Seafood Pr.	P.O. Box 38	Mappsville	VA	23407
Ellenton	Dave	World Wide Trading	26 Locust St., Suite 2	Danvers	MA	01923
Ellis	Steven	National Marine Fish Serv	PO Box 436	Hampton	VA	23669
England	Marilyn	Scully Science Center	306 South Bay Ave	Islip	NY	11751
Enners	Peter	19 Long Lane		Hampton Bays	NY	11946
Epstein	Jan	204 Lee's Lane		Mays Landing	NJ	08330
Escher	Diane	Envit. Review Coordinator	841 Chestnut St	Philadelphia	PA	19107
Ethridge	Capt. Rex	PO Box 91		Wanchese	NC	27981
Eutsler	Jeffrey	PO Box 51		Ocean City	MD	21842
Evans	Amos F	Old Inlet Bait and Tackle	P.O. Box 129	Rehoboth	DE	19971
Ewing	R.C.	Baader North America	PO Box 9504	Ft. Meyers	FL	33906
Fagin	Dan	Newsday, Environ. Writer	235 Pinelawn Rd.	Melville	NY	11747
Falk	James M.	College of Marine Studies	Univ. of Delaware	Lewes	DE	19958
Fant	Stephen	40 Walsh Ave.		Auburn	MA	01501
Farley	Sen. Hugh T	NY State Senate	412 Leg. Off. Bldg.	Albany	NY	12247
Farnham	Paul	Montauk Fish Dock	PO Box 2048	Montauk	NY	11954
Farnham	Dan	Box 2242		Montauk	NY	11954
Fee	Russ	66 Douglas Street	Sugarmill Woods	Homosassa	FL	34446

Last Name	First Name	Address 1	Address 2	City	State	Zip
Feinberg	William	Feinberg Dee, & Feinberg	554 Broadway	Bayonne	NJ	07002
Feller	Fred	417 Croatan Hills Rd.		Virginia Beach	VA	23451-3684
Ferrera	Jack	356 Arthur St.		Freeport	NY	11520
Fields	Jack	Merchant Marine & Fisher.	2228 Rayburn HOB	Washington	DC	20515
Figurski	Robert	The Trust Company of NJ	35 Journal Square	Jersey City	NJ	07306
Finke	Joe	29 July Ave.		Bayville	NY	11709
Fish & Game Assn	NASSAU Co.	P.O. Box 245		Rockville Centre	NY	11570
Fish Mgmt. Co.	Pacific	Metro Center, Suite 420	2000 SW First Ave.	Portland	OR	97201
Fish Mgmt. Co.	W. Pac.	1164 Bishop ST.	Room 1405	Honolulu	HI	96813
Fish. Mgmt. Co.	N.Pacif.	PO Box 103136		Anchorage	AK	99510
Fish. Mgt. Co.	Carib.	268 Ave Munoz Rivera 1108		San Juan	PR	00918
Fish. Mgt. Co.	Gulf	5401 W. Kennedy Blvd.		Tampa	FL	33607
Fisher	Wayne	11940 Old Buckingham Rd		Midlothian	VA	23113
Fisheries Coord.	Virginia	US Fish & Wildlife	P.O. Box 480	White Marsh	VA	23183
Fisheries Instit.	National	1525 Wilson Boulevard	Suite 500	Arlington	VA	22209
Fisherman's Dock		Coop	P.O. Box 1314	Pt. Pleasant Bch	NJ	08742
Fishery Mngmt Cou	New Engl	Suntaug Office Park	5 Broadway (Route 1)	Saugus	MA	01906
Fitzpatrick	James	Cape May Star and Wave	513 Washington Mall	Cape May	NJ	08204
Flannigan	Pat	P.O. Box 32	Mid-Atl. Fisheries Inc.	Swarthmore	PA	19081
Fletcher	James	123 Apple Road		Mans Harbor	NC	27953-9617
Flimlin, Jr.	Gef E.	Ocean Co. Ext. Serv.	Rt. 527 Agr. Cntr.	Toms River	NJ	08753
Fordham	Sonja	Center for Marine Conserv	1725 DeSales St NW Su 500	Washington	DC	20036
Foster	Bill	PO Box 212		Hatteras	NC	27943
Foster	William	PO Box 212		Hatteras	NC	27943
Foster, III	John W S	Tidewater Adm	Tawes State Off Bldg.	Annapolis	MD	21401
Fote	Thomas P	22 Cruiser Ct.		Toms River	NJ	08753
Francis	Woody	Baltimore Army Corps	10 S. Howard St., 8th Fl	Baltimore	MD	21201
Frangipane	Philip	78 Lawrence Ave		Brooklyn	NY	11230
Fredericksen	Pete	34 Stockton Lake Blvd		Manasquan	NJ	08736
Fricke, F/CM1	Peter	NMFS	1335 East-West Highway	Silver Spring	MD	20910
Fulcher	Mitchell	11 Delavan St		East Hampton	NY	11937
Fullilove	James	National Fisherman	PO Box 908	Rockland	ME	04841-0908
G-OLE-2, Fish Enf	Comandant	U.S. Coast Guard HQ	2100 2nd St., SW	Washington	DC	20593-0001
Gabriel	Wendy	NMFS/NEFC	166 Water Street	Woods Hole	MA	02543
Gallagher	William	508 Carroll Fox Rd		Brick	NJ	08724
Gallimore	Richard	P.O. Box 350		Beach Haven	NJ	08008
Gallo	Richard	23 The Keel		East Islip	NY	11730
Gant	Randy	10 Artic Ocean Drive		Brick	NJ	08723
Garnache	Charles	PO Box 353		Biddleford	ME	04006
Garrell	Martin	Dept of Physics, Box 701	Adelphi Univ. Garden City	Long Island	NY	11530
Garvey	Chris	15 Trail Road		Hampton Bays	NY	11946
Garvilla	Joseph	PO Box 53		Powellville	MD	21852
Gavin	Arthur J	1022 Crew Lane		Manahawkin	NJ	08050

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Gaw	Edward	Merritt	PO Box 5225	Lighthouse Pt	FL	33064
Gehan	Shaun	Seafares Int.	5201 Auth Way	Camp Springs	MD	20746
Geiser	John	1863 Barbee Lane		Wall	NJ	07719
Geld	Gene	793 Pinewood Drive		Elkins	PA	19027
Getz	Tim	1508 Stage Coach Rd		Seavill	NJ	
Ghigliotty	David J.	804 Bayview Ave.		Barnegat Light	NJ	08006
Giaramita, Jr.	Joseph	28 Bay 41 St #1		Brooklyn	NY	11214
Gibson	Barry	4 Puritan Road		Beverly	MA	01915
Gifford Marine		18 N. Franklin Blvd.		Pleasantville	NJ	08232
Gilford	Dr.James	7003 Glen Court		Frederick	MD	21701
Gillelan	M.Elizabeth	NOAA Chesapeake Bay Ofc.	410 Severn Ave , Ste 107A	Annapolis	MD	21403
Gillen	Patrick	25 Ryder Ave		Dix Hills	NY	11746
Gilzinger	Robert H.	The Gorton Group	128 Rogers Street	Gloucester	MA	01930
Giunta	Dennis	3 Browning Drive		Greenlawn	NY	11740
Glas	George	Nat'l Party Boat Owners	All. 181 Thames St.	Groton	CT	06340
Glickberg	Howard	2127 Broadway		New York	NY	10023
Gloege	Wayne	151 Ocean. Tch. Bldg.	Univ. of Washington	Seattle	WA	98195
Glowka	Arthur	60 Round Hill Drive		Stanford	CT	06903
Gocial	Morris	Certified Public Accnt's	Fox Pavilion-Suite 529	Jenkintown	PA	19046
Goell	Nancy K.	P.O. Box 1493		East Hampton	NY	11937
Goetze	Albert	5830 Hopkins Neck Rd		Easton	MD	21601
Golden, Jr.	Robert	Ebasco Environmental	160 Chubb Avenue	Lyndhurst	NJ	07071
Goldfinger	Bud	PO Box 2284		E. Hampton	NY	11937
Goldsborough	Bill	Ches. Bay Foundation	162 Prince George St.	Annapolis	MD	21401
Good	Keith	New York Post	210 S. St.	New York	NY	10002
Goodale	Hannah	Fisheries Mgt., NMFS/NOAA	One Blackburn Drive	Gloucester	MA	01930-2298
Goodger	Tim	NMFS Oxford Lab.	Railroad Ave.	Oxford	MD	21654
Gordon	Cindy	Issues Management	105 Campus Drive	Princeton	NJ	08540
Gordon	Wally	Mid-Atlantic Foods	PO Box 367	Pocomoke City	MD	21851
Gordon	William	Sandy Hook Field Station	Bldg. #22	Fort Hancock	NJ	07732
Goyeneche	Fernando	712W 175 St. Apt 2C		New York	NY	10033
Grabowski	Stephen	NMFS Northwest Fish. Cnt	2725 Montlake Blvd.E.	Seattle	WA	98112
Graham	Bruce	256 Louvick St		Norfolk	VA	23503
Greenling	William	10 Crane Fly Circle		Cape May	NJ	08204
Greenling	Bill	10 Crane Fly Circle		Cape May	NJ	08204
Greenly	David	RD 2 Box 447		Lincoln	DE	19960
Grice	Frank	84 Ring Rd		Plympton	MA	02367
Grimes	Churchil	NMFS SE Fish. Ctr.	3500 Delwood Beach Rd.	Panama City	FL	32407
Griswold	Whit	Salt Water Sportsman	77 Franlin St.	Boston	MA	02110
Grosse	Daniel	10480 Little Pawtuxet	Duite 725	Columbia	MD	21044
Guinn	Sonny	10448 Azeala Rd		Berlin	MD	21811
Haas	John	PO Box 270		Seaside Park	NJ	08752
Habron	Geoffrey	907 Washington Blvd	2nd Floor	Oak Park	IL	60302

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Haines	Marty	1450 Church St.		Rahway	NJ	07065
Halavik	Tom	US Fish & Wildlife Serv.	P.O. Box 307	Charlestown	RI	02813
Halbrunner	Wayne	713 Shunpike Rd		Cape May	NJ	08204
Hallock	Lance	P.O. Box 358		Stonington	ME	04681
Halperin	Laurie	Center for Marine Cons.	306A Buckroe Ave	Hampton	VA	23664
Hamburg	Dan	114 Cannon HOB	ATTN: Kate Anderton	Washington	DC	20515
Hamer	Paul	611 Chelsa Road		Absecon	NJ	08201
Hamilton, Jr.	Robert	527 Main St.		Greenport	NY	11944
Hanna	Susan	Dept. Resource Economics	Oregon State Univ.	Corvallis	OR	97331-3601
Hanrahan	Brian	269 Howard Ave		Rochelle Park	NJ	07662
Harrell	Samuel	RR 2 Box 215-K		Georgetown	DE	19947
Harrell	Lucielle	PO Box 329		Edenton	NC	27932
Harrington	Kerry	PO Box 224		Berlin	MD	21811
Harris	Jim	338 Lakeview Lane		Cape May	NJ	08204
Hasbrouck	Emerson	Suffolk Coop Marine Prog	39 South Avenue	Riverhead	NY	11901
Hastings	Jay	1111 3rd Ave. Bldg.	Suite 3305	Seattle	WA	98101
Haven Fish Co.Inc	New	34 Saginaw Trail		Guilford	CT	06437
Havens, Jr.	William	PO Box 1992		East Hampton	NY	11937
Hawkins	Jeff	Div. of Marine Fisheries	PO Box 1507	Washington	NC	27889
Hayes	Wayne	37 Anthony Dr		Hyannis	MA	02601
Haynie	Allen W.	Zapata-Haynie Corp.	P.O. Box 175	Reedville	VA	22539
Helm	Ray	18203 Hermitage Rd		Onancock	VA	23417
Henry	James	PO Box 37		Hampton Bays	NY	11946
Hickman	David	940 Shirley Avenue		Cape May	NJ	08204
Higgins	Besty	Envit. Rev. Coordinator	Rm 2203, JFK Federal Bldg	Boston	MA	02203
Hill	Tom	Atl.& Pacific Marine Cons	27 Ferry Street	Gloucester	MA	01930
Hillhouse	Roger	1222 80th St. South		St. Petersburg	FL	33707
Hinman	Ken	Nat's Coal. Marine Cons.	3 West Market Street	Leesburg	VA	22075
Hoffman	Larry	PA Fish&Boat Comm	PO Box 67000	Harrisburg	PA	17106
Hogan, Jr.	Philip	1299 Globe Ave.		New York	NY	11003
Hogarth	Wm. P.	NOAA/NMFS/F CM3	1315 East West Highway	Silver Spring	MD	20910
Hoheland	Porter	Marine Policy Center	WHOI	Woods Hole	MA	02543-1138
Holder	Mark	8021 Ocean Pines		Berlin	MD	21811
Holliday F/SR1	Dr. Mark	Resource Stat. Div. NMFS	1335 East-West Highway	Silver Spring	MD	20910
Hopkins	Terry	554 Blackstrap Rd.		Falmouth	ME	04105
Hopkins	D.Douglas	EDF	257 Park Ave South	New York	NY	10010
Houde	Edward D	Ches. Bio. Lab Univ of MD	P.O. Box 38	Solomons	MD	20688
Houston	Len	Army Corp of Eng, Env. Br	26 Federal Plaza	New York	NY	10278-0090
Howey	Ronald	US Fish & Wildlife Serv.	300 Westgate Center Dr	Hadley	MA	01035-8613
Huba	Greg	30 Eagle Nest Terrace		S.Kingston	RI	02879
Hughes	William	241 Cannon HOB	ATTN: Ashley Evans	Washington	DC	20515
Humphreys, Jr.	H.R.			Weems	VA	22576
Hutchins	Eric	702 South Rd		Wakefield	RI	02879

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Hutchinson	Robert	The Virginian Pilot	150 W. Brambleton Ave.	Norfolk	VA	23510
Hutto	Earl	2435 Rayburn HOB	ATTN: Delisa Harmon	Washington	DC	20515
Isaacson	Dean	800 B 13th St		Virginia Beach	VA	23451
Island Fisherman	Long	14 Ramsey Rd		Shirley	NY	11967
Island Sportsman	Long	Mr. Bill Shaber	Box 242	Patchogue	NY	11722
Jacangelo	Dominic	Senator Owen Johnson	23-24 Argyle Square	Babylon	NY	11702
Jackson	Patricia	Lower James River Assoc.	PO Box 110	Richmond	VA	23201
Jackson	Robert	6074 Worcester Hwy		Snow Hill	MD	21863
Jacobs	John	410 Severn Ave	Suite 107A	Annapolis	MD	21403
Jasuta	Jim	108 N. Grenich St.		Montauk	NY	11954
Jensen	Arne	512 Shun Pike Rd.		Cape May	NJ	08204
Jensen	W. Peter	Tawes State Office Bldg.	580 Taylor Ave.	Annapolis	MD	21401
Johnson	Charles	194 Connetquot Dr.		Oakdale	NY	11769
Johnson	Tom	Greenpeace	1436 U Street	Washington	DC	20009
Johnson	Gail	RFD #1, Box 321		South Harpswell	ME	04079
Johnston	W. Scott	3544 Falstone Rd		Richmond	VA	23234
Jones	Susan	Commercial Fisheries News	PO Box 37	Stonington	ME	04681
Jones	Andrew	PO Box 2088		Montauk	NY	11954
Jones	Dr. Cynthia	Old Dominion University	AMRL	Norfolk	VA	23529
Julian	Joseph P	Julian's Bait Shop	PO Box 302	Atl. Highlands	NJ	07716
Kaiser	Dana	499 Main St		Metuchen	NJ	08840
Kamienski	Don	10 McCay Drive		Roebling	NJ	08554
Kaminsky	James	75 Woodcliff Dr.		Mattituck	NY	11952
Kanopka	John	3622 Princeton Dr. N.		Wantagh	NY	11793
Kanyuk	Dennis	593 Maude St		S. Hempstead	NY	11550
Kaplan	Eugene	148 Waterview St		Northport	NY	11768
Karanozinski	Andrew	7713 Central Ave		Sea Isle City	NJ	08243
Kavanagh	Pat	39 Burnham Dr		Falmouth	MA	02540
Kearney, Jr.	Steve	79 Laurel Dr.		Massapequa Park	NY	11762
Keene	Harry M.	28256 Widgeon Terrace		Easton	MD	21601
Kelleher	John	14 Brookridge Rd		Cape May Crthse	NJ	08210
Kennedy	John	135 Cedar Island Rd		Narragansett	RI	02882
Kennerly, Jr.	Harold B	1115 Woodland Rd.		Salisbury	MD	21801
Kenney	Heidi	Warwick Cove Marine	2 Seminole	Warwick	RI	02886
Kensler	Mike	Chesapeake Bay Found.	100 W. Plume Ctr, #701	Norfolk	VA	23510
Keros	Caranean	5622 Ravens Crest Dr		Plainsboro	NJ	08536
Kessinger	R.	926 Hayes St		Boldwin	NY	11510
Kieser	Fred	209 Bellevue Rd		Oakdale	NY	11769
Kim Bay Co., Inc		P.O. Box 51		Ocean City	MD	21842
King	Jim	220 East Mill Rd.		Mattituck	NY	11952
Kingston	Jack	1229 Longworth HOB	ATTN: Triece Ziblut	Washington	DC	20515
Kircher	Peggy	LGL Alaska Rsrch Assoc	4175 Tudor Centre Dr, 101	Anchorage	AK	99508
Kirkeberg	Elrik	Tacony Rd.		Wildwood	NJ	08260

Last Name	First Name	Address 1	Address 2	City	State	Zip
Kislowski	Sigmund	2607 Felter Lane		Bowie	MD	20715
Kissell	Kenneth	103 Cartagena Dr		Brick	NJ	08723
Klinefelter	G.R.	21 West Main St.		Ephrata	PA	17522
Knisell	Ralph	100 W. Mantua Avenue		Wenonah	NJ	08090
Koehn	John	104 Campus Dr.		Princeton	NJ	08540
Kopel	Ty	Borden, Inc.	180 E. Broad St, 23rd Fl	Columbus	OH	43215
Kornahrens	Richard	14 Holly Tree Lane		East Islip	NY	11730
Koury	Peter	18 North Main St.	P.O. Box 778	Cape May Crthse	NJ	08210
Kozak	Linda	Access Unlimited, Inc	326 Center Ave, Suite 202	Kodiak	AK	99615
Kozofsky	Eric	31 Washington Heights		Hampton Bays	NY	11946
Krusa	David	Rt 2	Box 234	Montauk	NY	11954
Kuhnle	Alfred	117-26 228th Street		Cambria Heights	NY	11411
Kunz	Nancy	Dept of State CZMP	162 Washington Ave	Albany	NY	12231
Kurkul	Pat	NOAA Fisheries - F/NER72	One Blackburn Drive	Gloucester	MA	01930
LaMonica	Peter A.	Cape May Canners, Inc.	PO Box 158, Indian Trl.	Cape May	NJ	08204
LaRosa	Leo	19 Arcadia Ave.		Reading	MA	01867
Laaksonen	Will	VA Charterboat Assoc.	RT 2, Box 3D	Onancock	VA	23417
Lagace	Louis	3567 Main Rd.		Tiverton	RI	02878
Lambie	James T.	6 Ripley Lane		South Belmar	NJ	07719
Lancaster	H. Martin	2436 Rayburn HOB	ATTN: Skip Smith	Washington	DC	20515
Landau	Marc	696 Allwyn St.		Baldwin	NY	11510
Langreney	Fabrice	NACLS	9200 Basil Crt Suite 306	Landover	MD	20785
Lantz	Bryan	Cape Cod Times	#19 Cove Rd	New Orleans	MA	02653
Larson	Kirk	East 13th Street		Barnegat Light	NJ	08006
Laske	Ed	20 Iroquois Place		Massapequa	NY	11758
Lasprogata	Joe	2413 Whitby Rd		Havertown	PA	19803
Latannio, Jr.	John	50 Palmer Ave.		Staten Island	NY	10302
Lauderman	Keith	Cold Spring Fish & Sup.Co		Cape May	NJ	08204
Lauderman	Wally	Cold Spring Fish	& Supply Co.	Cape May	NJ	08204
Law Enforcement	NMFS	PO Box 4304		Salisbury	MD	21803-4304
Law Enforcement	NMFS	PO Box 277		Newport News	VA	23607
Law Enforcement	NMFS	PO Box 1869		Elizabeth City	NC	27906-1869
Lawrence	Geoffrey	Community Media, Inc.	25 W. Central Ave., Box93	Pearl River	NY	10965
Lazar	Naji	Coastal Fisheries Lab	1231 2nd Succotash	Wakefield	RI	02879
LeCates	John	222 Ann Ave.		Rehoboth Beach	DE	19971
LeCates	Harry L	222 Ann Ave		Rehoboth Bch	DE	19971
Legislative Comm.	NY State	on Water Resoure Needs-LI	11 Middleneck Rd. Sui.213	Great Neck	NY	11021
Leo	Arnold	E. Hampton Town Baymen' s	130 Gerard St.	E.Hampton	NY	11937
Leonard	Donald	PO Box 378		Chincoteague	VA	23336
Leonard	Thomas	Cape May County Library	30 West Mechanic St.	Cape May Crthse	NJ	08210
Lerman	Matthew	454 Beach 143rd St		Neponsit	NY	11694
Levin	Fred	Levin Marine Supply	PO Box 44	Fairhaven	MA	02719
Library		Rosenstiel School	4600 Rickenbacker Causewy	Miami	FL	33149

