AMENDMENT 13

TO THE

SUMMER FLOUNDER, SCUP, AND BLACK SEA BASS

FISHERY MANAGEMENT PLAN

(Includes Environmental Impact Statement, Regulatory Impact Review, Regulatory Flexibility Analysis, and Essential Fish Habitat Assessment)

VOLUME 1

August 2002

Mid-Atlantic Fishery Management Council

and the

the Atlantic States Marine Fisheries Commission,

in cooperation with

the National Marine Fisheries Service,

the New England Fishery Management Council,

and

the South Atlantic Fishery Management Council

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Council Chair's 1/31/03

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
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JAN 29 2003

Ricks E. Savage, Chairman
Mid-Atlantic Fishery Management Council
Room 2115, Federal Building
Dover, DE 19904-6790

Dear Ricks:

After carefully reviewing Amendment 13 to the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan (FMP), the administrative record underlying it and the public comments received, NOAA Fisheries has approved the Amendment. I want to congratulate the Council on its role in developing this Amendment. Further, during this past year, due to the Council's lead and industry's cooperation, we have been able to establish the foundation to implement the measures necessary to protect the black sea bass resource. As always, my staff and I are committed to assisting the Council in its continuing efforts to manage this species.

Sincerely,

for Patricia A. Kurkul
Regional Administrator

cc: Thomas R. Hill

RECEIVED
JAN 31 2003
MID-ATLANTIC FISHERY COUNCIL

EXECUTIVE SUMMARY

Amendment 13 to the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan (FMP), prepared by the Mid-Atlantic Fishery Management Council (Council) and Atlantic States Marine Fisheries Commission (Commission), is intended to manage the summer flounder (*Paralichthys dentatus*), scup (*Stenotomus chrysops*) and black sea bass (*Centropristis striata*) fishery pursuant to the Magnuson-Stevens Fishery Conservation and Management Act of 1976 (MSFCMA), as amended by the Sustainable Fisheries Act (SFA) in 1996. This amendment could: 1) revise the quarterly commercial quota system for black sea bass implemented in Amendment 9 to the Summer Flounder, Scup, and Black Sea Bass Fisheries Management Plan; 2) remove permit restrictions for fishermen that have both a Northeast Region Black Sea Bass (NER BSB) Permit and a Southeast Region Snapper/Grouper (SER S/G) Permit and fish for black sea bass north and south of Cape Hatteras, North Carolina; 3) address the potential problems related to the wet storage of black sea bass pots/traps; 4) establish *de minimus* specifications for black sea bass under the Atlantic State Marine Fisheries Commission Interstate Fisheries Management Program Charter; 5) implement tag requirements for black sea bass pots/traps; 6) limit the number of black sea bass pots/traps fished by fishermen; and 7) implement management alternatives for summer flounder, scup and black sea bass to prevent, mitigate or minimize adverse effects from fishing to bring the FMP into compliance with Section 303(a)(7) of the SFA.

The Council is required to prepare an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) to assess the potential effects of the proposed actions on the human environment. Because the prior EIS was prepared in 1992 for summer flounder and in 1996 for scup and black sea bass, NMFS advised the Council to draft a completely new EIS for these species. This new EIS, which is part of this document, would replace the information presented in Amendments 2, 8, and 9 for summer flounder, scup, and black sea bass, respectively.

The management units for summer flounder, scup and black sea bass remain unchanged in this amendment. Specifically, the management unit is summer flounder in US waters in the western Atlantic Ocean from the southern border of North Carolina northward to the US-Canadian border, and scup and 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:

1. Reduce fishing mortality in the summer flounder, scup and black sea bass fishery to assure that overfishing does not occur.

2. Reduce fishing mortality on immature summer flounder, scup and black sea bass to increase spawning stock biomass.

3. Improve the yield from these 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.

A number of alternatives have been identified by the Council and Commission for consideration by the public. These alternatives are discussed in further detail in section 2.0 of this document.

A. Black Sea Bass Commercial Management Alternatives (Note that Alternatives 1 through 8 relate to the black sea bass commercial quota and Alternatives 9 through 12 detail other black sea bass commercial management measures.)