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Library	NMFS	Panama City Lab	3500 Delwood Beach Rd	Panama City	FL	32408
Library	Regional	Dept of Fish. & Oceans	Box 5667, St. Johns, Nfld	Canada A1C 5X1		
Licate	Jeff	Top Catch Seafood	87 Sackett	Brooklyn	NY	11231
Lick	Bob	831 State Rd		West Grove	PA	19390
Lighthouse Marina		P.O. Box 705		Barnegat Lt	NJ	08006
Lind	William	1974 East 37th St		Brooklyn	NY	11234
Lipcius	Dr. Rom	VIMS College of Wm & Mary	School of Marine Science	Gloucester Point	VA	23062
Livernois	Raymond	277 Yawgoo Valley Rd		Exeter	RI	02822
Livingston	Dick	NOAA/NMFS Law Enforcement	617 Hwy 71 Bldg 2	Brielle	NJ	08730
Livingston	Laura	Envit. Review Coordinator	26 Federal Plaza	New York	NY	10278
LoPerfido	Tony	911 83rd Street		Brooklyn	NY	11228
LoVerde	Eugene A	NMFS, Statistics	PO Box 143	Toms River	NJ	08753
Locandro	Dr.Roger	26 Grafton Rd	Frog Hollow Hog Farm	Stockton	NJ	08559
Loe	Roy	PO Box 76		Gwynn	VA	23066
Lofstad, Jr.	Rick	c/o Inlet Seafood	PO Box 2148	Montauk	NY	11954
Loftes, Jr.	Harold	271 Congdon Dr		Wakefield	RI	02879
Looft	Edward	20 Tracy Lane		East Islip	NY	11730
Lore	Joseph C	Box 21		Ridge	MD	20680
Loret	John	Science Museum of LI	1526 North Plandome Rd	Manhasset	NY	11030
Lucy	John	Marine Adv. Serv.	VIMS	Gloucester Pt.	VA	23062
Lund	Warren O	997 Ocean Drive		N. Cape May	NJ	08204
MacDonald	Joel	NOAA Fisheries - GCNE	One Blackburn Drive	Gloucester	MA	01930
MacKell	Louis	PO Box 702		W. Hyannisport	MA	02672
MacLean	Malcolm O.	240 Causeway		Lawrence	NY	11559
MacMillan	Joseph	60 Atlantic Ave.		W. Sayville	NY	11796
Madsen	Stephanie	Aleutian Seafood Proc. As	Box 701	Unalaska	AK	99685
Malchoff	Mark H.	Cornell University Lab	39 Sound Ave.	Riverhead	NY	11901
Maliszewski	Ed	214 Ernston Rd.		Parlin	NJ	08859
Mallari	Ana	123 Edgewood Ave.		San Francisco	CA	94117
Manchester	Francis	Point Trap Co.	1728 Main Rd	Tiverton	RI	02878
Mangano	James	Box 140		Amagansett	NY	11930
Manning	Richard	Staten Is.Fed.of Sprtsmen	263 Lincoln Ave.	Staten Island	NY	10306
Manzari	Nicholas	60 Bandolier Ln		West Bayshore	NY	11706
Marconi	Capt.Thomas	219 Kensington Rd.		Lynbrook	NY	11563
Maresca	Joe	1 Wellington Rd		Merrick	NY	11566
Marine Laboratory	Mote	Davis Library	1600 Thompson Parkway	Sarasota	FL	34236-1096
Marine Product Bd	Virginia	554 Denbigh Blvd, Suite B		Newport News	VA	23602-4240
Marion	Ron	Basic American Foods	309 Battles Street	Brockton	MA	02401
Marks	Rick	National Fisheries Instit	1525 Wilson Blvd. Ste.500	Arlington	VA	22209
Marks	Peter	8 Doxee Place		Islip	NY	11751
Martin	David	Martin Fish Co.	Box 51	Ocean City	MD	21842
Martin	James	National Westminster Bank	450 Tilton Rd	Northfield	NJ	08225
Martin	Robert L	Lock Drawer 179		Bellefonte	PA	16823

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Masin	William	Flamingo Rd.		Montauk	NY	11954
Mason	John	Dept. of Env. Cons.	SUNY Bldg. #40	Stony Brook	NY	11790
Mattera	Fred	28 Knowles Lane		West Kingston	RI	02892-1119
Matthews	Howard	616 Seashore Road		Cape May	NJ	08204
Mayflower Int.		P.O. Box 324		Wenham	MA	01984-0624
Maynard	Al	East Coast Fish. Ass'n	192 Ballard Ct. Suite 202	Virginia Beach	VA	23462
Mazurie	John	121-50th st.		Sea Isle City	NJ	08243
Mazza	John	Continental Capri Inc.	250 Jackson Street	Englewood	NJ	07631
McBride	Capt. Joe	PO Box 1908		East Hampton	NY	11937
McCauley	Jim	30 Woodman's Trail		Wakefield	RI	02879
McCay	Bonnie J	Dept. of Human Ecology	Cook College, PO Box 231	New Brunswick	NJ	08903
McCloy	Thomas W.	Div Fish, Game, Wildlife	CN 400	Trenton	NJ	08625
McCullough	Charles	PO Box 351022		Palm Coast	FL	32135-1022
McDaniels	Donald	1052 Shunpike Rd.		Cape May	NJ	08204
McElroy	Paul	Charter Ind. Magazine	PO Box 375	Stuart	FL	34995
McGarrigle, Jr.	Harry	2401 W. Brigantine Ave.		Brigantine	NJ	08203
McGuigan	Bruce	Box 157B, Route 3		Selbyville	DE	19975
McHugh	Dr. J.L.	c/o Vinson Hall	6251 Old Dominion Drive	McLean	VA	22101
McKeen	Michael	Box 184		Crosswicks	NJ	08515
McKernan	Dave	National Marine Fisheries	Box 606	Patchouge	NY	11772
McKown	Kim	NY State Env. Conservat.	SUNY Bld #40	Stony Brook	NY	11790-2356
McQuillan	Dan	PO Box 854		Mattapoisett	MA	02739
McSweeney	Philip	118 Old Stone Highway		East Hampton	NY	11937
McVey	Thomas	813 Seashore Rd		Cape May	NJ	08204
McWeeney	Leo	174 Bellvue Ave		Newport	RI	02840
Meadows	Wm. R.	Nanticoke Seafood Co.	PO Box 70	Nanticoke	MD	21840
Mears	Harold	NOAA Fisheries - F/NE04	One Blackburn Drive	Gloucester	MA	01930
Meberg	Dave	403 Anchorage Way		Freeport	NY	11520
Medeiros	Arthur	CT Comm Fishermen	236 N Water St	Stonington	CT	06378
Medved, PhD	Dr. R.J.	Great Circle Fisheries	78-A Park Place	East Hampton	NY	11937
Meier	Mike	VA Marine Resource Comm	PO Box 756	Newport News	VA	23607
Melius	Tom	US Senate Comm. of Commer	RM 428 Hart Bldg	Washington	DC	20510
Mendonsa	George	Tallman & Mack Trap Co.	Spring Wharf, PO Box 88	Newport	RI	02840
Meny	Thomas	PO Box 791		Pt. Lookout	NY	11569
Meredith	Russell	NMFS/NOAA	201 Varick St. Rm. 731	New York	NY	10014
Merrill	Jeff	918 Houston St		South Plainfield	NJ	07080-2109
Metzner	Rebecca	125 C. Street SE	Apt. 3	Washington	DC	20003
Middleton	Mark	PO Box 192		East Marion	NY	11939
Middleton	Robert	Minerals Mgmt Serv - 644	Pkwy Atrium Bdg 381 Elden	Herndon	VA	22070-4817
Midgette	Donald	Marine Safety Ofc.Hampton	200 Granby Mall	Norfolk	VA	23510
Miguell	Celerina	229 Cannon Building		Washington	DC	20575
Mihale	John	153 California Place N.		Island Park	NY	11558
Miles	John R.	J.H. Miles & Co., Inc.	Box 178	Norfolk	VA	23501

Last Name	First Name	Address 1	Address 2	City	State	Zip
Miller	Dr. Gary	Advanced Aquacultural Tec	PO Box 426	Syracuse	IN	46567
Miller	Mort	NMFS- Univ. S.Bldg.	1335 East-West Highway	Silver Spring	MD	20910
Miller	Richard	PO Box 816		East Quogue	NY	11942
Miller	Brian	Foot Brown Ave	PO Box 2180	Norfolk	VA	23501
Millikin	Mark	NMFS, F/CM2	1335 East West Highway	Silver Spring	MD	20910
Miranda	J.L.	Embassy of Spain/Agricult	2375 Pennsylvania Ave.,NW	Washington	DC	20037
Mirkovich	Nick	PO Box 168		Aransas Pass	TX	78335
Mitchell	Ed	67 Hillcrest Ave.		Wethersfield	CT	06423
Mizzele	Joe	1409 Gabriele Dr		Norfolk	VA	23502
Moffa	Michael	M. Moffa & Son Seafood	Box 748 Coles Mill Rd.	Franklinville	NJ	08322
Mombelardi	Ray	401 Valley Way		Bricktown	NJ	08723
Monaghan	Rick	NC Div. Marine Fisheries	PO Box 769	Morehead City	NC	28557
Montfort	John	Box 358	207 Sunset Blvd.	Barnegat Light	NJ	08006
Montgomery	Joe	Office of Fed Activities	401 M st SW, MC 2252	Washington	DC	20460
Moore	Niels	National Fisheries Instit	1525 Wilson Blvd, Ste 500	Arlington	VA	22209
Moran	Bob	NFI Suite 500	1525 Wilson Boulevard	Arlington	VA	22209
Morse	Peter	62 Tuttle Lane		Greenland	NH	03840
Mortensen	Kaj F.	EC Delegation	2100 M St.,NW, Suite 707	Washington	DC	20037
Mott	Bill	Marine Fish Conserv. Net.	1725 Desales NW	Washington	DC	20036
Muhlbaier	Craig	c/o Farm Credit S.Jersey	PO Box 188	Bridgeton	NJ	08302
Muller	Dr. Wm.	37 West 10th Ave.		Deer Park	NY	11729
Muller	Heinz	Envit. Review Coordinator	EPA Reg 4, 345 Cortland	Atlanta	GA	30365
Murawski	Steve	NEFC/NMFS	Water Street	Woods Hole	MA	02543
Murchelano	Robert	Northeast Fisheries Cntr	166 Water Street	Woods Hole	MA	02543
Murray, Jr.	John	PO Box 387		Brielle	NJ	08730
Musick	Dr. Jack	VIMS		Gloucester Pt.	VA	23062
Muzio, Director	Joseph	Kinsborough Comm College	2001 Oriental Blvd	Brooklyn	NY	11235
Myers	Richard	Eastern Shore Seaf. Prod.		Mappsville	VA	23407
NAFO		PO Box 638	Dartmouth, N.S.	Canada B2Y 3Y9		
NMFS		Statistics Investigations	P.O. Box 125	Greenbackville	VA	23356
Nardi	George	25 Adams St		Holbrook	MA	02343
Nash	James	19 Priest Blvd.		Rio Grande	NJ	08242
Newman	Kenneth	150 Lexington Ave		New York	NY	10016
Newman	Vivian	Sierra Club	11194 Douglas Ave	Marriottsville	MD	21104
Nicholls	Bruce	Wadland & Nicholls	265 Franklin Street	Boston	MA	02110-3109
Nickerson	Howard	Offshore Mariner's Assoc.	114 MacArthur Dr.	New Bedford	MA	02740
Nielsen	John	National Public Radio	635 Mass. Ave., N.W.	Washington	DC	20001
Nolan	John&Laurie	Box 2124		Montauk	NY	11954
O'Connell	Tory	Marine Fisheries Sect/AFS	304 Lake St., Room 103	Sitka	AK	99835
O'Connor	Michael	Boston Herald, Outdoor Ed	1 Herald Square	Boston	MA	02106
O'Hara	Joe	1919 Marlin Dr.		Ocean City	MD	21842
O'Hara and Sons	F.J.	145 Northern Ave		Boston	MA	02210
O'Malley	Jim	East Coast Fisheries	PO Box 649	Naragansett	RI	02882

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O'keefe	Jim	563 Sunny Ave.		Sommers Point	NJ	08244
Ocean, Inc.	Scan	33 Crafts Rd.		Gloucester	MA	01930
Oches	Arthur	1 Muriel Place		Manasquan	NJ	08736
Odierno	Linda	NJ Dept of Agriculture	CN 330, Rm. 200	Trenton	NJ	08625
Odlin	Arthur	210 A Pine St.		S. Portland	ME	04106
Odlin	Jim	PO Box 288		Portland	ME	04112
Office	Comm.	College of Wm. & Mary	VIMS	Gloucester Pt.	VA	23062
Offshore Fish Asn	Atl.	P.O. Box 3001		Newport	RI	02840
Ofiara	Douglas	Inst. of Marine & Coastal	Cook College, PO Box 231	New Brunswick	NJ	08903-0231
Olsen	Rolf	2042 Marshland Dr.		Charleston	SC	29414
Osmundsen	Sig	Sig's Dock, Inc.	704 W. Montgomery Ave.	Wildwood	NJ	08260
Ottmann	Barry	7017 Sandringham Ct.		Raleigh	NC	27613
Ouellette , CGLO	LCDR D.	National Marine Fisheries	8484 Georgia Ave., Ste415	Silver Spring	MD	20910
Outten	Bill	Tawes State Office Bldg.	580 Taylor Ave.	Annapolis	MD	21401
Overton	Ellen	1825 Connecticut Ave., NW	Rm 627 Universal South	Washington	DC	20235
Paladino	Thomas	2332 Royce St		Brooklyn	NY	11234
Pallone	Frank	241 Cannon HOB	ATTN: Jed Brown	Washington	DC	20515
Palmer	Steve	2647 Haddonfield Rd.		Pennsauken	NJ	08110
Parker, Esq.	Barry T.	3 Greentree Ctr Suite 401	Rt. 73 & Greentree Rd.	Marlton	NJ	08053
Parsons	H. Dale	7 Vermont Ave		Lewes	DE	19958
Paschall	Allan	2137 E. Admiral Drive		Virginia Beach	VA	23451
Patterson, Jr.	Jack	Patterson, Jrs., Inc.	PO Box 332	Barnegat Light	NJ	08006
Penello	Julian	2928 Replica Lane		Portsmouth	VA	23703
Pennypacker	Norman	Sea Watch	242 S Rehoboth Blvd	Milford	DE	19963
Peterson	Allen	NOAA Fisheries	NEFC Water Street	Woods Hole	MA	02543
Peterson	Ralph	Squid Mack Freezers	6 North Industrial Blvd	Bridgeton	NJ	08302
Petronio, Jr.	Everett	1239 Hartford Ave		Johnston	RI	02920
Phanz	Allen	Box 212		East Hampton	NY	11937
Phillips	Mark S.	F/V Illusion	217 4th St.	Greenport Village	NY	11944
Phillips	James H.	1021 Cedar Ridge Ct.		Annapolis	MD	21403
Pierce	David	Div. of Marine Fisheries	100 Cambridge St.	Boston	MA	02202
Plante	Janice M.	Commercial Fisheries News	1183 Taughannock Blvd.	Ithaca	NY	14850
Pleickhardt	John	15 Leach St.		Lyn	NY	11563
Poffenberger	Brian	Senator B. Mikulski	709 Hart Office Bldg. NE	Washington	DC	20510
Pollock	Susan	National Fisherman	65 Langdon St.	Cambridge	MA	02138
Pollum	Michael	217 N Princeton Ave.		Swarthmore	PA	19081
Power	Greg	NMFS, Woods Hole Lab	166 Water Street	Woods Hole	MA	02543
Powers	Collin	PO Box 10009	629 East Main St., 6th fl	Richmond	VA	23240
Pride	Bob	Fisheries Mngmt Committee	2105 Turnberry Cove	Virginia Beach	VA	23454
Pruitt	William	Marine Res. Comm.	P.O. Box 756	Newport News	VA	23607
Pt. Judith Fishmn		Cooperative Assoc., Inc.	P.O. Box 730	Narragansett	RI	02882
Puskas	Frances	1202 Central Ave.	PO Box 191	Barnegat Light	NJ	08006
Puskas, Jr.	Louis	PO Box 191		Barnegat Light	NJ	08006

Last Name	First Name	Address 1	Address 2	City	State	Zip
Quinby	Bill	Mayglower Int'l	PO Box 234	Wenham	MA	01984
Quinn	Adeline	1 Ocean Blvd		Lido Beach	NY	11561
RCG Fisheries		5 Beach Road East		Old Saybrook	CT	06475
RI Seafd. Council		212 Main St #3		Wakefield	RI	02879
Radio	WWQQ	News Director	721 Market St., Suite 101	Wilmington	NC	28401
Radonski	Gilbert	51 Pepper Tree Ct		Warrenton	VA	22186-3002
Ralyee	David	Frank Flower & Son	Ludlan Ave	Bayville	NY	11709
Randolph	Jack	304 Nottingham Dr.		Colonial Heights	VA	23834
Ratti	Bryan	6851 Imperial Dr		West Palm Beach	FL	33411
Ravenel, Jr.	Arthur	231 Cannon HOB	ATTN: Thomas Henderson	Washington	DC	20515
Raymond	Fran	Rockeseller Bros Fund	1290 6th Ave	New York	NY	10104-0233
Redmayne	Peter	Seafood Leader	1115 N.W. 46th Street	Seattle	WA	98107
Rees	Jeff	Borden, Inc	180 East Broad Street	Columbus	OH	43215
Reeve	Ian	3235 Emmons Ave		Brooklyn	NY	11235
Regenstein	Dr. J.M.	112 Rice Hall	Cornell Univ.	Ithaca	NY	14853-5601
Regional Director		NOAA Fisheries - F/NER	One Blackburn Drive	Gloucester	MA	01930
Reichle	Jeff	Lund's Fisheries	977 Ocean Drive	Cape May	NJ	08204
Reitz	Capt Doug	62 Laurel Lane		West Kingston	RI	02892
Reporting Spec.	Fishery	NMFS-Statistics Branch	PO Box 547	Narragansett	RI	02882
Reporting Spec.	Fishery	NMFS-Statistics Branch	PO Box 624	Cape May	NJ	08204
Reporting Spec.	Fishery	NMFS, Statistics Inv.	U.S. Custom House	New Bedford	MA	02740
Reporting Spec.	Fishery	NMFS, Rm 217 Fed. Bldg.	P.O. Box 708	Rockland	ME	04841
Reporting Spec.	Fishery	NMFS-Statistics Branch	PO Bldg. Thames St.	Newport	RI	02840
Reporting Spec.	Fishery	NMFS-Statistics Branch	29C Stage Harbor Rd	Chatham	MA	02633
Rhodes	Dusty	2361 Fire Lane North		Southampton	NJ	08088
Richard	G.	Dep. Min. of Fisheries	P.O. Box 2223	Halifax, N.S.		B3J 3C4
Richardson	George	Blount Seafood Corp.	Box 327	Warren	RI	02885
Richford	George	2150 Hendrickson St		Brooklyn	NY	11234
Ridge	Duncan	38 Shore Rd		E. Setauket	NY	11733
Riffe	Donald E	Old Salt Seafood	8978 Glebe Park Dr	Easton	MD	21601
Rins	Burton	Ruggiero Seafood	1137 Dickinson Ave	Yardley	PA	19067
Risdon	Frank	The Gorton Group	Gorton Rd, PO Box 309	Millville	NJ	08332
Ristori	Allan	1552 Osprey Court		Manasquan Park	NJ	08736
Robbins	Neil	7711 Roberts Ave		Sea Isle City	NJ	08243
Roberts	Fred	Deep Water Fleet, Inc.	376 Vanderbilt Blvd.	Oakdale	NY	11769-2038
Roberts	Mark	PO Box 99		Jonesport	ME	04649
Robinson F/NW02	William	NMFS	Bin C15700	Seattle	WA	98115
Robson	Ron	1447 Rt. 83		Cape May CourtHse	NJ	08210
Rodia, Jr.	Louis A.	6 N Main St		Cape May Crthse	NJ	08210
Rodrigues	Kathi L.	NOAA Fisheries - F/NER72	One Blackburn Drive	Gloucester	MA	01930
Roman	Gordon	Captree Boatmens Assoc.	17 Laurel Road	Freeport	NY	11520
Rose	Benny	712 Pilgrim Plaza		N. Cape May	NJ	08204
Rose	Arthur	4 Francis St		Westport	MA	02790

Last Name	First Name	Address 1	Address 2	City	State	Zip
Rosenman	Richard	Dept of State Room 5806	2205 C Street NW	Washington	DC	20520
Ross	Bob	8 Janes Road		Boxford	MA	01921
Rothschild	Dr. Brian	Chesapeake Bio Lab	Univ. of MD	Solomons	MD	20688-0038
Ruais	Rich	PO Box 447		Salem	NH	03079
Rubin	Bernie	Chincoteague Seafood	PO Box 21	Chincoteague	VA	23336
Rubins	Jonathan	2671 Village Blvd	Apt 302	West Palm Beach	FL	33409-6927
Rucky	Robert	15 Hunting Lane		East Islip	NY	11730
Ruggiero	Sal	96 Fairmont Ave		Chester	NJ	07930
Rugolo	Dr. Louis	MD Dept Nat. Res.	B-3 Tawes State Ofc. Bldg	Annapolic	MD	21401
Ruhle	James	PO Box 302		Wanchese	NC	27981
Ryan	Patrick	Micro Systems Integration	97 Stony Brook Rd	Stonington	CT	06378-1623
Ryder	Richard	14 Teal Rd.		Rio Grande	NJ	08242
Safina	Carl	National Audobon Society	306 S Bay Ave	Islip	NY	11751
Sampson	Mark	10418 Exeter Rd.		Ocean City	MD	21842-9792
Santich	Matthew	CR 112	PO Box 657	Greenwood	DE	19950
Santos, Jr.	Antone	77 Chancery St.		New Bedford	MA	02740
Sapp, Sr.	Robert L	Box D-14 River Village		Millsboro	DE	19966
Savadove	Larry	Jersey Shore Newsmagazine	1816 Long Beach Blvd	Surf City	NJ	08008
Savage	Ricks E.	11824 Parfin Drive		Berlin	MD	21811
Sawyer, III	Henry B	Kiawah-Seabrook Seafood	3966 Bohicket Road	Charleston	SC	29455
Schaefer F/CM	Richard	NMFS, SSMC Bldg 1	1335 East-West Highway	Silver Spring	MD	20910
Scheible	Capt. Bruce	23 Wynne Rd.		Ridge	MD	20680
Schick	Francis	7147 Marsden St		Philadelphia	PA	19135
Schill, Exec.Dir.	Jerry	NC Fisheries Assoc.	PO Box 12303	New Bern	NC	28561
Schmidt	Ray	185 Blue Point Rd.		Oakdale	NY	11769
Schumann	Chris	1 Bow Oarsmans Rd		East Hampton	NY	11937
Schwab	Fred	87 Old Farm Road		Levittown	NY	11756
Sciabarra	Joseph	31 Ross Lane		Sinai	NY	11766
Scott	Karl	312 Oxford Dr.		Savannah	GA	31405
Sea Grant Legal	Louisiana	170 Law Center	LSU	Baton Rouge	LA	70803-1018
Sea Watch Int'l.	M. Burns	8978 Glebe Park Drive		Easton	MD	21601
SeaCove, Inc.	Atlantic	402 "C" Street		Boston	MA	02210
Seafood, Inc.	Phillips	Saul Phillips	PO Box 817	Barnegat Light	NJ	08006
Seawave Corp.		PO Box 400		Rio Grande	NJ	08242
Seminara, Esq.	Joseph F	Wolff, Seminara & Mitberg	230 Park Ave.,Suite	New York	NY	10017
Serrone	Nat	881 Annette Dr.		Wantagh	NY	11793
Shackelford, Jr.	L.K.	PO Box 422		Hampton	VA	23669
Shepherd	Gary	NMFS/NEFC	166 Water Street	Woods Hole	MA	02543
Sherba, Jr.	John S	F/V Shearwater	16 Susan Lane	Green Creek	NJ	08219
Shinnecock Fish		Dock Inc	PO Box 728	Hampton Bays	NY	11946
Shoemaker	Dale E.	145 Winter Street		Bridgewater	MA	02324
Siegel	Al	41 Millbrook Drive		Stony Brook	NY	11790
Siegel	Lou	Shore Environmental Assc.	P.O. Box 202	Massapequa	NY	11758

Last Name	First Name	Address 1	Address 2	City	State	Zip
Siegel	Melvyn	American Swordfish Assoc.	7908 Bayshore Dr.	Margate	NJ	08402
Simmons	George	F/V Shearwater	814 Weekslanding Rd	Cape May	NJ	08204
Simmons	Marion R.	PO Box 10		Walterboro	SC	29488
Simonitsch	Mark	Nantucket Sound Fish Pier	84 Doane Rd.	Chatham	MA	02633
Sinning	John	PO Box 724		Southold	NY	11971
Skjevelano	Jorgen	U.S. Fish & Wildlife	1825 Virginia St.	Annapolis	MD	21401
Slikas	Vincent	87-34 95 st.		Woodhaven	NY	11421
Sloan	Stephen	Confed Atl Charter Boats	230 Park Av, Suite 1221	New York	NY	10169
Sminkey	Tom	DNR, Div. of Marine Res.	100 8th Ave., SE	St. Petersburg	FL	33701
Smith	Art	PO Box 399		Wanchese	NC	27981
Smith	Eric	Dept of Env. Protection	Marine Fisheries, Box 719	Old Lyme	CT	06371
Smith	Robert D	46 Woodcock Trail		Charlestown	RI	02813
Smith	Ronal	460 Gills Neck Rd.		Lewes	DE	19958
Smith	Terry	Northeast Fisheries Centr	166 Water Street	Woods Hole	MA	02543
Smith	Tom	7605 Worcester Hwy		Newark	MD	21841
Smith	LeAnn	88 Amityville St.		Islip Terrace	NY	11752
Smith	Bruce	416 Hulse Ave		Brick	NJ	08724
Smith	Mrs. Edward	7605 Worcester Highway		Newark	MD	21841
Solberg	Rob	3601 Somerset Dr.		Seaford	NY	11783
Spingler	Kevin	The Stony Brook School	Route 25A	Stony Brook	NY	11790
Spitsbergen	Dennis	NC Div of Marine Fish	PO Box 769	Morehead City	NC	28557
St John	Dr. R.Bruce	Caterpillar Inc.	PO Box 610	Mossville	IL	61552
Stallings	Jack	611 Goldsboro ave		Virginia Beach	VA	23451
State Univ.	Oregon	Library-Serials		Corvallis	OR	97331
Stavis	Fred	Stavis Seafoods, Inc.	148 Northern Ave.	Boston	MA	02210
Stavis	Norman	North Coast Seafoods	12-14 Fargo St	Boston	MA	02210
Steimle	Clair	US Dept of Commerce NOAA	Sandy Hook Lab	Higlands	NJ	07732
Stelle	William	Merchant Marine & Fisher.	1334 Longworth HOB	Washington	DC	20515
Stensland	John	Fisherman's Supply		Pt. Pleasant	NJ	08742
Stephens	Harry C.	237 Cabots Creek Drive		Myrtle Beach	SC	29577
Stevens	Lorelei	PO Box 655		West Harwich	MA	02671
Stevenson	Barbara	Suite 313	Two Portland Fish Pier	Portland	ME	04101
Stevenson	Douglas	Cntr for Seafarers Rights	241 Water St.	New York	NY	10038
Steves	Gale	Home Magazine	1633 Broadway, 41st floor	New York	NY	10019
Stolpe Exec. Dir.	Nils E.	3840 Terwood Dr.		Doylestown	PA	18901
Stone F/CM3	Dick	NMFS/NOAA	1335 East West Highway	Silve Spring	MD	20910
Stott III	Charles	1406 Bayvine Ave	Box 23	Barnegat Light	NJ	08006
Stotz	Richard	East St. & Mass. Ave.		Cape May	NJ	08204
Strand	Dr. Ivar	Univ of MD Ag & Res. Dept	2200 Symons Hall	College Park	MD	20742
Strattman	Steve	72 N. Lakeshore Drive		Manahawkin	NJ	08050
Stray	Bill	107-10 Shore Front Pkwy	Apt 8K	Rockaway Pt.	NY	11694
Street	Michael W.	NC Div. Marine Fisheries	PO Box 769	Morehead City	NC	28557-0769
Strombom	Dan B.	Rutgers Cooperative Ext.	4 Moore Road	Cape May Crthse	NJ	08210

Last Name	First Name	Address 1	Address 2	City	State	Zip
Studds	Gerry E.	Merchant Marine & Fish.	1334 Longworth HOB	Washington	DC	20515
Suisan Kaisha Ltd	Nippon	Bank of CA Center	900 Fourth Ave., 30F	Seattle	WA	98164
Sullivan	Michael	Westminister Press	1280 Ritchie Rd.	Capital Hghts	MD	20743
Sullivan	Patrick	PO Box 1028		East Hampton	NY	11937
Sullivan	John	245 E. Main St.		Gloucester	MA	01930
Sutton	Alex	IOLAR Enterprises	PO Box 919	Remsenburg	NY	11960
Swagler	Jim	1662 Yakana Rd		Towsown	MD	21204
Sweeney	Brian A.	Seafreeze Ltd.	100 Davisville Pier	N. Kingstown	RI	02852
Swenson	Carl	1201 Ocean Ave.	Apt. 78	Sea Bright	NJ	07760
Tadick	Vincent	Josh H. Carter Co.	33-34 Fulton Fish Market	New York	NY	10038
Tamimie	David	USCGR	245 Hampton Rd.	King of Prussia	PA	19406
Taormina	Anthony	7090 SE Lillian Crt.		Stuart	FL	34997
Tarasevich	Chris	Chipper Seafood	43 Celestial Dr	Sounderstown	RI	02874
Targett	Nancy	College of Marine Studies	University of DE	Lewes	DE	19958
Tatem	Damon	PO Drawer 429		Nags Head	NC	27959
Taylor	Gene	215 Longworth HOB	ATTN: Stephen Peranich	Washington	DC	20515
Taylor	Shirley	1414 Hilltop Drive		Tallahassee	FL	32303
Terceiro	Mark	NMFS/NEFC	166 Water Street	Woods Hole	MA	02543
Testaverde	Sal	11 Lakeridge Drive		Georgetown	MA	01833
Tharp	Robert	283 North St		West Creek	NJ	08092
Thomas	Randi	US Tuna Foundation	1101 17th St.N.W.Suite609	Washington	DC	20036
Thompson	Capt. Paul	95 Acorn Lane		Cape May Court Hse	NJ	08210
Tillett	Billy	PO Box 383		Wanchese	NC	27981
Tillett	Kevin	PO Box 159		Manteo	NC	27954
Times	Sakonnet	East Bay Window Section	1 Bradford St	Bristol	RI	02809
Timmons, Editor	Dale	Coastal Fisherman	9747 Golf Course Rd.	Ocean City	MD	21842
Tomorowiez	Dr Jacek	Polish Embassy, Econ. Co.	1503 21st St. N.W	Washington	DC	20036
Touris	Arthur	Touris Products Inc	34 Fifth St.	Pelham	NY	10803
Townsend	Chester	Sandy Landing		Dagsboro	DE	19939
Traber, Jr.	Frederic	300 E. Myrtle Rd.		Wildwood Crest	NJ	08260
Travelstead	Jack	Marine Res. Comm.	PO Box 756	Newport News	VA	23607
Tribbitt, Sr.	Robert L.	RD 2, Box 5		Frankford	DE	19945
Truex	Leroy	P.O. Box 727		Manahawkin	NJ	08050
Tully	William	39 Canoe Place Rd.		Hampton Bays	NY	11946
Tweedy, Jr.	Groege	168 Sumpwams Ave		Babylon	NY	11702
Ulanski	Prof. Stan	Dept of Geology	James Madison Univ.	Harrisonburg	VA	22807
Ulsh	Stephen	PA Fish & boat Commission	PO Box 67000	Harrisburg	PA	17106-7000
Unlimited, Inc.	Access	PO Box 2436		Port Angels	WA	98362
Unsoeld	Jolene	1527 Longworth HOB	ATTN: Jim Hoff	Washington	DC	20515
Valliere	April	Division of Fish & Wldlif	Succotash Rd	Wakefield	RI	02879
Vansant	Ron	8 E. Sunrise Rd		Petersburg	NJ	08270
Verbanas	Capt. Bill	2614 Whittier Dr		Wilmington	DE	19808
Vessels, Inc.	Atlantic	P.O. Box 178		Norfolk	VA	23501

Last Name	First Name	Address 1	Address 2	City	State	Zip
Village Dock	Viking	19th Street	Box 458	Barnegat Lt	NJ	08006
Vincent	Raoul	18 Argyle Drive		Northport, LI	NY	11768
Voss, Jr.	Leonard	210 N. Street		Smyrna	DE	19977
Wadelton	Peter	PO Box 1174		Mattituck	NY	11952
Wadsworth	John	15 First St.		Waterford	CT	06385
Wagner	Eric	AT & T Communication	340 Mt. Kemble Ave. S200	Morristown	NJ	07960
Wagner	Joe	10 Woodbine-Ocean View Rd		Ocean View	NJ	08230
Waidman	Alan	611 Roosevelt Blvd		Marmora	NJ	08223
Waldman	Cheryl	Cong. Info. Serv.	4520 East West Hwy.	Bethesda	MD	20814-3389
Walker, III	Wm E	57 Eastwood Rd		Media	PA	19063
Wall	Fred	68 Bay Breeze Dr.		Toms River	NJ	08753
Wallace	David	P.O. Box 1895		Salisbury	MD	21801
Wallo	Ron	RR2 Box 86 D		Dagsboro	DE	19939
Walsh	Laurence	P.O. Box 199		Barnegat Light	NJ	08006
Waltz	Bob	345 Rimson Rd.		Wading River	NY	11792
Wanchese Fish Co.		Box 369		Wanchese	NC	27981
Wang	Stanley	NOAA Fisheries - F/NER51	One Blackburn Drive	Gloucester	MA	01930
Ward	Charles	2332 Bayville Road		Virginia Beach	VA	23455
Ward	Lester	9308 Eclipse Drive		Suffolk	VA	23433
Wark	Kevin	1508 Bayview Ave		Barnegat Light	NJ	08006
Warny	Mrs. R.R.	Bridle Path Jrbpr Acr		Prt Washington	NY	11050
Water Seafoods	Deep	Box 144A East Lake Dr.		Montauk	NY	11954
Watson	A. Wayne	10222 Golf Course Rd.		Ocean City	MD	21842
Watson	Edward	420 Fidler Rd		Woodbine	NJ	08270
Weber	Rick	C/O South Jersey Marina	PO Box 641	Cape May	NJ	08204
Weeks	Stevensn	410 Front Street	PO Drawer 360	Beaufort	NC	28516
Weeks	Theodore	6 Irongate Lane		Medford	NJ	08055
Wehner	Diane E.	c/o USEPA, Rm 3137-C	26 Federal Plaza	New York	NY	10278
Weis	Nancy B.	4002 Golfview Dr.		Newark	DE	19702
Weisberg	Richard	509 Nassau Ave		Freeport	NY	11520
Weiss	Alan	Blue Water Fishing Tackle	211 Boro Line Rd.	King of Prussia	PA	19406
Weiss	Peter	GCTA	304 Newbury St, Box 343	Boston	MA	02115
Weiss	Richard	167 Reid Ave		Rockaway Pt.	NY	11697
Welch	Ed	12501 Cassondra Ct.		Woodbridge	VA	22192
Wells	William	PO Box 600		Seaford	VA	23696
Wertz	Charles	160 Gordon Plance		Freeport	NY	11520
West	Susan	North Carolina Fisheries	PO Box 183	Buxton	NC	27920
West	Katy	NCDMF	1424 Carolina Ave	Washington	NC	27889
Wheat	Max	NY Marine Ed. Assn.	333 Bedell St.	Freeport	NY	11520
Whitted F/CM2	Shirley	NOAA/NMFS Room 8237	1335 East West Highway	Silver Spring	MD	20910
Wiegand	Robert	2034 East 73rd St		Brooklyn	NY	11234
Wilkings	Prof. Bruce	Cornell Coop DNR	112 Fernow Hall	Ithaca	NY	14853
William	Roy	41 River Edge Rd.		River Edge	NJ	07661

Last Name	First Name	Address 1	Address 2	City	State	Zip
Williams	Chris	11 Canal Way		Hampton Bays	NY	11946
Williams	James	PO Box 1308		Hampton Bays	NY	11946
Williams	John	2 Seminole St		Warwick	RI	02886
Williams	Roy	Marine Fisheries Comm.	2540 Exec Cntr West , 106	Tallahassee	FL	32301
Williams, F/CM1	Loretta	NMFS/NOAA, Rm. 8490	1335 East-West Highway	Silver Spring	MD	20910
Wilson	Doug	Axelsson & Johnson	993 Ocean Drive	Cape May	NJ	08204
Wilson	Jennifer	428 Monticello Blvd		Alexandria	VA	22305
Winkel	Rob	State of NJ, DEP	CN400 5 Station Plaza	Trenton	NJ	08625
Wise	William	Marine Science Res. Cntr.	Discovery Hall, Room 155	Stony Brook	NY	11794
Witek	Charles	1075 Tooker Ave		W.Babylon	NY	11704
Woodley-Miller	Cheryl	NMFS, Charleston Lab	PO Box 12607	Charleston	SC	29412
Wright	Dr. Jim	1120 1st Colonial Rd.		Virginia Beach	VA	23454
Wurster	Richard	245 Fifth Ave		West Cape May	NJ	08204
Wyatt	Joseph R.	JRW Associates	1904 Severn Grove Rd	Annapolis	MD	21401
Wypyszinski	Alex	PO Box 231 Cook College	Rutgers Univ.	New Brunswick	NJ	08903
Young	Don	Fisheris Mngmt Subcommitt	2331 Rayburn HOB	Washington	DC	20515
Young	Ayanna	Greenpeace USA	1436 U Street, N.W.	Washington	DC	20009

APPENDIX 3. REGULATORY IMPACT REVIEW

1. INTRODUCTION

1.1. Purpose

Executive Order 12866, "Regulatory Planning and Review", was signed on September 30, 1993, and established guidelines for promulgating new regulations and reviewing existing regulations. While the executive order covers a variety of regulatory policy considerations, the benefits and costs of regulatory actions are a prominent concern. Section 1 of the order deals with the regulatory philosophy and principles that are to guide agency development of regulations. The regulatory philosophy stresses that, in deciding whether and how to regulate, agencies should assess all costs and benefits of all regulatory alternatives. In choosing among regulatory approaches, the philosophy is to choose those approaches that maximize net benefits to society.

The regulatory principles in E.O. 12866 emphasize careful identification of the problem to be addressed. The agency is to identify and assess alternatives to direct regulation, including economic incentives, such as user fees or marketable permits, to encourage the desired behavior. When an agency determines that a regulation is the best available method of achieving the regulatory objective, it shall design its regulations in the most cost-effective manner to achieve the regulatory objective. Each agency shall assess both the costs and the benefits of the intended regulation and, recognizing that some costs and benefits are difficult to quantify, propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs. Each agency shall base its decisions on the best reasonably obtainable scientific, technical, economic, and other information concerning the need for, and consequences of, the intended regulation.

The National Marine Fisheries Service (NMFS) requires the preparation of a Regulatory Impact Review (RIR) for all regulatory actions that either implement a new Fishery Management Plan (FMP) or significantly amend an existing plan. The RIR is part of the process of preparing and reviewing FMPs and provides a comprehensive review of the changes in net economic benefits to society associated with proposed regulatory actions. The analysis also provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve the problems. The purpose of the analysis is to ensure that the regulatory agency systematically and comprehensively considers all available alternatives so that the public welfare can be enhanced in the most efficient and cost-effective way. The RIR addresses many of the items in the regulatory philosophy and principles of E.O. 12866.

Executive Order 12866 requires that the Office of Management and Budget review proposed regulatory programs that are considered to be "significant". A "significant regulatory action" is one that is likely to:

(1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

A regulatory program is "economically significant" if it is likely to result in the effects described in item (1) above.

The RIR is designed to provide information to determine whether the proposed regulation is likely to be "economically significant."

The document also contains an analysis of the impacts of the Plan relative to the Regulatory Flexibility Act and the Paperwork Reduction Act of 1980.

1.2. Description of User Groups

The fishery is described in Sections 7 and 8 of the FMP.

1.3. Problems Addressed by the FMP

The problems to be addressed are discussed in Section 4.2 of the FMP.

1.4. Management Objectives

The objectives of the FMP are:

1. Reduce fishing mortality in the black sea bass fishery to assure that overfishing does not occur.

2. Reduce fishing mortality on immature black sea bass 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 the FMP

The management measures adopted for public hearing are presented below.

1.5.1. MEASURES TO ATTAIN MANAGEMENT OBJECTIVES

1.5.1.1. Specification of 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.

OY is all black sea bass 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 black sea bass 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 conditions in the fishery, F_{max} is 0.29.

Stock assessment information indicates that black sea bass stocks are overfished. Results of a virtual population analysis indicate that the current fishing mortality rates (F) is 1.05.

The Council and the ASMFC Management Board approved a recovery strategy that reduces overfishing on black sea bass over an 8 year time frame. The recovery strategy calls for minimum fish sizes and commercial gear regulations in year 1 and 2. In years 3 to 5, target exploitation rates would be 48% for black sea bass. In years 6 and 7, the target exploitation rates would be 37% and in year 8 and subsequent years, the target exploitation rate would be based on F_{max}. Based on current conditions in the fishery, F_{max} is 0.29 and the associated exploitation rate is 23%. The recovery schedule is as follows:

	Exploitation Rates
Current	60%
Year 3	48%
Year 6	37%
Year 8	23%

1.5.1.2 Specification of Adopted Management Measures

1.5.1.2.1. Permits and fees

1.5.1.2.1.1. Vessel permits and fees

1.5.1.2.1.1.1. General

Any owner of a vessel desiring to fish for black sea bass within the US EEZ for sale, or transport or deliver for sale, any black sea bass taken within the EEZ, must obtain a moratorium permit from NMFS for that purpose. The vessel must meet the criteria set forth in 1.5.1.2.1.1.2 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 black sea bass 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 1.5.1.2.1.1.2. 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 and not more than 3 when it is operating as a charter boat.

1.5.1.2.1.1.2. Moratorium on entry to the commercial fishery

There will be a moratorium on entry of additional commercial vessels into the black sea bass 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 black sea bass for sale between 26 January 1988 and 26 January 1993 qualify for a moratorium permit to land and sell black sea bass under this moratorium program. Under the moratorium, vessels and moratorium permits together may be bought and sold with the approval of the Regional Director. Vessels that involuntarily leave the fishery (for example, vessels that were sunk or burnt) may be replaced with vessels of the same Gross Registered Tonnage (GRT) and overall registered length as the vessel being replaced. Commercial vessels that are judged unseaworthy by the Coast Guard for reasons other than lack of maintenance may be replaced by a vessel with the same GRT and vessel registered length. Permits may not be combined to create larger replacement vessels. The moratorium may be terminated or replaced at any time by FMP amendment 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 black sea bass in the management unit for black sea bass between 26 January 1988 and 26 January 1993; or

2. The vessel was under construction for, or was being rerigged for, use in the directed fishery for black sea bass on 26 January 1993 and provided the vessel has landed black sea bass 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 black sea bass; or

3. The vessel is replacing a vessel of substantially similar harvesting capacity which involuntarily left the black sea bass 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 condition 3, a notarized statement from marine architects or surveyors or shipyard officials will be considered acceptable forms of proof.