1. Status quo: the quarterly quota system currently in effect (Alternative 1).

2. A quarterly quota system with a rollover provision (Alternative 2).

   a. A quarterly quota system with a change in the allocation formula based on 1988-1997 landings data and a rollover provision (Alternative 2a).

   b. A quarterly quota system with a change in the allocation formula based on 1993-1997 landings data and a rollover provision (Alternative 2b).

3. Quota allocation by permit category (Alternative 3).

   a. Quota allocation by permit category - 3 separate categories based on landings data from 1988-1997 (Alternative 3a).

   b. Quota allocation by permit category - 3 separate categories based on landings data from 1993-1997 (Alternative 3b).

   c. Quota allocation by permit category - 2 separate categories based on landings data from 1988-1997 (Alternative 3c).

   d. Quota allocation by permit category - 2 separate categories based on landings data from 1993-1997 (Alternative 3d).

4. Quota allocation to separate subregions (Alternative 4).

   a. Quota allocation to separate subregions based on 1988-1997 landings data with additional period allocations January through April and May through December (Alternative 4a).

   b. Quota allocation to separate subregions based on 1993-1997 landings data with additional period allocations January through April and May through December (Alternative 4b).

5. State-by-state allocations (Alternative 5).

a. State-by-state allocations based on 1988-1997 landings data (Alternative 5a).

b. State-by-state allocations based on 1993-1997 landings data (Alternative 5b).

c. State-by-state allocations based on the best five landing years for each state during the period 1988 to 1997 (Alternative 5c).

d. State-by-state allocations based on the best five landing years for each state during the period 1980 to 1997 (Alternative 5d).

e. *De minimus* specifications (Alternative 5e).

f. Coastwide quota to facilitate state-by-state allocations implemented by the Commission (Alternative 5f: preferred alternative).

6. A hybrid quota system: coastwide quota from January through April and state-by-state quotas from May through December (Alternative 6).

a. A hybrid quota system based on 1988-1997 landings data: coastwide quota from January through April and state-by-state quotas from May through December (Alternative 6a).

b. A hybrid quota system based on 1993-1997 landings data: coastwide quota from January through April and state-by-state quotas from May through December (Alternative 6b).

c. A hybrid quota system based on 1980-1997 landings data: coastwide quota from January through April and state-by-state quotas from May through December (Alternative 6c).

7. A hybrid quota system: coastwide quota from January through April and subregional quotas from May through December (Alternative 7).

a. A hybrid quota system based on 1988-1997 landings data: coastwide quota from January through April and subregional quotas from May through December (Alternative 7a).

b. A hybrid quota system based on 1993-1997 landings data: coastwide quota from January through April and subregional quotas from May through December (Alternative 7b).

8. Allocations by gear type.

a. Quota allocation by gear type based on 1988-97 landings data (Alternative 8a).

b. Quota allocation by gear type based on 1993-97 landings data (Alternative 8b).

9. Permit requirements for fishermen that have both a Northeast Black Sea Bass Commercial Permit and a Southeast Snapper/Grouper Permit (Alternative 9).

a. Status quo (Alternative 9a).

b. Remove the permit requirement that restricts fishermen from using a Southeast Snapper/Grouper Permit during a northern closure (Alternative 9b: preferred alternative).

10. Prohibit the wet storage of black sea bass pots/traps during a closure (Alternative 10).

a. Status quo: allow wet storage of black sea bass pots/traps during a closure (Alternative 10a: preferred alternative).

b. Prohibit the wet storage of black sea bass pots/traps during a closure of longer than two weeks (Alternative 10b).

c. Prohibit the wet storage of black sea bass pots/traps during a closure of longer than four weeks (Alternative 10c).

11. A black sea bass pot/trap tag program.

a. Status quo: no tag program (Alternative 11a: preferred alternative).

b. A tag requirement for black sea bass pots/traps (Alternative 11b).

12. A limit on the number of pots/traps used by fishermen.

a. Status quo: no limit on the number of pots/traps (Alternative 12a: preferred alternative).

b. A limit of 400 pots/traps (Alternative 12b).

c. A limit of 800 pots/traps (Alternative 12c).