1.5.1.2.1.1.3. Permit application

The owner or operator of a qualified US vessel may obtain the appropriate Federal permit by furnishing on the form provided by NMFS information specifying, at least, the names and addresses of the vessel owner, the name of the vessel, official Coast Guard number, directed fishery or fisheries, gear type or types utilized to take black sea bass, 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 black sea bass legally landed during the year prior to the one for which the permit is being applied (documented by sales records), principal State of landing, the home port of the vessel, and number of passengers the vessel may carry (for party and charter boats). Operators of commercial vessels must

also supply information required to establish that the vessels qualify for a permit pursuant to the moratorium. The Regional Director will notify the applicant of any deficiency in the application. If the applicant fails to correct the deficiency within 15 days following the date of notification, the application will be considered abandoned.

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

Permits expire: (1) when the owner or operator retires the vessel from the fishery, or (2) on 31 December of each year, or (3) when the ownership of the vessel changes; however, the Regional Director may authorize continuation of a vessel permit for the black sea bass 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 black sea bass shall be charged to permit holders as authorized by section 303(b) (1) of the Magnuson Act. In establishing the annual fee, the Regional Director will ensure that the fee does not exceed the administrative costs incurred in issuing the permit, as required by section 304(d) of the Magnuson Act. Proper accounting for administrative costs may include labor costs (salary and benefits of permitting officers plus prorated share of secretarial support and supervision at both the NMFS regional and headquarters levels), computer costs for creating and maintaining permit files (prorated capital costs, time share and expendable supplies), cost of forms and mailers (purchase, preparation, printing and reproduction), and postage costs for application forms and permits.

1.5.1.2.1.2. Dealer permits and fees

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

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

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

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

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

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

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

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

1.5.1.2.1.3. Operator permit and fees

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

The permit program has the following requirements:

1. Any operator of a vessel fishing for black sea bass must have an operator's permit issued by the NMFS Regional Director.

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

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

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

5. The permit is not transferable.

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

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

1.5.1.2.2. Black Sea Bass FMP Monitoring Committee

The Black Sea Bass 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 ASMFC representatives. The MAFMC Executive Director or his designee will chair the Committee.

The Black Sea Bass 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 black sea bass is not

exceeded (as specified in section 1.5.1.1). The Committee will also review state regulatory programs for consistency with the FMP. The Committee will also review the gear used to catch black sea bass to determine whether additional gears need 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 for action by the Regional Director are:

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

2. The Demersal Species Committee and ASMFC Management 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 Management 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.

1.5.1.2.3. Commercial management measures

1.5.1.2.3.1. Commercial quota

The quota setting process is specified in 1.5.1.2.2. Beginning in year 3, a quota would be allocated to the commercial fishery to control fishing mortality. The quota would be based on projected stock size estimates for that year as derived from the latest stock assessment information. Estimates of stock size coupled with the target fishing mortality rate would allow for a calculation of total allowable landings. Based on the historic proportion of commercial and recreational landings, 42% (note that this percentage will be recalculated upon completion of the revisions to the MRFSS recreational data base) of the total target would be allocated to the commercial fishery.

The annual commercial quota will be set at a range of between 0 and the commercial share of 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 black sea bass 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 Black Sea Bass 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 quota must apply throughout the management unit, that is, in both state and federal waters. All commercial landings would count toward the quota for that period. When the quota had been landed, fishing for and/or landing black sea bass would be prohibited for the remainder of the period.

Any landings in excess of the quota would be subtracted from the following year's quota. For example, if the quota was exceeded by 10,000 pounds in 1997, 10,000 pounds would be subtracted from the quota in 1998.

Using data collected through this FMP (section 1.5.1.3), NMFS will monitor the fishery to determine when a quota will be reached. It is expected that the states will assist NMFS with data collection.

The Regional Director shall close the EEZ to fishing for black sea bass by commercial vessels when the quota has been landed.

1.5.1.2.3.2. Commercial fish size limitations

It is illegal for owners or operators of vessels issued moratorium permits to possess black sea bass less than 9" total length (TL). It is also illegal to possess parts of black sea bass less than 9" to the point of landing.

Beginning in year 3 of the management program, it would be illegal for owners or operators of vessels issued moratorium permits to possess black sea bass less than 10" total length (TL). It would also be illegal to possess parts of black sea bass less than 10" 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 Black Sea Bass FMP Monitoring Committee process set forth in 1.5.1.2.2.

1.5.1.2.3.3. Maximum roller diameter

It would be illegal for owners or operators of vessels issued moratorium permits to use roller rig trawl gear equipped with rollers greater than 18" in diameter.

1.5.1.2.3.4. Minimum escape vent requirement

Black sea bass pots and traps would be required to have a minimum escape vent of 1 1/8" x 6" or 2.5" in diameter. Vents would be required to be placed in a lower corner of the parlor portion of the pot or trap. Pots or traps constructed with wooden lathes would be required to have the spacing between lathes 1 1/8" or greater. The escape vent provision would be implemented at the start of the first calendar year following FMP approval so that fishermen would not be required to pull their pots and add vents in the middle of the season.

Beginning in year 3, vents size would be increased in conjunction with the increase in minimum fish size. Pots and traps would be required to have a minimum escape vent of 1 1/4"x 6" or 2.75" in diameter. Vents would be required to be placed in a lower corner of the parlor portion of the pot or trap. Pots or traps constructed with wooden lathes would be required to have the spacing between lathes 1 1/4" or greater.

A black sea bass pot or trap would be defined by the state regulations that applied to a vessel's principal port of landing. The definition and the minimum escape vent requirement would apply to pots fished in

both state and federal waters.

1.5.1.2.3.5. Degradable fasteners in traps and pots

Black sea bass pots and traps would be required to have hinges and fasteners on one panel or door made of one of the following degradable materials:

a. untreated hemp, jute, or cotton string of 3/16" (4.8 mm) diameter or smaller;

b. magnesium alloy, timed float releases (pop-up devices) or similar magnesium alloy fasteners; or

c. ungalvanized or uncoated iron wire of 0.062" (1.6 mm) diameter or smaller.

1.5.1.2.3.6. Minimum mesh requirement

Owners or operators of otter trawl vessels possessing 100 lbs or more of black sea bass, may only fish with nets that have a minimum mesh size of 4.0" diamond (3.5" 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.

Beginning in year 3 of the management program, owners or operators of otter trawl vessels possessing 100 lbs or more of black sea bass, may only fish with nets that have a minimum mesh size of 4.5" diamond (4.0" 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 more stringent net mesh regulation, the state regulation would prevail. States with minimum mesh regulations larger than those established in this FMP are encouraged to maintain them.

Owners or operators of otter trawl vessels possessing 100 lbs or more of black sea bass may not have available for immediate use any net, or any piece of net not meeting the minimum mesh size requirements, or mesh that is rigged in a manner that is inconsistent with the minimum mesh size. A net that conforms to one of the following specifications and that can be shown not to have been in recent use is considered to be not "available for immediate use":

(1) A net stowed below deck, provided:

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

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

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

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

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

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

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

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

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

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

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

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

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.

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 Black Sea Bass FMP Monitoring Committee process set forth in 1.5.1.2.2. Based on the recommendations of the Black Sea Bass Monitoring Committee and Council, the Regional Director, by regulatory amendment, shall implement regulations on gear other than otter trawls to achieve discards of black sea bass 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 black sea bass fishery are developed as a way of avoiding the minimum otter trawl mesh rule.

1.5.1.2.4. Recreational Fishery Measures

The recreational fishery throughout the management unit would be managed through an annual evaluation of a framework system (section 1.5.1.2.2) of possession limits, size limits, and seasonal closures. Beginning in year 3, 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 were required for the following year or if the fishery needed to be closed for certain periods.

Any landings in excess of the target harvest level would be subtracted from the following year's target level. For example, if the target was exceeded by 10,000 pounds in 1997, 10,000 pounds would be subtracted from the target harvest level in 1998.

In years 1 and 2 of the management program, it would be illegal for recreational fishermen to possess whole black sea bass or parts of black sea bass less than 9" total length (TL). Beginning in year 3, it would be illegal for recreational fishermen to possess whole black sea bass or parts of black sea bass less than 10" total length (TL).

The annual recreational possession limit, size limit, and season will be set at a range of between 0 and the maximum allowed by the recreational share of the adopted fishing mortality rate reduction strategy.

On vessels with several passengers, where catches are pooled in one or more containers, the number of black sea bass 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 black sea bass 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 black sea bass fishing.

1.5.1.2.5. Experimental Fishery

The Regional Director, in consultation with the Executive Director, may exempt any person or vessel from the requirements of this FMP for the conduct of experimental fishing beneficial to the management of the black sea bass resource or fishery.

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

1. have a detrimental effect on the black sea bass resource and fishery or cause any quota to be exceeded; or

2. create significant enforcement problems.

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

All experimental activities must be consistent with the fishing mortality rate reduction schedule in the FMP.

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

1.5.1.2.6. Enforcement recommendations

It is recommended that violators of the mesh regulations be severely punished. This is necessary to minimize abuses of the flexibility introduced into the management regime that allow for several meshes onboard. Examples of possible penalties include permit sanctions and requiring that offenders carry only the legal mesh on board.

1.5.1.2.7. Special Management Zones

Upon request to the Council from a permittee (possessor of a Corps of Engineers permit) for an artificial reef, the modified area and an appropriate surrounding area of an artificial reef or fish attraction device (or

other modification of habitat for the purpose of fishing) could be designated as a Special Management Zone (SMZ). The SMZ would prohibit or restrain the use of specific types of fishing gear that are not compatible with the intent of the permittee for the artificial reef or fish attraction device. The establishment of an SMZ would be done by regulatory amendment:

1. A monitoring team (the team will be comprised of members of Council staff, NMFS Northeast Region, and the NMFS Northeast Fisheries Science Center) will evaluate the request in the form of a written report considering the following criteria:

    a. fairness and equity
    b. promote conservation
    c. excessive shares

2. The Council Chairman may schedule meetings of Industry Advisors and/or Scientific and Statistical Committee (SSC) to review the report and associated documents and to advise the Council. The Council Chairman may also schedule pubic hearings.

3. The Council, following review of the Team's report, supporting data, public comments, and other relevant information, may recommend to the Northeast Regional Director of the National Marine Fisheries Service (RD) that a SMZ be approved. Such a recommendation would be accompanied by all relevant background data.

4. The RD will review the Council's recommendation, and if he concurs in the recommendation, will propose regulations in accordance with the recommendations. He may also reject the recommendation, providing written reasons for rejection.

5. If the RD concurs in the Council's recommendations, he shall publish proposed regulations in the *Federal Register* and shall afford a reasonable period for public comment which is consistent with the urgency of the need to implement the management measure(s).

1.5.1.2.8. Other measures

Only persons with a dealer permit may buy black sea bass 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 black sea bass at the point of first sale only to a dealer that has a dealer permit issued pursuant to this FMP.

Owners or operators of vessels with moratorium permits may not land black sea bass during a period when the Regional Director has determined that the commercial quota has been landed.

All black sea bass on vessels fishing with a mesh smaller than the legal minimum size must have any black sea bass on board boxed in a manner that will facilitate enforcement personnel knowing whether the vessel has 100 lbs or more of black sea bass on board to meet the minimum mesh size criterion. Any unboxed black sea bass on board a vessel fishing with a net smaller than the legal minimum is considered a violation of this FMP. A standard 100 pound tote has a liquid capacity of 18.2 gallons (70 liters), or a volume of not more than 4,320 cubic inches (2.5 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 black sea bass fishery.

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

No vessel may use a net capable of catching black sea bass in which the bars entering or exiting the knots twist around each other.

No person may assault, resist, oppose, impede, harass, intimidate, or interfere with either a NMFS-approved observer aboard a vessel, or an authorized officer conducting any search, inspection, investigation, or seizure in connection with enforcement of this FMP.

1.5.1.3. Specification and Sources of Pertinent Fishery Data

1.5.1.3.1. 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) black sea bass catch, effort, and ex-vessel value and the catch and ex-vessel value of those species caught in conjunction with black sea bass 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 boats with Federal permits issued pursuant to this FMP must submit logbooks monthly showing at least name and permit number of the vessel; total 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. A sample of party and charter boats may be required to report length frequencies of species caught for a sample of their trips.

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

It is intended that the reports required by this section are the same as the reports required by the Summer Flounder FMP, the Northeast Multispecies FMP, and the Atlantic Sea Scallop FMP. That is, fishermen need to submit one logbook report, not one report for each FMP.

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

1.5.1.3.2. 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 black sea bass purchased (in pounds), and the name and permit number of the vessels from whom the black sea bass 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).

It is intended that the report required by this section is the same as the report required by the Summer Flounder FMP. That is, fishermen need to submit one logbook report, not one report for each FMP.

1.5.1.3.3. 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.

2. REGULATORY IMPACT ANALYSIS

The impacts of the adopted management measures are presented at continuation.

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

2.1.1. The FMP Relative to the National Standards

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:

2.1.1.1. 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 black sea bass. OY is all black sea bass harvested pursuant to this FMP.

Overfishing in the Black Sea Bass FMP is defined as fishing in excess of the F_{max} level. F_{max} is a biological reference point derived from yield per recruit analysis that corresponds to the level of fishing mortality (F) that produces the maximum yield per recruit. The Council has adopted an overfishing definition for black sea bass based on an estimate of F_{max}. Best available information indicates that F_{max} is 0.29 for black sea bass based on current conditions in the fishery.

Stock assessment information indicates that black sea bass stocks are overfished (NEFSC 1995). Results of a virtual population analysis indicate that current fishing mortality rates (F) is 1.05. Based on this mortality estimate, exploitation rates would have to be reduced 60% to achieve an F_{max} of 0.29.

The Council and the ASMFC Management Board approved a recovery strategy that reduces overfishing on black sea bass over an 8 year time frame. The recovery strategy calls for minimum fish sizes and commercial gear regulations in year 1 and 2. In years 3 to 5, target exploitation rates would be 48% for black sea bass. In years 6 and 7, the target exploitation rates would be 37% and in year 8 and subsequent years, the target exploitation rate would be based on F_{max}. Based on current conditions in the fishery, F_{max} is 0.29 and the associated exploitation rate is 23%.

This eight-year strategy reflects the pressure now being placed on fishermen by other FMPs. Although the black sea bass resource should be rebuilt as quickly as possible, black sea bass management measures can be implemented over an eight-year time frame to minimize the short term economic burden placed on fishermen and still reduce the overfished condition of the stocks.

2.1.1.2. 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 black sea bass

research should be devoted toward both data collection and analysis in order to evaluate the effectiveness of this FMP. This species should be reviewed annually by the NEFSC Stock Assessment Workshop process.

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

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

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

The 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.

This FMP would establish a commercial fishery quota system for black sea bass, based on historical landings data. This allocation, based on traditional landings patterns, would ensure that fishermen from each state received a fair and equitable share of the resource.

Commercial regulations would be applied coastwide. The minimum sizes for the recreational fishery, are also the same throughout the management unit.

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

The moratorium is fair and equitable. The Council voted to establish 26 January 1990 as a control 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 this FMP. The long time period for establishing eligibility (26 January 1988 through 26 January 1993) assures that the largest possible number of fishermen can qualify under the moratorium.

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

The 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.

2.1.1.6. 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 minimum size regulations were developed with the recognition that the commercial and recreational fisheries have traditionally harvested similar sizes of black sea bass.

The commercial minimum size regulations, mesh regulations, and pot requirements were designed to reduce the discarding of small black sea bass by commercial vessels, increase yields, and allow more black sea bass to reach sexual maturity and spawn. Monitoring of the fishery will indicate if discards are reduced and whether modifications in gear regulations or minimum sizes should be implemented during any year of the management program.

The commercial minimum fish size, gear regulations, and commercial quota and the recreational size limits, possession limits, and season are all specified so that they may be adjusted annually following procedures set forth in the FMP to assure that the fishing mortality reductions strategy is followed.

2.1.1.7. 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, gear regulations, 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.

2.2. METHODOLOGY AND FRAMEWORK FOR ANALYSIS

For the alternatives considered in the plan, an analysis of expected benefits was conducted. In an ideal situation, as data permit, discounting can be employed to transform future benefits and costs into present values. The net yield steam over time associated with different alternatives would be employed to evaluate and compare impacts. The benefits or value of the change in output are interpreted as the change in the consumers' and producers' surplus in the commercial sector. For recreational fisheries, consumer surplus can be estimated by the travel cost, contingent valuation, etc. Unfortunately, the issues addressed in the Amendment cannot be quantified due lack of data. The analysis employed in the document is qualitative in nature, however, it is intended to analyze the directional effect of the course of actions and the effects on the fishery industry. A summary of the incremental benefits and costs of all major alternatives is presented at the end of the document.

2.3. PREFERRED ALTERNATIVES

2.3.1. Recreational Fishery

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

The proposed minimum size limits would effect recreational landings of black sea bass in all states with landings of black sea bass. In 1991, almost 100% of the sea bass were landed in states from New York to North Carolina (Table 22). In states north of New York, landings were relatively small. In fact, during most years from 1983-92, landings in North Carolina exceeded the landings in all the North Atlantic states combined.

Analysis of 1990-92 intercept data for states from New York through North Carolina indicated that 14 to 38% of the measured sea bass were less than 9" TL (Table 36). On a coastwide basis, Maine to Cape Hatteras, NC approximately 28% of the black sea bass were less than 9" TL. Assuming a post-release mortality of 25%, the percent reduction in the number of black sea bass killed by anglers associated with a 9" TL minimum size limit would be 21% (Table 37).

These assumed level of post-release mortality (hooking and handling mortality) used in the above calculations is based on several studies. Bugley and Shepherd (1991) conducted a hooking mortality study

on black sea bass caught by hook and line in Nantucket Sound, MA. They estimated a hooking mortality of 4.7% based on their sample size of 64 fish. However, these fish were caught in water depths of 6-12 m. Rogers et al. (1986) found severe trauma in black sea bass caught by hook and line in relatively deep water (37 m) due to oral protrusions of the swim bladder. Of the 169 black sea bass collected by angling, 45 or 27% had protrusions of the swim bladder. Based on these studies and hooking mortality studies conducted for other fish, the ASMFC technical committee assumed a 25% hooking mortality for black sea bass caught by recreational fishermen.

Beginning in year 3, the same minimum size of 10" TL would apply to the recreational fishery throughout the management unit. Based on 1990-92 intercept data, 45.9% of the sea bass landed during these years were less than this size (Table 36). However, increased survival of smaller fish due to minimum size regulations and reduced discards in years 1 and 2 of the management program should allow larger fish to become more available to recreational fishermen in year 3. As a result, the short term effect of the 10" TL minimum size to the fishermen in these states would be less than the 45.9% reduction associated with 1990-92 landings.

Based on the fishing mortality reduction schedule adopted by the Council and Commission, exploitation would have to be reduced 20% in year 3 to achieve the target F. MRFSS data for 1990-92 indicate that catch frequencies for black sea bass ranged from 1 to 150 fish per day on a coastwide basis (Table 38). Based on these data, the reductions in exploitation associated with various possession limits for 1 to 50 black sea bass per trip were calculated (Table 39). The coastwide possession limit associated with a 20% reduction in exploitation is 16 fish. The possession limit would increase when combined with size limits and/or seasons.

Analysis of black sea bass recreational data indicated that nearly 30% of the annual landings occurred from September through October for the years 1990 to 1992 combined (Table 40). Seasons based on this MRFSS data could be established on a coastwide basis to reduce exploitation. A season could be combined with the size limit to allow for higher possession limits.

It is expected that the implementation of minimum size limits will allow recreational fishermen to have larger fish available to them over the stock recovery period. This will likely mitigate the initial effects of the size limits. The two year period before a possession limit is implemented will provide sufficient time for initial recovery without closing the fishery or affecting the economy or social structure of the participants in a detrimental manner.

In the long term, the implementation of the minimum size limits considered in this plan could enhance the recreational fishing opportunities through the management unit. Furthermore, implementation of a regional minimum size limit will likely enhance compliance by participants.

2.3.1.2. 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 50 black sea bass per angler, the size limit from 9" TL to 12" 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.

Short term impacts due to restrictive limits would be outweighed by the long term benefit of conserving the black sea bass stock for future generations of recreational anglers. The possession limit could be as high as 50 black sea bass, the size limit decreased to 9" TL, and the season open throughout the year. However, decreases in restrictions would only occur under circumstances of increased black sea bass 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 black sea bass are abundant or angler effort is less. Although it is not possible to estimate exact impacts for hypothetical levels of black sea bass 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 black sea bass 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 12" 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 58% based on 1990-1992 coastwide MRFSS data (Table 37). 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. 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.

Beginning in year 3 of the management program, 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.

2.3.2. Commercial Fishery

2.3.2.1. Minimum fish size

Historic commercial length frequencies were used as an estimate of potential short-term impacts of length limits on the commercial black sea bass fisheries (Tables 41 to 44). Specifically, commercial length frequencies from the NMFS Weighout Data and North Carolina DMF from 1982 to 1992 were used to determine potential size limit effects. In general, size frequency data indicated that potential size limit effects increased from north to south, were gear dependent, and varied from one year to the next.

Based on NMFS weighout data, approximately 11% of the measured black sea bass were less than 9" TL for all otter trawl vessels with sampled landings (Table 43). This gear is associated with most of the commercial landings coastwide; otter trawl vessels accounted for over 56% of the coastwide landings based on 1983-1992 General Canvass data (Table 10).

A 9" TL minimum size regulation would have a slightly greater effect on landings from fish pots/traps, the other predominant gear in the black sea bass fishery (this gear accounted for 33% of the landings from 1983-92). Based on NMFS weighout data, almost 26% of the measured fish were less than 9" TL for the 4,592 black sea bass obtained from this gear from 1983 to 1991 combined (Table 43).

Size limit effects varied annually in North Carolina landings from the winter trawl fishery (Table 44). From 1983 to 1992, the amount of measured fish less than 9" TL ranged from 17.1% to 38.9%. North Carolina accounted for 11% of the coastwide commercial landings on average from 1983-1992.

Assuming that undersized fish are not caught and discarded, minimum size regulations have positive

impacts on the stock. In general, because minimum sizes increase the size at full recruitment, yields are increased as fishermen catch larger, heavier fish. In addition, minimum size regulations can increase the resilience of the stock to overfishing, i.e., the biological reference points (F_{max}) can increase. Finally, minimum size regulations can increase spawning stock biomass by allowing more fish to spawn. Sexual maturity data for black sea bass indicate that 50% of the black sea bass are mature by a size of 7.7" TL.

2.3.2.2. Minimum mesh size

Owners or operators of otter trawl vessels possessing 100 lbs or more of black sea bass would only be allowed to fish with nets that have a minimum mesh size of 4.0" diamond (3.5" square) in the codend. The L_{25} (the length at which 25% of the black sea bass are retained) is 9.3 inches for this mesh size (Table 45).

Mesh selectivity studies have not been conducted for black sea bass. The relationship between body depth and total length as derived by Weber and Briggs (1983) was used to calculate the 50% retention lengths for black sea bass. A selection range of 2 inches (based on selectivity studies conducted on fish of similar shape) was then used to estimate 25% and 75% retention lengths.

Landings of black sea bass represent only a portion of the fishing mortality experienced by the stock. Undersized black sea bass, those less than 9" 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.

Black sea bass are a component of the mixed trawl fishery in Southern New England and the Mid-Atlantic. Although Sea Sampling data indicate that fishermen may differentiate between species on a per tow basis (i.e., target a single species on a tow), fishermen land many different species on a per trip basis. Based on 1992 NMFS weighout data, black sea bass are most frequently landed with *Loligo* squid, silver hake, scup, and flounder. In fact, for trips landing a 100 or more pounds of black sea bass per trip, more *Loligo* squid were landed than black sea bass in 1992 (Table 29).

However, this predominance of *Loligo* may reflect reduced availability of other species in 1992. Based on 1983 to 1987 data, the landings of otter trawl vessels landings 100 lbs or more of black sea bass were composed primarily of scup (29%) and summer flounder (24%) (Table 46). *Loligo* accounted for only 17% of the landings.

The 100 pound threshold would effect 62% of the vessels and 34% of the trips that landed black sea bass in 1992 (Table 47) These trips accounted for 95% of the black sea bass landed by otter trawl vessel in 1992.

Regulations that allow multiple nets onboard would allow fishermen who traditionally targeted multi-species on a trip, to fish for and retain other species with small mesh until the 100 pound threshold of black sea bass was reached. These fishermen would then have to use the 4.0" mesh if they decided to target more black sea bass. Once the threshold was reached fishermen would have to properly stow other cod ends for the remainder of the trip.

Landings of black sea bass by fishermen targeting *Loligo* squid and scup on the same trip could be effected by these regulations. Based on 1992 NMFS weighout data, 45% of the vessels and 29% of the trips landing 2500 pounds or more of *Loligo* squid, landed over 95% of *Loligo* landed by all *Loligo* otter trawl fishermen (Tables 48 and 49). Based on this 2500 pound threshold, black sea bass comprise slightly less than 0.7% of the total fish landed on these trips (Table 50). However, the total pounds accounted for approximately 41% of all black sea bass landed by otter trawl fishermen in 1992.

Similarly, 52% of the vessels and 28% of the trips landing 1000 pounds or more of scup, landed over 95% of scup landed by scup otter trawl fishermen (Tables 51 and 52). Based on this 1000 pound

threshold, black sea bass comprise slightly more than 1.1% of the total fish landed on these trips (Table 53). Because scup and *Loligo* squid are frequently landed on the same trip, the total pounds accounted for approximately the same amount of black sea bass landed by directed *Loligo* squid trips.

In general, these regulations would modify some traditional fishing practices. The fishermen most effected by these regulations would be those fishermen who targeted other species on a trip with small mesh net (squid, scup, or whiting) and had coincidental catches of black sea bass. If a fishermen had 100 lbs of black sea bass on board, and desired to continue fishing with a small mesh net, he would be required to discard any sea bass caught in tows directed to other species. Alternatively, if he desired to continue to fish for black sea bass, he would have to stow his other cod ends for the remainder of the trip perhaps losing an opportunity to catch and land valuable bycatch (i.e., summer flounder, squid, etc.).

However, these mesh provisions should have minimal effect on bycatch species. Most of the species caught with black sea bass are regulated, or have proposed regulations that require mesh sizes and/or minimum fish sizes that equal or exceed the black sea bass regulations. A 6" minimum mesh size is required for most of the New England groundfish species. The minimum mesh size for summer flounder is 5.5" with a minimum fish size of 13" TL. The proposed minimum size for black sea bass would require that fishermen use a 4.5" tail bag to reduce catch of sublegal fish, i.e. those less than 9" TL.

Minimum mesh provisions in conjunction with the minimum fish size will ensure that discards of sub-legal black sea bass will be reduced. Greater gains will accrue to fishermen through protecting black sea bass until they reach legal size. Discard mortality is extremely high for trawl caught fish and the problem is particularly acute when new year classes are abundant. The benefits of the proposed minimum fish size and mesh size regulations will be manifested through a more balanced age structure of the black sea bass stock. Further, waste will be reduced due to (1) lower total discards and (2) lower mortality of net encounter.

Major changes of net benefits from the implementation of this measure can not be quantified given existing information. Increases in operating costs are expected to be minimal from the implementation of this measure. Potential positive effects include decreases in economic waste from harvesting sub-legal black sea bass and increases in yields over time.

2.3.2.3. Maximum roller diameter

It would be illegal for owners or operators of vessels issued moratorium permits to use roller rig trawl gear equipped with rollers greater than 18" in diameter. A 18" diameter corresponds to the maximum roller diameter limitation imposed by the state of Massachusetts to regulate this gear in state waters.

Roller diameter is correlated with vessel size and the ability of vessels to fish rough, hard bottom areas. Larger roller sizes require larger engine sizes to pull the net. An engine size with an associated horsepower of 800-900 hp is required to tow a net with 18" to 24" rollers whereas 10" to 12" rollers can be pulled by a boat using a 175-200 hp engine (D. Simpson pers. comm.).

Information is lacking as to the relationship between roller diameter and the size of obstruction that it can clear. In general, 10-12" diameter rollers can be used for fishing over rough bottom that can include ledges and cliffs. Limitations on roller size will make some areas of the ocean inaccessible to trawls by preventing fishermen from trawling in the harder, rough bottom areas. As a result, black sea bass associated with these areas would be protected from harvest allowing more fish to grow to maturity and spawn increasing stock biomass and yields.

2.3.2.4. Minimum escape vent requirement

Black sea bass pots are required to have a minimum escape vent of 1 1/8" x 6" or 2.5" in diameter. The escape vent provision would be implemented at the start of the first calendar year following FMP approval

so that fishermen would not be required to pull their pots and add vents in the middle of the season.

During the development of this plan, Council staff proposed that black sea bass pots or traps have escape vents that would allow for the release of undersized fish. Although there were a number of studies that indicated that escape vents release fish from pots and traps, there were a lack of specific studies on black sea bass. MAFMC staff initiated a project in 1994 to determine the size selectivity of traps fitted with vents of various sizes. The objective of the study was to determine the vent size which allowed 50% escapement of black sea bass below the proposed minimum size limits of 9" and 10" TL.

In the study, the catch and size distribution of black sea bass taken in commercial sea bass pots fitted with escape vents was compared to catches from unvented traps. Four strings of 25 traps (100 traps) were fished from May through October, 1994 on commercial fishing grounds in areas offshore from Cape May, NJ to Ocean City, MD. A total of 9 trips were made to haul the traps.

A total of 100 traps were assigned a vent size of 1 1/8" x 6", 1 1/4" x 6", 1 3/8" x 6", 1 1/2" x 6", or no vent (control). The traps with the various vent sizes were randomly placed in groups of five on the four strings. The vents were made from aluminum and were patterned after the vents used in lobster traps. Vents were placed vertically in the door of the trap such that they would allow fish to escape from the lower corner of the parlor portion of the trap. The lower corner location was used as the result of aquarium studies that indicated sea bass almost always tried to escape from a lower corner after they were placed in a trap (G. Shepherd pers. comm.).

Traps were fished under normal commercial fishing conditions. Soak time, the period between hauls, averaged 14 days. The catch from each trap was retained separately and all black sea bass were measured to the nearest half cm TL.

Length frequency distributions were constructed for black sea bass from each of the treatment vent sizes and control. Proportions retained at length were computed as the ratio between the number of fish taken in vented traps and the number taken at that length in the control traps. The length at 50% retention for each vent size was estimated by fitting a logistic curve to the proportion retained at length data for each vent size.

A total of 5574 black sea bass were measured from the 100 traps from April through October. Black sea bass ranged in size from 16.5-36.5 cm. The control traps caught the largest number of sea bass (n = 1534) followed in descending order by traps with the experimental vents: 1 1/8" (n = 1164), 1 1/4" (n = 644) 1 3/8" (n = 397) and 1 1/2" (n = 305).

Results indicate that vents do release undersized black sea bass. Length frequency histograms for black sea bass from each vent size compared to the control are presented in Figures 12 - 15. Based on these length frequencies, the L_{50} derived for traps fitted with the 1 1/8" and 1 1/4" vents was 8.7" TL and 10.1" TL, respectively (Table 54). Based on these results, a 1 1/8" x 6" vent will be required for traps during the first two years of the management program when the size limit will be 9" TL and 1 1/4" x 6" when the size limit is 10" TL.

Studies were not conducted to determine the selectivity of traps fitted with circular escape vents. A body length/depth relationship (Weber and Briggs 1983) was used to derive the minimum sizes of black sea bass that would be retained by fish traps fitted with these escape vents (Table 55).

Pots and traps accounted for approximately 33% of the total commercial landings for the period 1983-1992. However, in recent years the proportion of the landings attributable to this gear has generally increased. In 1991, this gear accounted for almost 62% of the landings. The escape vents will allow for a significant proportion of undersized fish to escape alive. Currently, relatively few sea bass fishermen in the Mid-Atlantic have escape vents in their pots and traps. This gear is fished at varying depths and hauled to the surface quickly with hydraulic or electric pot hauler. As a result, fish may experience internal

trauma due to changes in pressure and a significant portion may not survive (Rogers et al. 1986). Although many pot fishermen use sorters on deck to release nonmarketable fish, the escape of these fish from the traps before they are hauled will significantly increase survival.

In addition, fishermen are encouraged to use sorting devices that allow for undersized fish to be returned quickly to the water. Combined, the escape vent provisions and sorting devices will significantly reduce the number of undersized fish that are killed by pot fishermen. This reduction in sublegal mortality will increase yields and the amount of mature fish in the stock.

2.3.2.5. Degradable fasteners in traps

Black sea bass pots would be required to have hinges and fasteners of one panel or door made of degradable materials. These materials would allow the door or panel of a trap to fall away from an unattended trap. This would prevent lost traps from "ghost fishing", i.e., continuing to catch and retain fish that could not be removed from the trap. Thus black sea bass and other species of fish and invertebrates typically caught by these traps could escape preventing waste and lost yields in a number of fisheries.

Increases in costs from the implementation of this management strategy are expected to be minimal. Positive benefits would be derived from the prevention of "ghost fishing."

2.3.2.6. Commercial quota

Beginning in year 3 a quota would be allocated to the commercial fishery to control fishing mortality. The quota would be based on stock assessment information on projected stock size estimates for that year. Estimates of stock size coupled with the target fishing mortality rate would allow for a calculation of total allowable landings. Based on the historic proportions of commercial and recreational landings for 1983 to 1992, 42% of the total target would be allocated to the commercial fishery. Note that this percentage would change to reflect the revisions to the MRFSS data set that will be available in 1995.

To assess potential impacts of the quota, landings data were used from 1988-1992 to derive average landings for those years (3.275 million lbs). Based on these data, a 20% reduction in exploitation would equate to a commercial quota of 2.6 million lbs (80% x 3.275).

The gear restrictions and minimum fish size regulations will reduce discard and escape mortality of undersized black sea bass. However, decreases in mortality would occur only with the smaller fish; reductions in mortality would not occur for black sea bass once they reached the legal size of 10" TL. Essentially the fish that contribute the most to the spawning population, fish 10" 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.

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 black sea bass will allow for an increase in yield or harvest as small fish that were previously killed grow larger and add weight to the stock.

Combined, these management measures, the minimum size regulation and the commercial quota, will prevent overfishing and reduce waste. As the stock rebuilds, commercial quotas would increase.

2.3.2.7. 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 black sea bass commercial fishery is estimated to range between 545 and 565 vessels.

In addition to black sea bass, these vessels land *Loligo* squid, Atlantic mackerel, silver hake, summer flounder, scup, and other species. Most of the marketable species caught in the mixed trawl and pot fisheries are depleted, if not technically overfished. A moratorium exists for vessels in the summer flounder fishery. The Mid-Atlantic Council has already determined that black sea bass are overfished, and has adopted a control date for limited entry. The New England Council has approved moratoria for the Northeast Multispecies FMP and the Scallop FMP.

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 beginning in year 3 of the management program, 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.

The Amendment proposes a moratorium on new entrants to the commercial black sea bass 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 black sea bass between 26 January 1988 and 26 January 1993.

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 black sea bass 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.

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 black sea bass fishery follows:

A. Present participation in the fishery.

Present participation in the black sea bass commercial fishery is estimated to range between 545 and 565 vessels. The proposed program of limited entry seeks to reduce the size of the fleet gradually through natural attrition. No vessel which was actively fishing for black sea bass between 26 January 1988 and 26 January 1993 would be denied access to the fishery.

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

Fishermen using otter trawls and pots/traps account for the majority of commercial landings; 56% and 33% respectively, based on 1983 to 1992 data (Table 10). Other important commercial gears include hand lines, lobster pots, and floating traps. Many species are caught in conjunction with black sea bass (Table 29). Economically, black sea bass is an important species in the mixed trawl fishery (Table 29).

C. The economics of the fishery.

Black sea bass are economically important species in the mixed trawl fishery, the predominant species landed by black sea bass pot fishermen, and an important bycatch for some lobster fishermen. 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 dissipated among new entrants following recovery, and over-capitalization in this segment of the fishery industry could result. The implementation of this alternative will allow historical participants in the fishery to continue in this activity and maintain adequate productivity and profitability levels.

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

Black sea bass vessels traditionally harvest other species. However, a number of species in the mixed trawl and pot fisheries have also been determined to be overfished. The Mid-Atlantic Council has determined that summer flounder and scup are overfished and is preparing an amendment to the Bluefish FMP to eliminate the overfished nature of that resource. The ASMFC has adopted an Amendment to their Weakfish FMP to eliminate an overfished situation. The Mid-Atlantic Council has prepared an Amendment to the Atlantic Mackerel, Squid, and Butterfish FMP to limit entry into the squid and butterfish fisheries.

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.

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

Many of the vessels in the fishery are owned and operated by independent, individual fishermen who have obtained their position of ownership through individual enterprise. There is a strong tradition of black sea bass 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.

2.4. ALTERNATIVE TO THE AMENDMENT

2.4.1. Take no action at this time

2.4.1.1. Description

No action would mean that the black sea bass fishery would not be managed under the Magnuson Act. The resource would continue to be overfished.

2.4.1.2. Evaluation

The "No Action" alternative would not solve the problems identified in section 4 of the FMP. Further improvements and development of the US fishery would not be attained. The overall result from this action would likely be that net benefits would be affected in a negative manner.

2.4.2. Seasonal closures in the commercial fishery for years 3 and beyond

2.4.2.1. Description

This alternative would achieve the fishing mortality rate reduction target in years three and beyond through a seasonal closure in conjunction with a minimum fish size and gear regulations.

The Monitoring Committee would annually estimate a mortality target from the fishing mortality rate reduction schedule. From this, a seasonal closure would be specified to assure that the mortality target was not exceeded. This would go through a review, comment, and approval process involving the Council, ASMFC Management Board, and NMFS Northeast Regional Director.

Gear-specific seasonal closures would be implemented to control fishing mortality in the commercial black sea bass fishery (Table 61). During a seasonal closure all gear capable of catching black sea bass be removed from the water during the closed period. In addition, vessels would be required to carry and operate an electronic vessel tracking device that met NMFS specifications.

2.4.2.2. Evaluation

NMFS General Canvass Data from 1988 to 1992 were used to determine the potential impact of seasonal closures on commercial landings of black sea bass. The ASMFC technical committee decided that these years would be most representative of current conditions in the fisheries.

The committee decided that seasonal closures for black sea bass fishermen be applied on a coastwide basis. Calculations restricted the smallest unit of closure to one week. In addition, seasonal closures were derived assuming that fishermen would recoup 0% and 15% of their landings during the open season. The 15% level applied to all mobile gears, including hook and line. Because of the fixed nature of the pots and traps, only a 0% (no recoupment) level was used for these gears.

If a recoupment level was assumed, calculations were made using a simple algorithm that accounted for changes in landings per day (LPD) during the open and closed seasons. For example, for black sea bass landed by otter trawl fishermen, the time period from November 15 to January 31 accounted for 34% of the landings during 1982-1991. A closed season during these months would result in a fishing season that

would be open for 8 ½ months (February through November 14) or approximately 288 days. The amount of discretionary time during this open period would be 43 days (15% x 288 days). Since 66% of the landings occurred during the open period, the LPD during the open period would be 66 divided by the days fished or 245 (288-43). This LPD multiplied times the discretionary time (43 days) would result in a recoupment of 12%. As a result, the realized reduction in landings for the closed period February through May would be 22% (34% - 12%).

Seasonal closures ranged from slightly more than one month to four months depending on location (north or south) and gear type (Table 61). Seasonal closures could achieve the desired reductions if the following criteria were met:

1. The level of discretionary time used to derive the reductions is realistic. The assumed value of 15% may be an underestimate for some gears, especially for the black sea bass trawl fisheries where there are few directed trips, i.e., most sea bass are caught incidentally with other species.

2. All gear capable of catching black sea bass be removed from the water during the closed period. Without such a provision, fishermen would continue to fish for other species during the closed period, catching and discarding black sea bass in the process. For trawl fisheries, the technical committee recommended that mesh sizes of 5.5" diamond mesh or larger could continue to operate and exemptions be required for squid and fly net fisheries.

3. Landings patterns do not vary much from one year to the next, i.e., anticipated landings in year three of the management program are similar to the landings observed for 1988-1992.

It is also important to note that fishermen could negate seasonal closure effects by increasing effort or efficiency during the open season. These increases could produce conditions in the stock that were equivalent to or worse than those before regulations.

Finally, any effective area/seasonal closure would require that NMFS be able to track commercial vessels on a real time basis to ensure a high level of compliance. Such a system could be comparable to the Vessel Monitoring System that will be implemented by NMFS for groundfish and scallops.

2.4.3. *Bimonthly commercial quota*

2.4.3.1. Description

This alternative would allocate the annual coastwide quota on a bimonthly basis. The Regional Director would be required to prohibit landings by federally permitted vessels when any bimonthly quota had been reached.

The quota setting process is specified in 1.5.1.2.2. Beginning in year 3, a quota would be allocated to the commercial fishery to control fishing mortality. The quota would be based on projected stock size estimates derived from stock assessment information for that year. Estimates of stock size coupled with the target fishing mortality rate would allow for a calculation of total allowable landings. Based on the historic proportions of commercial and recreational landings, 42% of the total target would be allocated to the commercial fishery (Note that this percentage will be modified to reflect the changes to the MRFSS data by the NMFS).

The annual commercial quota will be set at a range of between 0 and the commercial share of 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 black sea bass are caught with an otter trawl, pot, 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 Black Sea Bass 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 quota must apply throughout the management unit, that is, in both state and federal waters. All commercial landings during a bimonthly period would count toward the quota for that period. When the quota had been landed for a bimonthly period, fishing for and/or landing black sea bass would be prohibited for the remainder of the period.

Any landings in excess of the bimonthly quota would be subtracted from the following year's quota for the same period. For example, if the period 1 (January-February) quota was exceeded by 10,000 pounds, 10,000 pounds would be subtracted from the period 1 allocation the following year.

Using data collected through this FMP (section 1.5.1.3), NMFS will monitor the fishery to determine when a bimonthly quota will be reached. It is expected that the states will assist NMFS with data collection.

The Regional Director shall close the EEZ to fishing for black sea bass by commercial vessels when the bimonthly allocation has been landed.

The Regional Director may establish a system of trip limits to ensure an equitable distribution of the quota over the bimonthly period.

Annual quotas would be allocated on a bimonthly basis based on commercial landings for the period 1988-1992 (Table 62).

2.4.3.2. Evaluation

Beginning in year 3 a quota would be allocated to the commercial fishery to control fishing mortality. The quota would be based on stock assessment information on projected stock size estimates for that year. Estimates of stock size coupled with the target fishing mortality rate would allow for a calculation of total allowable landings. Based on the historic proportions of commercial and recreational landings for 1983 to 1992, 42% of the total target would be allocated to the commercial fishery.

To assess potential impacts of the quota, landings data were used from 1988-1992 to derive average landings for those years (3.275 million lbs). Based on these data, a 20% reduction in exploitation would equate to a commercial quota of 2.6 million lbs (80% x 3.275).

A bimonthly quota system could allow for an equitable allocation of the commercial quota to northern and southern participants as well as between the smaller day boats and larger offshore vessels. Due to the seasonal nature of the black sea bass fishery, the quota would have to be divided into bimonthly units. To minimize effects on traditional landings patterns, the allocation to each period would be based on past landings instead of a system that divided the quota equally over the six periods. Based on 1988-1992 data, 20.79% would be allocated to period 3 (May-June) and only 8.46% to period 4 (July-August) (Table 62). The bimonthly allocations would range from 219,960 lbs to 687,440 lbs based on a annual quota of 2.6 million lbs (Table 62). Based on state data for those years, fishermen would be able to maintain traditional landings patterns in most states (Tables 63 and 64).

A coastwide system would allow fishermen to land in any port along the coast and all commercial landings during a bimonthly period would count toward that quota for that period. When the quota had been landed for a bimonthly period, fishing for and/or landing black sea bass would be prohibited for the remainder of

the period. Landings in excess of the allocation for the period would be subtracted from the following years's quota for the same period. Trip limits would have to be implemented. Bimonthly allocations without trip limits would encourage derby-style fishing practices that would allow the quota to be landed by larger, more mobile vessels at the beginning of each period. As a result, supplies of black sea bass would be discontinuous and smaller boats would be disadvantaged.

Trip limits would be established and modified throughout the two-month period to allow for a continuous supply of product and equitable distribution of black sea bass to fishermen using both small and large vessels. For example, almost all of the landings in period 1 are attributable to fishermen using otter trawl vessels. A 5,000 pound trip limit could be established for the beginning of period 1. The limit would decrease to 2,500 lbs when 50% of the allocation was reached, 1000 lbs when 75% of the quota was taken, and 500 lbs when 90% of the landings were reached.

Different trip limit systems could be designed for each period to ensure equitable distribution over each two-month period. Unlike a system where states have the flexibility to design their own systems, NMFS would be responsible for implementing trip limits for each period.

2.4.4. State by state quotas

2.4.4.1. Description

This alternative would allocate the commercial quota on a state by state basis. States would have the responsibility for closures in their state and the Regional Director would be required to prohibit landings by Federally permitted vessels in any state that had reached its quota. States would be allowed to trade or combine quotas and the states could impose trip limits or other measures to manage their quotas. The system would be the same as that operating under the Summer Flounder FMP.

2.4.4.2. Evaluation

The quota setting process is specified in 1.5.1.2.2. Beginning in year 3, a quota would be allocated to the commercial fishery to control fishing mortality. The quota would be based on stock assessment information on projected stock size estimates for that year. Estimates of stock size coupled with the target fishing mortality rate would allow for a calculation of total allowable landings. Based on the historic proportions of commercial and recreational landings, 42% of the total target would be allocated to the commercial fishery (Note that this percentage will be modified to reflect the changes to the MRFSS data by the NMFS). To assess potential impacts of the quota, landings data were used from 1988-1992 to derive average landings for those years (3.275 million lbs). Based on these data, a 20% reduction in exploitation would equate to a commercial quota of 2.6 million lbs (80% x 3.275).

Quotas would be distributed to the states based on their percentage share of commercial landings for the period 1988-1992. Quotas would range from 1,300 lbs to 892,060 lbs based on these percentages (Table 65).

A state-by-state quota system could allow for the most equitable distribution of the commercial quota to fishermen. Specifically, states under this alternative would have the responsibility of managing their quota for the greatest benefit of the commercial black sea bass industry in their state. States could design allocation systems based on trip limits and seasons. States would also have the ability to transfer or combine quota increasing the flexibility of the system to respond to year to year variations in fishing practices or landings patterns.

However, state-by-state allocations could negatively affect fishermen who land in those states that do not have the capability of regulating a quota. Based on the quota system implemented for summer flounder, a few states have not been able to establish trip limit systems that ensure a continuous and steady supply of product over the season for producers and/or a fair an equitable distribution of flounder to all fishermen

who have traditionally landed summer flounder in their state. In addition, some states have had problems coordinating their regulations with neighboring states to prevent large scale landings by fishermen in states with the most favorable trip limits. A similar situation could occur if a state-by-state system was implemented for black sea bass.

2.4.5. Individual transferrable quotas

2.4.5.1. Description

An individual transferrable quota (ITQ) program would assign annual quotas to individual vessels. Qualifications to participate could be the same as participation under the vessel moratorium. Initial allocations could be made based on sales receipts for the most recent five years, but no vessel could be allocated more than some maximum percentage. Fishermen would be prohibited from fishing for or landing black sea bass after their annual allocations had been taken.

2.4.5.2. Evaluation

ITQs are a relatively new management technique where a total quota is divided into small parts and allocated to individual participants. Individual quotas or shares could be bought, sold or leased so that harvesters have flexibility in planning their fishing activities. Potential advantages of ITQs include increased profits, greater economic stability, improved product quality, improved safety, reduced gear conflicts and losses, elimination of derby-type fisheries, bycatch reduction, an improved investment climate, reduction of market gluts, and reduction in post-harvest waste (Anderson 1986). Potential disadvantages of ITQs include increased high-grading, under-reporting of catch, enforcement costs and problems, creation of a "rich mans club", changes in the makeup of the fishing fleet, and potential inequities of the initial allocation of quota shares due to lack of information (Anderson 1986).

An ITQ program could allow individual fishermen greater flexibility than any of the quota or seasonal closure based systems. That is, they could fish for black sea bass when they wanted to, rather than being controlled by quota or seasonal closures.

As with the other alternatives, fishermen could not fish for (catch and discard as well as catch and land) black sea bass after their allocations had been taken. This would require careful management of their allocations to assure that their participation in other small mesh fisheries did not violate their ITQ allocations.

An initial problem is associated with the initial allocation process. A great deal of time would be required to obtain and validate sales records to determine initial allocations. NMFS weighout data indicate a minimum of 460 vessels could be eligible for allocations. Since not all vessels are captured in the weighout data base, the number could be considerably larger. It might be preferable to initiate management of the black sea bass resource without ITQs to protect the resource and introduce an ITQ system subsequently.

2.4.6. Seasonal dependent minimum sizes in the commercial fishery: a 10" TL minimum size from October 1 -April 30 and a 9" TL minimum size for the rest of the year

2.4.6.1. Description

This alternative would require that commercial fishermen not land for sale any black sea bass smaller than the 9" TL minimum size limit from May through September 30 and a 10" TL minimum size limit from October 1 through April 30. Gear regulations for otter trawl fishermen and pot/trap fishermen would correspond to the 10" TL minimum size as identified in the preferred alternative, i.e., a 4.5" minimum mesh size and 1 1/4" x 6" or 2.75" vents. A maximum of a 5% tolerance by weight of undersized black sea bass would be allowed on commercial vessels. Black sea bass less than the minimum size limit could

not be sold. This alternative would be used in conjunction with other alternatives such as the quota or closed seasons beginning in year 3 of the management program.

The minimum fish size may be changed annually, if appropriate, following the Black Sea Bass FMP Monitoring Committee process set forth in 1.5.1.2.2.

2.4.6.2. Evaluation

This alternative recognizes the seasonal nature of the commercial black sea bass fisheries. Based on 1983 to 1992 monthly data, most black sea bass are harvested from state waters from May through June and from EEZ waters from January through June (Table 15).

Historic commercial length frequencies were used as an estimate of potential short-term impacts of length limits on the commercial black sea bass fisheries (Tables 41 to 44). Specifically, commercial length frequencies from the NMFS Weighout Data and North Carolina DMF from 1982 to 1991 were used to determine potential size limit effects. In general, size frequency data indicated that potential size limit effects increased from north to south, were gear dependent, and varied from one year to the next.

Based on NMFS weighout data, approximately 11% of the measured black sea bass were less than 9" TL for all otter trawl vessel with sampled landings (Table 43). A 9" TL minimum size regulation would have a slightly greater effect on landings from fish pots/traps, the other predominant gear in the black sea bass fishery. Based on NMFS weighout data, almost 26% of the measured fish were less than 9" TL for the sea bass obtained from this gear from 1983 to 1991 combined.

A 10" TL minimum size limit would have a significantly greater effect on both otter trawl landings and landings from fish pots/traps. Based on 1983 to 1992 NMFS weighout data, 30% and 59% of the fish measured from landings from otter trawls and pots/traps were less than 10" TL, respectively. In addition, almost 57% of the black sea bass measured from the North Carolina winter trawl fishery in 1991-1992 were less than 10" TL (Table 44).

Thus, it is probable that a 10" TL minimum size in the commercial fishery could significantly reduce landings in the short term. In, addition because gear regulations would apply to a 10" minimum size for the entire year, a significant amount of 9" TL black sea bass would escape from otter trawls and pots/traps reducing landings of 9" TL fish from May to November when 9" TL fish could be landed. A large reduction in landings could have large negative economic consequences to fishermen, processors, and the consuming public.

However, assuming that undersized fish are not caught and discarded, minimum size regulations have positive impacts on the stock. In general, because minimum sizes increase the size at full recruitment, yields are increased as fishermen catch larger, heavier fish. In addition, minimum size regulations can increase the resilience of the stock to overfishing, i.e., the biological reference points (F_{max}) can increase. Finally, minimum size regulations can increase spawning stock biomass by allowing more fish to spawn. Sexual maturity data for black sea bass indicate that 50% of the sea bass are mature by a size of 7.7" TL.

2.4.7. A threshold requirement to qualify for a moratorium permit

2.4.7.1. Description

This alternative would require that a vessel have documented landings of black sea bass equal to, or in excess of, some minimum threshold amount in order to qualify for a moratorium permit to land and sell black sea bass under the moratorium program. The qualification period, 26 January 1988 to 26 January 1993, would remain identical to that proposed in the preferred alternative. However, this alternative differs from the preferred alternative in that the preferred alternative would require that any amount of

black sea bass (i.e., greater than 0 pounds) be documented for sale between those dates to qualify for the permit.

2.4.7.2. Evaluation

The number of vessels landing a threshold amount of black sea bass on an annual basis was derived using 1992 NMFS weighout data (Table 28). These data indicate that the number of vessels landing black sea bass decrease as the threshold amount increases.

An appropriate threshold amount would be determined such that those fishermen whose livelihoods are dependent on black sea bass receive moratorium permits.

2.4.8. Separate management measures for party/charter boat fishermen

2.4.8.1. Description

This alternative would recognize that anglers fishing from party/charter boats form a distinct user group that is separate from other recreational or commercial fishermen. As such, beginning in year 3 of the fishery management program, management measures would be developed that were applicable only to this user group. These could include a coastwide harvest limit, minimum size limit, possession limit, and season.

2.4.8.2. Evaluation

Based on 1983 to 1992 MRFSS data, anglers fishing from party/charter boats accounted for 71% of the recreational landings of black sea bass on a coastwide basis. Based on this data, 71% of the coastwide recreational harvest limit would be allocated to anglers fishing from party/charter vessels. A combination of size and possession limits with seasons could then be used to achieve the allocation on an annual basis.

2.4.9. A 9" TL minimum fish size and a 3.5" minimum square mesh size in the otter trawl fishery when the vessel has 100 pounds or more of black sea bass on board

2.4.9.1. Description

This alternative would allow fishermen to use only nets that have a minimum mesh size of 3.5" square mesh when they had 100 pounds or more of black sea bass on board. The use of diamond mesh in the directed otter trawl fishery for black sea bass would be prohibited. In addition to the minimum mesh provisions, this alternative would require that fishermen not land for sale any black sea bass smaller than the 9" TL minimum size limit. A maximum of a 5% tolerance by weight of undersized black sea bass would be allowed on commercial vessels. Black sea bass less than 9" TL could not be sold. This alternative would be used in conjunction with other alternatives such as the quota or closed seasons.

This alternative would require that owners or operators of otter trawl vessels possessing 100 lbs or more of black sea bass, fish only with nets that have a minimum mesh size of 4.0" square, 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 more stringent net mesh regulation, the state regulation would prevail. States with minimum mesh regulations larger than those established by this alternative would be encouraged to maintain them.

In addition, this alternative would require that owners or operators of otter trawl vessels possessing 100 lbs or more of black sea bass not have available for immediate use any net, or any piece of net not meeting

the minimum mesh size requirements, or mesh that is rigged in a manner that is inconsistent with the minimum mesh size. A net that conformed to one of the following specifications and that could be shown not to have been in recent use is considered to be not "available for immediate use":

(1) A net stowed below deck, provided:

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

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

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

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

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

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

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

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

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

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

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

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

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

This alternative would prohibit the owner or operator of a fishing vessel from using 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.

The minimum net mesh size could be changed annually, if appropriate, following the Black Sea Bass FMP Monitoring Committee process set forth in 1.5.1.2.2. Based on the recommendations of the Black Sea Bass Monitoring Committee and Council, the Regional Director, by regulatory amendment, shall implement regulations on gear other than otter trawls to achieve discards of black sea bass 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 gears currently not in significant use in the black sea bass fishery are

developed as a way of avoiding the minimum otter trawl mesh rule.

2.4.9.2. Evaluation

If implemented, owners or operators of otter trawl vessels possessing 100 lbs or more of black sea bass would only be allowed to fish with nets that have a minimum mesh size of 3.5" square in the codend. Based on selectivity studies conducted for other round fish, the selectivity of a 3.5" square mesh should be equivalent to that of a 4.0" diamond mesh. The L_{25} (the length at which 25% of the black sea bass are retained) is 9.3 inches for this mesh size based on body measurements (Table 45).

Mesh selectivity studies have not been conducted for black sea bass. The relationship between body depth and total length as derived by Weber and Briggs (1983) was used to calculate the 50% retention lengths for black sea bass. A selection range of 2 inches (based on selectivity studies conducted on fish of similar shape) was then used to estimate 25% and 75% retention lengths.

Preliminary work conducted on other species indicates that square mesh may allow for increased survival of fish escaping from the codend of a net. Unlike diamond mesh, square mesh retains its shape as the net is fished (i.e., does not compress) allowing fish to escape with minimal loss of scales and body damage.

Landings of black sea bass represent only a portion of the fishing mortality experienced by the stock. Undersized black sea bass, those less than 9" 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.

Black sea bass are a component of the mixed trawl fishery in Southern New England and the Mid-Atlantic. Although Sea Sampling data indicate that fishermen may differentiate between species on a per tow basis (i.e., target a single species on a tow), fishermen land many different species on a per trip basis. Based on 1992 NMFS weighout data, black sea bass are most frequently landed with *Loligo* squid, silver hake, scup, and flounder. In fact, for trips landing a 100 or more pounds of black sea bass per trip, more *Loligo* squid were landed than black sea bass in 1992 (Table 29).

However, this predominance of *Loligo* may reflect reduced availability of other species in 1992. Based on 1983 to 1987 data, the landings of otter trawl vessels landings 100 lbs or more of black sea bass were composed primarily of scup (29%) and summer flounder (24%) (Table 46). *Loligo* accounted for only 17% of the landings.

The 100 pound threshold would effect 62% of the vessels and 34% of the trips that landed black sea bass in 1992. These trips accounted for 95% of the black sea bass landed by otter trawl vessel in 1992.

Regulations that allow multiple nets onboard would allow fishermen who traditionally targeted multi-species on a trip, to fish for and retain other species with small mesh until the 100 pound threshold of black sea bass was reached. These fishermen would then have to use the 3.5" square mesh if they decided to target more black sea bass. Once the threshold was reached fishermen would have to properly stow other cod ends for the remainder of the trip.

Landings of black sea bass by fishermen targeting *Loligo* squid and scup on the same trip could be effected by these regulations. Based on 1992 NMFS weighout data, 45% of the vessels and 29% of the trips landing 2500 pounds or more of *Loligo* squid, landed over 95% of *Loligo* landed by all *Loligo* otter trawl fishermen (Tables 48 and 49). Based on this 2500 pound threshold, black sea bass comprise slightly less than 0.7% of the total fish landed on these trips (Table 50). However, the total pounds accounted for approximately 41% of all black sea bass landed by otter trawl fishermen in 1992.

Similarly, 52% of the vessels and 28% of the trips landing 1000 pounds or more of scup, landed over 95% of scup landed by scup otter trawl fishermen (Tables 51 and 52). Based on this 1000 pound

threshold, black sea bass comprise slightly more than 1.1% of the total fish landed on these trips (Table 53). Because scup and *Loligo* squid are frequently landed on the same trip, the total pounds accounted for approximately the same amount of black sea bass landed by directed *Loligo* squid trips.

In general, these regulations would modify some traditional fishing practices. The fishermen most effected by these regulations would be those fishermen who targeted other species on a trip with small mesh net (squid, scup, or whiting) and had coincidental catches of black sea bass. If a fishermen had 100 lbs of black sea bass on board, and desired to continue fishing with a small mesh net, he would be required to discard any sea bass caught in tows directed to other species. Alternatively, if he desired to continue to fish for black sea bass, he would have to stow his other cod ends for the remainder of the trip perhaps losing an opportunity to catch and land valuable bycatch (i.e., summer flounder, squid, etc.).

However, these mesh provisions should have minimal effect on bycatch species. Most of the species caught with black sea bass are regulated, or have proposed regulations that require mesh sizes and/or minimum fish sizes that equal or exceed the black sea bass regulations. A 6" minimum mesh size is required for most of the New England groundfish species. The minimum mesh size for summer flounder is 5.5" with a minimum fish size of 13" TL. The proposed minimum size for black sea bass would require that fishermen use a 4.5" tail bag to reduce catch of sublegal fish, i.e. those less than 9" TL.

Minimum mesh provisions in conjunction with the minimum fish size will ensure that discards of sub-legal black sea bass will be reduced. Greater gains will accrue to fishermen through protecting black sea bass until they reach legal size. Discard mortality is extremely high for trawl caught fish and the problem is particularly acute when new year classes are abundant. The benefits of the proposed minimum fish size and mesh size regulations will be manifested through a more balanced age structure of the black sea bass stock. Further, waste will be reduced due to (1) lower total discards and (2) lower mortality of net encounter.

2.5. SUMMARY AND EXPECTED NET IMPACT OF PROPOSED ACTION

The purpose of this summary is to briefly describe the expected economic impact of the preferred actions. A summary of impacts of all alternatives presented in this amendment are documented in Table RIR-1. The analysis utilized to evaluate the economic impact of the various proposed alternatives is qualitative in nature. However, it provides the basis for making well reasoned management decisions.

Alternative number one deals with possession limits, minimum size limits and seasonal closures in the recreational fishery. All states with recreational landings of black sea bass would be subjected to similar minimum size limits. In years 1 and 2, a 9" minimum fish size in the recreational fishery would be implemented. In year 3 and beyond, a 10" minimum fish size in the commercial fishery would be implemented. Given the interest that anglers placed on black sea bass (section 8.2 of the FMP), it is expected that the proposed initial size limit would have little negative impact on overall fishing participation by anglers. Increased survival of smaller fish due to minimum size regulations and reduced discards in years 1 and 2 of the management program should allow larger fish to become more available to recreational fishermen in year 3. Possession limits and or seasonal closures may be adjusted annually through framework action, in year 3 and beyond. It is expected that the implementation of minimum size limits will allow recreational fishermen to have larger fish available to them over the stock recovery period. This will likely mitigate the initial effects of the size limits. The two year period before a possession limit is implemented will provide sufficient time for initial recovery without closing the fishery or affecting the economy or social structure of the participants in a detrimental manner. In the long term, the implementation of the minimum size limits considered in this plan could enhance the recreational fishing opportunities through the management unit. Furthermore, implementation of a coastwide minimum size limit will likely enhance compliance by participants.

The second alternative deals with establishing a framework for possession limits, minimum size limits and seasonal closures in the recreational fishery. With the implementation of this alternative, possession size

limits will be evaluated in the future to reflect stock status and recruitment information. This is expected to enhance the long term viability of the fishery.

Alternative number three deals with the implementation of a minimum size limit in the commercial fishery. It is expected that this action will have a positive impact on the stock if sub-legal fish are not caught and discarded. It is expected that this alternative will increase net benefits from the reduction in biological and economic waste from harvesting undersized black sea bass.

The minimum mesh size alternative would reduce harvest of undersized black sea bass. Positive effects from this option include an increase in yield over time.

The alternative dealing with the 18" maximum roller diameter is expected to protect black sea bass in some areas therefore allowing more fish to grow to maturity and spawn increasing stock biomass and yields.

The minimum escape vent requirement would allow for some undersize fish to escape alive increasing the amount of mature fish in the stock and increasing yields. A study conducted by the MAFMC staff indicates that vents do release undersized black sea bass (2.3.2.4).

Alternative number seven deals with the requirement to have hinges and fasteners of one panel or door of black sea bass pots made of degradable materials. The increase in costs from the implementation of this alternative are expected to be minimal. Positive benefits from the prevention of "ghost fishing" are expected from this alternative.

The implementation of a commercial quota along with the implementation of other regulations addressed in the black sea bass FMP may increase benefits due to reduction in overfishing and stock collapse prevention.

The last alternative deals with a moratorium on commercial vessels. This alternative is expected to reduce problems of over-capitalization and dissipation of profits.

Table RIR-1. Summary of All Alternatives

Preferred Alternatives	Economic Effects
Recreational possession limits, minimum size limits, and seasonal closures	Potential increase in net benefits from stock recovery and an increase in the availability of larger fish through the region
Evaluation of framework provisions	Expected to provide positive net benefits over the long term. Evaluation will require information on stock conditions available in years 2, 3, and beyond
Commercial minimum fish size	Positive net benefits expected from a reduction in biological and economic waste derived from harvesting undersized black sea bass
Minimum mesh size	Positive net benefits expected from a reduction in biological and economic waste resulting from harvesting undersized black sea bass
Maximum roller diameter	Potential increase in net benefits from allowing more animals to grow to maturity and spawn, increasing stock biomass and yields
Minimum escape vent requirement	Potential increase in net benefits from allowing more animals to grow to maturity and spawn, increasing stock biomass and yields
Degradable fasteners in traps	Positive net benefits from the prevention of "ghost fishing"
Commercial quota	Positive net benefits from a reduction in biological and economic waste, allowing for prevention of overfishing and stock rebuilding
Moratorium on commercial vessels	Positive net benefits from reduction of potential over-capitalization and dissipation of profits.

Table RIR-1 (continued). Summary of All Alternatives

Non-Preferred Alternatives	Economic effects
Take no action at this time	Further improvements and development of the US fishery would not be attained; net benefits would be negatively affected
Seasonal closures in the commercial fishery for years 3 and beyond	Potential decrease in net benefits since fishermen may increase effort or efficiency during open season; also the removal of gear capable of harvesting black sea bass from the water would have major impact on the catch of other economically important species
Bimonthly commercial quota	Potential benefits by allowing seasonal allocation of quotas
State by state quotas	Potential benefits by allowing states flexibility to allocate quotas
Individual transferrable quotas	Initial problems associated with the initial allocation process
Seasonal dependent minimum sizes in the commercial fishery: a 10" TL minimum size from October 1 -April 30 and a 9" TL minimum size for the rest of the year	Potential decrease in net benefits because of the short term negative impacts on commercial fishermen
A threshold requirement to qualify for a moratorium permit	Potential implications would vary according to different threshold levels. The higher the threshold level, the lower the number of vessel that would qualify for permit under this alternative
Separate management measures for party/charter boat fishermen	Having separate management measures (harvest limit, minimum size limit, possession limit, and season) for party/charter boat fishermen versus other recreational fishermen would potentially create confusion in the industry
A 9" TL minimum fish size and a 3.5" minimum square mesh size in the otter trawl fishery when the vessel has 100 pounds or more of black sea bass on board	Potential increase in net benefits if discards are not reduced with minimum fish size regulation alone

MAJOR RULE DETERMINATION

The analysis described above, even thought qualitative in nature, shows that if the described management measures were to be enacted, they would not constitute a "major rule" under the criteria described in E.O. 12866 [p.RIR-1]. Furthermore, these actions would not have a significant economic impact on a substantial number of small entities.

3. Other E.O. 12866 Requirements

The FMP should not have an annual effect of $100 million or more. Based on unpublished NMFS General Canvas data the 1993 total exvessel value for black sea bass commercial landings was estimated at $3.2 million. The value of commercial landings in 1992 indicated a 10% decrease from the 1991 level and a 13% decrease from the 1983-1992 mean.

The Sport Fishing Institute estimated that in 1985, direct sales related to marine recreational fishing for all species from North Carolina to Maine amounted to over $1.8 billion. Unfortunately, estimates of the economic activity specifically associated with black sea bass were not provided separately but were combined with other species. In the North and Mid-Atlantic regions, black sea bass impacts were not specifically enumerated due to the greater relative popularity and abundance of other species. Intercept surveys conducted by the NMFS indicate that in 1992 1.85% of the anglers interviewed indicated that they preferred or sought black sea bass as the primary species targeted in the Mid-Atlantic region. The FMP is intended to allow the black sea bass resource to rebuild in order to enhance recreational fishing opportunities through the management unit.

The FMP is not expected to lead to an increase in costs or prices to consumers. In recent years, the exvessel price per pound of black sea bass caught commercially has shown a slight upward trend, indicating that supply and/or demand factors may be shifting. For the period between 1983 to 1992, the highest price for all size categories of black sea bass occurred in 1989, at $1.32. NMFS weighout data for 1992 indicate an average exvessel price of $1.05 per pound coastwide, ranging from $0.42 per pound for pins to $2.76 per pound for jumbos. Continual increase in the demand of fish and shellfish in general (due to health awareness) could be the cause for increased exvessel revenue. However, the effects of this factor on exvessel price can not be addressed quantitatively at this time. Potential reduction in landings and value attributed to this plan in its early years will not significantly increase overall exvessel black sea bass price. Future increases in black sea bass supply due to reduction in mortality, higher harvest weight, and stock stability, should maintain the consumer black sea bass price level, holding everything else constant.

The implementation of this plan is not expected to create additional administrative, enforcement or information costs.

The FMP should not have significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of US-based enterprises to compete with foreign-based enterprises in domestic or export markets.

4. Impacts of the Plan relative to the Regulatory Flexibility Act

4.1. Regulatory Flexibility Analysis

4.1.1. Introduction

The purpose of the Regulatory Flexibility Act (RFA) is to minimize the adverse impacts from burdensome regulations and record keeping requirements on small businesses, small organizations, and small government entities. The impacts of the proposed action on the fishing industry and the economy as a whole were discussed in sections 2.3, 2.4 and 2.5 above. The following discussion of impacts centers specifically on the effects of the proposed action on small businesses.

4.1.2. Determination of significant economic impact on a substantial number of small entities

According to guidelines on regulatory analysis of fishery management actions, a "substantial number" of small entries is more than 20 percent of those small entries engaged in the fishery (NMFS 1994). The Small Business Administration (SBA) defines a small business in the commercial fishing activity as a firm with receipts of up to $2.0 million annually. The number of vessels fishing for black sea bass could range from 545 to 565 vessels (section 8.1.1.2 of the FMP). Based on unpublished NMFS weighout data, 340 otter trawl vessels landed scup in 1992 (Table 28). About 60% of the otter trawl vessels which reported landing any black sea bass (212 out of 340) accounted for 95% of the total otter trawl catch. In 1985, a total of 454 party and 1,626 charter boats operated out of Atlantic coast ports from Maine through North Carolina (Table 31). The majority of the vessels in the black sea bass fishery may readily qualify as small entities according to the SBA criteria. Given that he proposed action will affect many of these vessels, the "substantial number" criteria will be met.

At the present time there is no annual permit requirement for recreational fishing vessels taking black sea bass within US waters. The National Marine Fisheries Service estimated that in 1991, a total of 23,416,000 trips were taken by marine recreational anglers in the Mid-Atlantic and North Atlantic regions (USDC 1992). Intercept surveys show that 1.85% of the anglers interviewed indicated that they preferred or sought black sea bass as the primary species targeted in the Mid-Atlantic region. A survey of the charter/party boat industry conducted by the Council in 1990 (section 8.2.4 of the FMP) indicated that boat owners ranked black sea bass as one of the least desirable species.

Economic impacts on small business entities are considered to be "significant" if the proposed action would result in any of the following: a) a reduction in annual gross revenues by more than 5 percent; b) an increase in total costs of production by more than 5 percent as a result of an increase in compliance costs; c) an increase in compliance costs as a percent of sales for small entities at least 10 percent higher than compliance costs as a percent of sales for large entities; d) capital costs of compliance represent a significant portion of capital available to small entities, considering internal cash flow and external financing capabilities; or, e) as a "rule of thumb," 2 percent of small businesses entities being forced to cease business operations (NMFS 1994).

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

The group of individuals that could be most likely affected by the possession and minimum size limits are fishermen that are interested in obtaining very large catches per fishing trip. However, a survey of the party and charter boat (section 8.2.4 of the FMP) indicates that charter and party boat owners reported black sea bass as one of the least desirable species for their customers.

It is expected that the implementation of minimum size limits will allow recreational fishermen to have larger fish available to them over the stock recovery period. This will likely mitigate the initial effects of the size limits. The two year period before a possession limit is implemented will provide sufficient time for initial recovery without closing the fishery or affecting the economy or social structure of the participants in a detrimental manner.

4.1.2.2. Evaluation of framework provisions

The framework provision is intended to allow for changes in recreational limits, size limits and season closures to account for changes in stock abundance and meet the time frame of the fishing mortality reduction strategy. This action will not have immediate effects on the fishery. The potential effects of measures implemented through the framework provision will be analyzed when they are proposed.

4.1.2.3. Commercial minimum fish size

According to NMFS weighout data (excluding North Carolina), in 1992, the exvessel value of landed black sea bass measuring less than 9" TL was approximately 551 thousand dollars (Table 27). Assuming this is the initial decrease in annual revenues for all participants in the fishery, and that it is evenly distributed

over all participants in the fishery, each business unit would lose between $975 and $1,011 during the first year. This represents a small percentage of the total gross revenue for these vessels. This decrease in annual revenues are considered foregone earnings in one time period which may be realized later when the fish have grown to a larger size.

4.1.2.4. Minimum mesh size

The intent of this alternative is to implement a minimum mesh size . In general, these regulations would modify some traditional fishing practices. The fishermen most effected by these regulations would be those fishermen who targeted other species on a trip with small mesh net (squid, scup, or whiting) and had coincidental catches of black sea bass. If a fishermen had 100 lbs of black sea bass on board, and desired to continue fishing with a small mesh net, he would be required to discard any sea bass caught in tows directed to other species. Alternatively, if he desired to continue to fish for black sea bass, he would have to stow his other cod ends for the remainder of the trip perhaps losing an opportunity to catch and land valuable bycatch (i.e., summer flounder, squid, etc.).

However, these mesh provisions should have minimal effect on bycatch species. Most of the species caught with black sea bass are regulated, or have proposed regulations that require mesh sizes and/or minimum fish sizes that equal or exceed the black sea bass regulations. A 6" minimum mesh size is required for most of the New England groundfish species. The minimum mesh size for summer flounder is 5.5" with a minimum fish size of 13" TL. The proposed minimum size for black sea bass would require that fishermen use a 4.5" tail bag to reduce catch of sublegal fish, i.e. those less than 9" TL.

4.1.2.5. Maximum roller diameter

This action is likely to affect compliance cost for those vessels which currently use rollers with a diameter greater than 18". However, most commercial fishermen are now using rollers, use gear with roller sizes less than 18" diameter.

The cost of otter trawls vary considerable depending on numerous features that can be built into the trawl and the quality of material used. Generally, a 80-90 ft trawl net will cost about $5,000-$6,000 with 20 to 33 percent of the cost being the roller (D. Simpson pers. comm.). It is possible that the cost of compliance for some of the vessels that currently employ rollers with a diameter greater than 18", and have to purchase rollers with a diameter no greater than 18" could potentially reach 5% of the total cost of production.

4.1.2.6. Minimum escape vent requirement

The intent of this option is to allow undersize black sea bass to escape from the trap before they are brought to the surface. This will allow for undersize fish to escape alive increasing the amount of mature fish in the stock and increasing yields. The cost of placing escape vents in black sea bass traps is expected to be minimal.

4.1.2.7. Degradable fasteners in traps

The cost of hinges and fasteners made of degradable material is likely to be lower than the galvanized or stainless hinges and fasteners commonly employed in the fishery (R. Sisson pers. comm.). Furthermore, this alternative would prevent lost traps from "ghost fishing."

4.1.2.8. Commercial quota

This option could potentially be implemented in year 3 to control fishing mortality. The quota would be allocated to the commercial fishery base on stock assessment information on projected stocks for that year. This action will not have immediate effects on the fishery. The potential effects of measures implemented through this action will be analyzed when they are proposed. Commercial quotas, along with minimum size regulation will prevent overfishing and reduce waste. As the stock rebuilds, commercial

quotas would increase.

4.1.2.9. Moratorium on commercial vessels

The intent of this provision is simply to cap entry into the fishery, so that any future gains in productivity and profitability which may occur 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. Moratorium permits will curtail the entry into the industry of vessels that have not historically participated in the fishery. This will likely lead moratorium permits to accrue a substantial value. The factors set forth in section 303(b)(6) of the Magnuson Act (section 9.2.2.3.7 of the FMP) will be considered in implementing the moratorium.

4.1.3. Explanation of why is the action being considered

Refer to the section on Problems for Resolution of the amendment document.

4.1.4. Objectives and legal basis for the rule

Refer to the section on Management Objectives of the amendment document. The Magnuson Fishery Conservation and Management Act of 1976 provides the legal basis for the rule.

4.1.5. Demographic analysis

Refer to the Black Sea Bass Fishery Management Plan.

4.1.6. Cost analysis

Refer to the section on Regulatory Impact Analysis and Summary and Expected Net Impact of proposed Action in the RIR.

4.1.7. Competitive effects analysis

The industry is primarily formed by small businesses (harvesters and processors). There are no large businesses involved in the industry, therefore, there are no disproportional small versus large business effects. There are no disproportional cost of compliance among the affected small entities.

4.1.8. Identification of overlapping regulations

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

4.1.9. Conclusions

The preceding Regulatory Flexibility Analysis indicate that most of the proposed regulations in this amendment do not result in significant economic impacts on small entries. However, the criterion of "significant economic impact" may be met because of the potential increase in operating costs to vessels employing rollers with a diameter greater than 18" under the minimum roller diameter option.

5. Paperwork Reduction Act of 1980

The Paperwork Reduction Act concerns the collection of information. The intent of the Act is to minimize the Federal paperwork burden for individuals, small business, State and local governments, and other persons as well as to maximize the usefulness of information collected by the Federal government.

It is assumed that most individuals that will potentially apply for black sea bass operator permits already hold operator permits for summer flounder, multispecies and scallops. It is also expected than since most

of the vessel operators already submit logbooks reports under the Northeast Multispecies, Scallop, and Summer Flounder FMPs, the implementation of this plan would not affect the reporting process to any significant extent.

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 4. DRAFT PROPOSED REGULATIONS

Subpart A - General Provisions

§648.1 Purpose and scope.
§648.2 Definitions.
§648.3 Relation to other laws.
§648.4 Vessel permits.
§648.5 Dealer permit.
§648.6 Operator permits.
§648.7 Recordkeeping and reporting requirements.
§648.8 Vessel identification.
§648.9 Prohibitions.
§648.10 Facilitation of enforcement.
§648.11 Penalties.

Subpart B - Management Measures

§648.20 Catch quotas and other restrictions.
§648.21 Closure.
§648.22 Time restrictions.
§648.23 Minimum size.
§648.24 Gear restrictions.
§648.25 Possession limit.
§648.26 Sea sampler program.
§648.27 Experimental fishery.
§648.28 Experimental fishery.
§648.29 Special management zones.

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

Subpart A - General Provisions

§648.1 Purpose and scope.

The regulations in this part implement the Fishery Management Plan for the Black Sea Bass 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 black sea bass.

§648.2 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 black sea bass.

Black sea bass means the species *Centropristis striata.*

Black Sea Bass 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.

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 black sea bass for a commercial purpose from the owner or operator of a vessel issued a moratorium permit under §648.4 other than solely for transport on land.

Fishery Management Plan (FMP) means the Fishery Management Plan for the Black Sea Bass Fishery and any amendments thereto.

Fishing commercially means retaining black sea bass in excess of the possession limit specified in §648.25.

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 508-281-9254, or a designee.

Reporting week means a period of time beginning at 0001 hours local time on Sunday and ending at 2400 hours local time the following Saturday.

Substantially similar harvesting capacity means the same or less Gross Registered Tonnage (GRT) and vessel registered length.

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.

§648.3 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 black sea bass by foreign vessels in the EEZ are set forth in 50 CFR Part 611, Subparts A and C.

§648.4 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 or retain black sea bass in the EEZ.

(2) *Exemption.* Any vessel other than a party or charter boat that observes the possession limit in §648.25 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 black sea bass in any state that the Regional Director has determined no longer has commercial quota available.

(b) *Moratorium permit.*

(1) A vessel is eligible to receive a permit to fish for and retain black sea bass in excess of the possession limit in §648.25 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 black sea bass between January 26, 1988, and January 26, 1993; or

(ii) The vessel was under construction for, or was being rerigged for, use in the directed fishery for black sea bass on January 26, 1993, provided the vessel landed black sea bass for sale prior to the effective date of these regulations; or

(iii) The vessel is replacing a vessel of substantially similar harvesting capacity which involuntarily left the black sea bass 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.

(2) *Restriction.* No one may apply for the permit specified in paragraph (b)(1) of this section more than 12 months after the effective date of these regulations, or the events specified under paragraph (h)(1) 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 §648.25.

(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 and notarized statements from marine architects or surveyors or shipyard officials will be considered acceptable forms of proof.

(2) *Information requirements.* In addition to applicable information required to be provided by paragraph (d)(1) of this section, an application for either a moratorium permit or a party and charter boat permit must contain at least the following information, and any other information required by the Regional Director: vessel name; owner name, mailing address, and telephone number; U.S. Coast Guard documentation number and a copy of the vessel's U.S. Coast Guard documentation or, if undocumented, the vessel's state registration number and a copy of the state registration; home port and principal port of landing; length; gross tonnage; net tonnage; engine horsepower; year the vessel was built; type of construction and type of propulsion; approximate fish hold capacity; type of fishing gear used by the vessel; number of crew; permit category;if owner is a corporation, a copy of the Certificate of Incorporation, and the names and addresses of all shareholders owning 25 percent or more of the corporation's shares; if the owner is a partnership, a copy of the Partnership Agreement and the names and addresses of all partners; if there is more than one owner, names of all owners having owned more than a 25-percent interest; the name and signature of the owner or the owner's authorized respresentative;

permit number of any current or, if expired, previous Federal fishery permit issued to the vessel; and a copy of charter/party boat license and number of passengers the vessel is licensed to carry (charter and party boats).

(3) *Change in permit information.* Any change in the information specified in paragraph (d)(2) of this section must be submitted by the applicant in writing to the Regional Director within 15 days of the change.

(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 §648.6 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 §648.6 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's decision was made in error.

(2) The appeal may be presented, at the option of the applicant, at a hearing before an officer appointed by the Regional Director.

(3) The 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) Upon the renewal date specified on the permit; or

(3) When the ownership of the vessel changes; however, the Regional Director may authorize the continuation of a moratorium permit for the black sea bass fishery if the new owner requests. Applications for continuation of a permit must be addressed to the Regional Director.

(i) *Duration*. A permit is valid until it is revoked, suspended, or modified under 15 CFR Part 904, or until it otherwise expires or ownership changes or the applicant has failed to report any change in the information on the permit application to the Regional Director as specified in paragraph (d)(3) of this section.

(j) *Alteration*. Any permit which has been altered, erased, mutilated is invalid.

(k) *Replacement*. Replacement permits for an otherwise valid permit may be issued by the Regional Director when requested in writing by the owner, stating the need for replacement, the name of the vessel, and the fishing permit number assigned. An application for a replacement permit will not be considered a new application. An appropriate fee may be charged for issuance of the replacement permit.

(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 displayed for inspection upon request by any authorized official or any employee of NMFS designated by the Regional Director.

(n) *Suspension and revocation*. The Administrator may suspend, revoke, or modify any permit issued or sought under this section. Subpart D of 15 CFR Part 904 (Civil Procedures) governs the imposition of enforcement-related sanctions against a permit issued under this part.

§648.5 Dealer permit.

(a) *General*. Any dealer must have a valid permit issued under this section in their possession.

(b) *Permit application.*

(1) An applicant must apply for a dealer permit on a form provided by the Regional Director. The application must be signed by the applicant and submitted to the Regional Director at least 30 days before the date upon which the applicant desires to have the permit made effective. Applications must contain the name, principal place of business, mailing address and telephone number of the applicant. The Regional Director will notify the applicant of any deficiency in the application pursuant to paragraph (b)(3)(ii) of this section.

(2) *Change in permit information*. Any change in the information specified in paragraph (b)(1) of this section must be submitted by the applicant in writing to the Regional Director within 15 days of the change.

(3) *Issuance*.

(i) The Regional Director will issue a permit at any time during the fishing year to an applicant if:

(A) The application is complete; and

(B) The applicant has complied with all applicable reporting requirements of this section and §648.6(a) during the 12 months immediately preceding the application.

(ii) Upon receipt of an incomplete application, or an application from a person who has not complied with all applicable reporting requirements of paragraph (b)(1) this section and §648.6(a) during the 12 months immediately preceding the application, the Regional Director will notify the applicant of the deficiency. If the applicant fails to correct the deficiency within 30 days of the Regional Director's notification, the application will be considered abandoned.

(4) *Expiration*. The permit must be renewed annually and unless renewed annually will expire upon the renewal date specified in the permit.

(5) *Duration*. Any permit issued under this section remains valid until it is revoked, suspended or modified under 15 CFR part 904, or otherwise expires, or ownership changes, or the applicant has failed to report any change in the information on the permit application to the Regional Director.

(6) *Alteration*. Any permit which is altered, erased, or mutilated is invalid.

(7) *Replacement*. The Regional Director may issue replacement permits for lost permits. Any application for a replacement permit shall not be considered a new permit.

(8) *Transfer*. A permit is not transferable or assignable. It is valid only for the 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.

§648.6 Operator permits.

(a) *General*. Any operator of a vessel holding a valid Federal black sea bass permit under this part, or any operator of a vessel fishing for black sea bass in the EEZ or in possession of black sea bass in or harvested from the EEZ, must carry on board a valid operator's permit issued under this part.

(b) *Operator application*. Applicants for a permit under this section must submit a completed permit application on an appropriate form obtained from the Regional Director. The application must be signed by the applicant and submitted to the Regional Director at least 30 days prior to the date on which the applicant desires to have the permit made effective. The Regional Director will notify the applicant of any deficiency in the application pursuant to this section.

(c) *Condition*. Vessel operators who apply for an operator's permit under this section must agree as a condition of this permit that the operator and vessel's fishing, catch, and pertinent gear (without regard to whether such fishing occurs int he EEZ or landward of the EEZ, and without regard to where such fish or gear are possessed, taken, or landed), are subject to all requirements of this part while fishing in the EEZ or on board a vessel permitted under §648.4. The vessel and all such fishing, catch, and gear will remain subject to all applicable state or local requirements. Further, such operators must agree as a condition of this permit that if the permit is suspended or revoked pursuant to 15 CFR part 904, the operator cannot be on board any fishing vessel issued a Federal Fisheries Permit or any vessel subject to Federal fishing regulations while the vessel is at sea or engaged in offloading. If a requirement of this part and a management measure required by state or local law differ, any operator issued a permit under this part must comply with the more restrictive requirement.

(d) *Information requirements*. An applicant must provided at least all the following information and any other information required by the Regional Director: Name, mailing address, and telephone number; date of birth; hair color; eye color; height; weight; social security number (optional) and signature of the applicant. The applicant must also provide two color passport-size photographs.

(e) *Fees*. The Regional Director may charge a fee to recover the administrative expense of issuing

a permit required under this section. The amount of the fee is calculated in accordance with the procedures of the NOAA Finance Handbook for determining the administrative costs of each special product or service. The fee may not exceed such costs and is specified on each application form. The appropriate fee must accompany each application; if it does not, the application will be considered incomplete for purposes of paragraph (f) of the section.

(f) *Issuance.* Except as provided in subpart D of 15 CFR part 904, the Regional Director shall issue an operator's permit within 30 days of receipt of a completed application if the criteria specified herein are met. Upon receipt of an incomplete or improperly executed application, the Regional Director will notify the applicant of the deficiency in the application. If the applicant fails to correct the deficiency within 30 days following the date of notification, the application will be considered abandoned.

(g) *Expiration.* Federal operator permits must be renewed annually, and unless renewed will expire upon the renewal date specified in the permit.

(h) *Duration.* A permit is valid until it is revoked, suspended or modified under 15 CFR part 904, or otherwise expires, or the applicant has failed to report a change in the information on the permit application to the Regional Director as specified in paragraph (k) of this section.

(i) *Replacement.* Replacement permits, for otherwise valid permits, may be issued by the Regional Director when requested in writing by the applicant, stating the need for replacement and the Federal operator permit number assigned. An applicant for a replacement permit must also provide two color passport-size photos of the applicant. An application for a replacement permit will not be considered a new application. An appropriate fee may be charged.

(j) *Transfer.* Permits issued under this part are not transferable or assignable. A permit is valid only for the person to whom it is issued.

(k) *Change in application information.* Notice of a change in the permit holder's name, address, or telephone number must be submitted in writing to, and received by, the Regional Director within 15 days of the change in information. If written notice of the change in information is not received by the Regional Director within 15 days, the permit is void.

(l) *Alteration.* Any permit that has been altered, erased, or mutilated is invalid.

(m) *Display.* Any permit issued under this part must be maintained in legible condition and displayed for inspection upon request by any authorized officer.

(n) *Sanctions.* Vessel operators with suspended or revoked permits may not be on board a Federally permitted fishing vessel in any capacity while the vessel is at sea or engaged in offloading. Procedures governing enforcement related permit sanctions and denials are found at subpart D of 15 CFR part 904.

(o) *Vessel owner responsibility.* Vessel owners are responsible for ensuring that their vessels are operated by an individual with a valid operator's permit issued under this section.

§648.7 Recordkeeping and reporting requirements.

(a) *Dealers.*

(1) *Weekly report.* Dealers must send by mail to the Regional Director, or official designee, on a weekly basis on forms supplied by or approved by the Regional Director, a report on fish purchases. If authorized in writing by the Regional Director, dealers may submit reports electronically or through other media. The following information and any other information required by the Regional Director, must be provided in the report: name and mailing address of dealer; dealer number; name and permit number of the vessels from which fish are landed or received; dates of purchases; pounds by species; price by species;

and port landed. If no fish are purchased during the week, a report so stating must be submitted.

(2) *Annual report.* All persons required to submit reports under paragraph (a)(1) of this section are required to complete the "Employment Data" section of the Annual Processed Products Reports; completion the other sections on that form is voluntary. Required data are the number of employees handling fishery products by month. Reports for a given calendar year must be submitted to: NMFS Statistics, 166 Water Street, Woods Hole, MA 02543, and must be postmarked by February 10 of the following year.

(3) *Inspection.* Upon the request of an authorized officer, or by an employee of NMFS designated by the Regional Director to make such inspections, the dealer must make immediately available for inspection copies of the required reports that have been submitted, or should have been submitted, and the records upon which the reports were based.

(4) *Record retention.* Copies of reports, and records upon which the reports were based, must be retained and be available for review for 1 year after the date of the last entry on the report. The dealer must retain such reports and records at its principal place of business.

(5) *Submitting reports.* Reports must be received or postmarked, if mailed, within 3 days after the end of each reporting week. Each dealer will be sent forms and instructions, including the address to which to submit reports, shortly after receipt of a dealer permit. If no fish were purchased during a week, a report so stating must be submitted.

(6) *At-sea activities.* All persons purchasing, receiving, or processing any black sea bass 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 reports.* The owner of any vessel issued a moratorium permit under §648.4 must maintain on board the vessel, and submit, an accurate daily fishing log report for all fishing trips regardless of species fished for or taken, on forms supplied by or approved by the Regional Director. If authorized in writing by the Regional Director, vessel owners may submit reports electronically, for example by using a vessel tracking system or other media. At least the following information, and any other information required by the Regional Director, must be provided: Vessel name, U.S. Coast Guard (USCG) documentation number (or state registration number if undocumented); permit number; date/time sailed; date/time landed; trip type; number of crew; gear fished; quantity and size of gear; mesh/ring size; chart area fished; average depth; latitude/longitude (or loran station and bearings); total hauls per area fished; average tow time duration; pounds by species of all species landed or discarded; dealer permit number; dealer name; date sold; port and state landed; and vessel operator's name, signature, and operator permit number (if applicable).

(2) *When to fill in the log.* Such log reports must be filled in, except for information required but not yet ascertainable, before offloading has begun. All information in paragraph (b)(1) of this section must be filled in for each fishing trip before starting the next fishing trip.

(3) *Inspection.* Upon the request of an authorized officer, or an employee of NMFS designated by the Regional Director to make such inspections, at any time during or after a trip, owners and operators must make immediately available for inspection, the fishing log reports currently in use, or to be submitted.

(4) *Record retention.* Copies of the fishing log reports must be retained and available for review for 1 year after the date of the last entry on the log.

(5) *Submitting reports.* Fishing log reports must be received or postmarked, if mailed, within 15 days after the end of the reporting month. Each owner will be sent forms and instructions, including the

address to which to submit reports, shortly after receipt of a Federal Fisheries Permit. If no fishing trip is made during a month, a report so stating must be submitted.

(c) *Owners of party and charter boats.*

(1) *Fishing log reports.* The owner of any party or charter boat issued a moratorium permit under §648.4 and carrying passengers for hire shall maintain on board the vessel, and submit, an accurate daily fishing log report for each charter or party fishing trip, even if no black sea bass is retained, on forms supplied by or approved by the Regional Director. The owner of any party or charter boat issued a black sea bass permit other than a moratorium permit and carrying passengers for hire shall maintain on board the vessel, and submit, an accurate daily fishing log report for each charter or party fishing trip which lands black sea bass. If authorized in writing by the Regional Director, vessel owners may submit reports electronically, for example, by using a vessel tracking system or other media. At least the following information, and any other information required by the Regional Director, must be provided: Vessel name, U.S. Coast Guard (USCG) documentation number (or state registration number if undocumented); permit number; date/time sailed; date/time landed; trip type; number of crew; number of anglers, quantity and size of gear; chart area fished; average depth; latitude/longitude (or loran station and bearings); average tow time duration; count by species of all species landed or discarded; port and state landed; and vessel operator's name, signature, and operator permit number (if applicable).

(2) *When to fill in the log.* Such log reports must be filled in before offloading has begun. All information required in paragraph (c)(1) of this section must be filled in for each fishing trip by the end of each fishing trip.

(3) *Inspection.* Upon the request of an authorized officer, or an employee of NMFS designated by the Regional Director to make such inspections, at any time during or after a trip, owners and operators must make immediately available for inspection the fishing log reports currently in use, or to be submitted.

(4) *Record retention.* Copies of the fishing log reports must be retained and available for review for 1 year after the date of the last entry on the log.

(5) *Submitting reports.* Fishing log reports must be received or postmarked, if mailed, within 15 days after the end of the reporting month. Each owner will be sent forms and instructions, including the address to which to submit reports, shortly after receipt of a Federal Fisheries Permit. If no black sea bass is landed or no fishing trip is made during a month, a report so stating must be submitted.

§648.8 Vessel identification.

(a) *Vessel name.* Each fishing vessel subject to this Part and over 25 feet (7.6 m) in registered length must affix permanently its name on the port and starboard sides of the bow and, as possible, on its stern.

(b) *Official number.* Each fishing vessel subject to this Part and over 25 feet (7.6 m) in registered length shall display its official number on the port and starboard sides of the deckhouse or hull, and on an appropriate weather deck so as to be clearly visible from enforcement vessels and aircraft.

(c) *Numerals.* Except as provided in paragraph (e) of this section, the official number must be displayed in block arabic numerals in contrasting color at least 18 inches (45.7 cm) in height for fishing vessels over 65 feet (19.8 m) in registered length, and at least 10 inches (25.4 cm) in height for all other vessels over 25 feet (7.6 m) in registered length. The registered length of a vessel, for purposes of this section, is that registered length set forth in US Coast Guard or state records.

(d) *Duties of owner.* The vessel owner shall insure that each vessel subject to this part will:

(1) Keep the vessel's name and official number clearly legible and in good repair, and

(2) Ensure that no part of the vessel, its rigging, its fishing gear, or any other object obstructs the view of the official number from any enforcement vessel or aircraft.

(e) *Nonpermanent marking.* Vessels carrying recreational fishing parties on a per capita basis or by charter must use markings that meet the above requirements, except for the requirement that they be affixed permanently to the vessel. The nonpermanent markings must be displayed in conformity with the above requirements when the vessel is fishing for black sea bass.

§648.9 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 under §648.4 to do any of the following:

(1) Land or possess at sea any black sea bass, or parts thereof, that fail to meet the minimum fish size specified in §648.23;

(2) Fail to affix and maintain markings as required by §648.8;

(3) Possess 100 or more pounds (45.4 kg) of black sea bass, unless the vessel meets the minimum mesh requirement specified in §648.24(a);

(4) Possess black sea bass in other than a box specified in §648.25(d) if fishing with nets having mesh that does not meet the minimum mesh-size requirement specified in §648.24(a).

(5) Land black sea bass for sale, after the effective date published in the FEDERAL REGISTER notifying permit holders that commercial quota is no longer available.

(6) Fish with or possess nets or netting that do not meet the minimum mesh requirement, or that are modified, obstructed or constricted, if subject to the minimum mesh requirement specified in §648.24, unless the nets or netting are stowed in accordance with §648.24(f);

(7) Fish with or possess pots or traps that do not meet the requirements §648.24(b);

(8) Sell or transfer to another person for a commercial purpose, other than transport, any black sea bass, unless the transferee has a dealer permit issued under §648.5;

(9) 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 §648.4; or

(10) 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 §648.4, 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 black sea bass in excess of the possession limit established pursuant to §648.25;

(2) Possess black sea bass smaller than the minimum size limit for recreational fishermen established pursuant to §648.23(b);

(3) Fish for black sea bass other than during a season specified pursuant to §648.22;

(4) Refuse to embark a sea sampler if requested by the Regional Director; or

(5) Sell black sea bass or transfer black sea bass 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 black sea bass either in excess of the possession limit specified in §648.25 or before or after the time period specified in §648.22, unless the person is operating a vessel issued a moratorium permit under §648.4 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 black sea bass that do not meet the minimum size specified in §648.23(b);

(3) Possess nets of netting with mesh not meeting the minimum mesh requirement of §648.24 if the person possesses black sea bass harvested in or from the EEZ in excess of the threshold limit of §648.24(a).

(4) If subject to the permit requirements in §648.4 or §648.5, offload, cause to be offloaded, sell or buy any black sea bass, whether on land or at sea, as an owner, operator, dealer, buyer or receiver in the black sea bass fishery without accurately preparing and submitting in a timely fashion the documents required by §648.6;

(5) Purchase or otherwise receive, except for transport, black sea bass from the owner or operator of a vessel issued a moratorium permit under §648.4 unless in possession of a valid permit issued under §648.5;

(6) Purchase or otherwise receive for commercial purposes black sea bass caught by other than a vessel with a moratorium permit not subject to the possession limit in §648.5 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 black sea bass landed after the effective date published in the FEDERAL REGISTER notifying permit holders that commercial quota is no longer available;

(8) Make any false statement, verbal or written, to an authorized officer, concerning the catching, taking, harvesting, landing, purchase, sale, possession, or transfer of any black sea bass;

(9) Fail to report to the Regional Director within 15 days any change in the information contained in the permit application;

(10) Assault, resist, oppose, impede, harass, intimidate, or interfere with or bar by command, impediment, threat, coercion or refusal of reasonable assistance of an observer or sea sampler conducting his or her duties aboard a vessel; or

(11) Violate any other provision of this part, the Magnuson Act, or any regulation or permit issued under the Magnuson Act.

(d) All black sea bass possessed aboard a party or charter boat issued a permit under §648.4(c) are deemed to have been harvested from the EEZ.

(e) It is unlawful for any person to violate any terms of a letter authorizing experimental fishing pursuant to §648.28 or to fail to keep such letter aboard the vessel during the time period of the experimental fishing.

§648.10 Facilitation of enforcement

See §620.8 of this chapter.

§648.11 Penalties.

See §620.9 of this chapter.

Subpart B - Management Measures

§648.20 Catch quotas and other restrictions.

(a) *Annual review.* The Black Sea Bass 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 target exploitation rate of 48% for black sea bass in 1998, 1999, and 2000; a target exploitation rate of 37% in 2001 and 2002; and a target exploitation rate based on F_{max} in 2003 and subsequent years:

(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 black sea bass; and

(10) Any other relevant information.

(b) *Recommended measures.* Based on this review, the Black Sea Bass 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) A commercial quota will 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) A recreational possession limit set from a range of 0 to the maximum allowed by the recreational share of the adopted fishing mortality rate reduction strategy black sea bass 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.

(c) *Annual fishing measures*. The Demersal Species Committee shall review the recommendations of the Black Sea Bass 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 October 15 to implement a coastwide commercial quota and recreational harvest limit and additional management measures for the commercial fishery, and will publish in the *Federal Register* a proposed rule on or before February 15 to implement additional management measures for the recreational fishery, if he determines that these measures are necessary to assure that the fishing mortality rates specified in paragraph (a) of this section are not exceeded. After considering public comment on a 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.

§648.21 Closure.

(a) *EEZ Closure*. The Regional Director shall close the EEZ to fishing for black sea bass by commercial vessels for the remainder of the calendar year by publishing a notice in the FEDERAL REGISTER if he determines that the quota will be caught by the time the closure takes effect.

§648.22 Time restrictions.

Beginning with the third year following FMP implementation, vessels that are not eligible for a moratorium permit under §648.4 and fishermen subject to the possession limit may fish for black sea bass only during the period specified by the Regional Director pursuant to the procedures in §648.20.

§648.23 Minimum sizes.

(a) The minimum size for black sea bass is 9 inches (22.9 cm) total length for all vessels issued a moratorium permit under §648.4, 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 for the first and second years these regulations are in effect. Beginning with the third year following implementation, the minimum fish size shall be increased to 10 inches (25.4 cm) total length.

(b) The minimum size for black sea bass is 9 inches (22.9 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 for the first and second years these regulations are in effect. Beginning with the third year following implementation, the minimum fish size shall be increased to 10 inches (25.4 cm) total length.

(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 §648.20.

(d) Beginning with the third year following implementation, the minimum fish sizes set forth in paragraphs (a) and (b) of this section may be changed following the procedures in §648.20.

§648.24 Gear restrictions.

(a) *General*. Beginning with the third year following implementation of these regulations, otter trawlers whose owners are issued a permit (including moratorium permit) under §648.4 and that land or

possess 100 or more pounds (45.4 kg) of black sea bass, per trip, must fish with nets that have a minimum mesh size of 4.0 inches (10.16 cm) diamond 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) *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.

(c) *Mesh obstruction or constriction.*

(1) A fishing vessel may not use any mesh configuration, mesh construction, or other means on or in the top of the net, as defined in paragraph (d) of this section, if it obstructs the meshes of the net in any manner.

(2) No vessel may use a net capable of catching black sea bass in which the bars entering or exiting the knots twist around each other.

(d) *Stowage of nets.* Otter trawl vessels subject to the minimum mesh requirement may not have available for immediate use any net, or any piece of net, not meeting the minimum mesh size requirement, or mesh that is rigged in a manner that is inconsistent with the minimum mesh size. A net that conforms to one of the following specifications and that can be shown not to have been in recent use is considered not to be "available for immediate use":

(1) A net stowed below deck, provided:

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

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

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

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

(i) It is fan-folded (flaked) and bound around its circumference.

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

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

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

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

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

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

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

(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 §648.24(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 §648.24(a).

(f) Beginning with the third year following FMP implementation, the minimum net mesh set forth in paragraph (a) of this section may be changed following the procedures in §648.20.

(g) Beginning with the third year following FMP implementation, the Regional Director may impose restrictions on gear other than otter trawls following the procedures in §648.20.

(h) Rollers used in roller rig or rock hopper trawl gear shall be no larger than of 18" (45.72 cm) in diameter.

(i) *Escape vents.*

(1) Beginning with the start of the first calendar year following FMP approval, pots or traps capable of catching and retaining black sea bass shall have a minimum escape vent of 1.125" X 6" (2.8575 X 15.24 cm) or 2.5" (6.35 cm) in diameter.

(2) Beginning with the start of the third calendar year following FMP approval, pots or traps capable of catching and retaining black sea bass shall have a minimum escape vent of 1.25" X 6" (3.175 X 15.24 cm) or 2.75" (6.985 cm) diameter

(3) Escape vent dimensions may be adjusted following the procedures in §648.20 following completion of Mid-Atlantic Council's escape vent study.

(j) *Degradable panels*. Pots or traps capable of catching and retaining black sea bass shall have the hinges and fasteners of each panel or door made of one of the following degradable materials:

(1) untreated hemp, jute, or cotton string of 3/16" (4.8 mm) diameter of smaller;

(2) magnesium alloy, timed float releases (pop-up devices) or similar magnesium alloy fasteners; or

(3) ungalvanized or uncoated iron wire of 0.062" (1.6 mm) diameter or smaller.

§648.25 Possession limit.

(a) Beginning with the third year following FMP implementation, the Regional Director may impose a possession limit following the procedures in §648.20 for persons harvesting black sea bass in or harvested from the EEZ unless that person is the owner or operator of a fishing vessel issued a moratorium permit under §648.4. Persons on board a commercial vessel that is not eligible for a moratorium permit under §648.4 are subject to this possession limit. The owner and operator and crew of a charter or party boat issued a moratorium permit under section 648.4(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 black sea bass are processed into fillets, an authorized officer will convert the number of fillets to whole black sea bass at the place of landing by dividing fillet number by 2. If black sea bass are filleted into a single (butterfly) fillet, such fillet shall be deemed to be from one whole black sea bass.

(c) Black sea bass 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 black sea bass 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) Owners or operators of otter trawlers issued a permit (including a moratorium permit) under §648.4, and fishing with, or possessing on board, nets or pieces of net that do not meet the minimum mesh requirements and that are not stowed in accordance with §648.24(f), may not retain 100 pounds (45.3 kg) or more of black sea bass. Black sea bass on board these vessels shall be stored in a standard 100-pound (45.3 kg) tote that has a liquid capacity of 18.2 gallons (70 liters), or a volume of not more than 4,320 cubic inches (2.5 cubic feet or 70.79 cubic cm), and that is readily available for inspection.

§648.26 Sea sampler program.

(a) *Request to take sea sampler.* The Regional Director may request a fishing vessel issued a permit under §648.4 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 black sea bass 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, black sea bass, or other specimens taken by the vessel, as requested by the sea sampler;

(8) Providing the sea sampler with sea turtles, marine mammals, black sea bass, 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.

§648.27 Experimental fishery.

(a) The Regional Director, in consultation with the Executive Director of the Council, may exempt any person or vessel from the requirements of this part for the conduct of experimental fishing beneficial to the management of the black sea bass resource or fishery.

(b) The Regional Director may not grant such exemption unless he/she determines that the purpose, design, and administration of the exemption is consistent with the objectives of the FMP, the provisions of the Magnuson Act, and other applicable law, and that granting the exemption will not:

(1) Have a detrimental effect on the black sea bass resource and fishery; or

(2) Cause any quota to be exceeded; or

(3) Create significant enforcement problems.

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

§648.28 Special management zones.

Upon request to the Council from a permittee (possessor of a Corps of Engineers permit) for an artificial reef, the modified area and an appropriate surrounding area of an artificial reef or fish attraction device (or other modification of habitat for the purpose of fishing) could be designated as a Special Management Zone (SMZ). The SMZ would prohibit or restrain the use of specific types of fishing gear that are not compatible with the intent of the permittee for the artificial reef or fish attraction device. The establishment of an SMZ would be done by regulatory amendment:

(a) A monitoring team (the team will be comprised of members of Council staff, NMFS Northeast Region, and the NMFS Northeast Fisheries Science Center) will evaluate the request in the form of a written report considering the following criteria:

(1) fairness and equity
(2) promote conservation
(3) excessive shares

(b) The Council Chairman may schedule meetings of Industry Advisors and/or the Scientific and Statistical Committee (SSC) to review the report and associated documents and to advise the Council. The Council Chairman may also schedule pubic hearings.

(c) The Council, following review of the Team's report, supporting data, public comments, and other relevant information, may recommend to the Regional Director that a SMZ be approved. Such a recommendation would be accompanied by all relevant background data.

(d) The Regional Director will review the Council's recommendation, and if he concurs in the recommendation, will propose regulations in accordance with the recommendations. He may also reject the recommendation, providing written reasons for rejection.

(e) If the Regional Director concurs in the Council's recommendations, he shall publish proposed regulations in the FEDERAL REGISTER and shall afford a reasonable period for public comment which is consistent with the urgency of the need to implement the management measure(s).

APPENDIX 5. 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 black sea bass 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 black sea bass - any activity, other than scientific research vessel activity, which involves: (a) the catching, taking, or harvesting of black sea bass; (b) any other activity which can reasonably be expected to result in the catching, taking, or harvesting of black sea bass; or © 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.

$F_{0.1}$ - 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".

FMP - fishery management plan.

FR - *Federal Register*.

FL - Fork length. The length from the most anterior part of the fish to the tip of the median caudal fin rays.

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.

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.

Territorial Sea - marine waters from the shoreline to 3 miles seaward.

Take - 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. The length along the mid-line of the fish from the tip of the snout to the tip of the tail.

Total Allowable Level of Foreign Fishing (TALFF) - that portion of the Optimum Yield made available for foreign fishing.

SL - standard length. The length from the tip of the upper jaw to the posterior end of the hypural bone.

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.