B. Summer Flounder, Scup, and Black Sea Bass EFH Alternatives

1. Status quo: current management measures (EFH Alternative 1: preferred alternative).

2. Prohibit bottom tending mobile gear from the nearshore areas surrounding estuaries (EFH Alternative 2).

3. Prohibit bottom tending mobile gear in the area surrounding the Hudson Canyon (EFH Alternative 3).

4. Roller rig and rock hopper gear restrictions (EFH Alternative 4).

5. Prohibit street-sweeper gear (EFH Alternative 5).

In the final deliberations on Amendment 13, and after a review of public comment, the Council and Commission considered all the alternatives and comments and chose the following preferred alternatives: a) a federal coastwide quota to facilitate the state-by-state allocation system implemented by the Commission (Alternative 5f; section 2.1.5.6); b) removal of the permit requirement that restricts fishermen from using a SER S/G Permit during a northern closure (Alternative 9b; section 2.1.9.2); c) no additional regulations regarding wet storage of black sea bass pots/traps during a closure (Alternative 10a: status quo; section 2.1.10.1); d) no initiation of a pot/trap tag program (Alternative 11a: status quo; section 2.1.11.1); e) no restrictions on the numbers of pots/traps used by fishermen (Alternative 12a: status quo; section 2.1.12.1); and f) rely on current management measures to minimize adverse effects of fishing on EFH (EFH Alternative 1: Status Quo; section 2.2.1).

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*Note that (EIS) identifies sections of the FMP required for the Environmental Impact Statement.

1.0 PURPOSE AND NEED FOR ACTION (EIS)*

The summer flounder, scup and black sea bass fisheries are managed under the Summer Flounder (*Paralichthys dentatus*), Scup (*Stenotomus chrysops*) and Black Sea Bass (*Centropristis striata*) Fishery Management Plan (FMP) that was prepared cooperatively by the Mid-Atlantic Fishery Management Council (Council) and the Atlantic States Marine Fisheries Commission (Commission).

This amendment, Amendment 13 to the Summer Flounder, Scup and Black Sea Bass FMP, could: 1) revise the quarterly commercial quota system for black sea bass implemented in Amendment 9 to the Summer Flounder, Scup, and Black Sea Bass Fisheries Management Plan; 2) remove permit restrictions for fishermen that have both a Northeast Region Black Sea Bass (NER BSB) permit and a Southeast Region Snapper/Grouper (SER S/G) permit and fish for black sea bass north and south of Cape Hatteras, North Carolina; 3) address the potential problems related to the wet storage of black sea bass pots/traps; 4) establish *de minimus* specifications for black sea bass under the Atlantic State Marine Fisheries Commission Interstate Fisheries Management Program Charter; 5) implement tag requirements for black sea bass pots/traps; 6) limit the number of black sea bass pots/traps fished by fishermen; and 7) implement management alternatives for summer flounder, scup and black sea bass to prevent, mitigate or minimize adverse effects from fishing to bring the FMP into compliance with Section 303(a)(7) of the Sustainable Fisheries Act (SFA).

These management alternatives have been proposed to remedy a number of problems related to the commercial management system currently in place for black sea bass. Specifically, the quarterly quota system implemented in Amendment 9 was designed to allow for black sea bass to be landed during the entire 3 months in each quarter. However, the black sea bass fishery experienced early closures during the last three quarters in 1999 and 2000. In fact, in quarters 3 and 4 of 2000 the quarterly allocation was harvested within one month leaving the fishery closed for the remaining two months of those quarters. In 2001, the quarters 1 through 4 also experienced early closures and quarter 3 of 2001 was closed in less than three weeks.

Long closures have obvious economic consequences to fishermen and processors. A market glut at the beginning of the quarter allows for a drop in prices as a large number of fish flood the market. After a short landings period, the fishery is closed and fishermen, especially those that fish primarily for black sea bass, are faced with the additional economic concerns of no or reduced income.

In addition to early closures, the quota in the first quarter was not taken in 1998, 1999, and 2000. This relates to the fact that the allocation percentages are based on historic landings during a period of time when the mesh size for summer flounder was smaller and the fishery was mixed, i.e., fishermen targeting summer flounder with 4" mesh landed significant quantities of black sea bass as bycatch from January through March. As a result of the quota system and minimum mesh sizes for summer flounder, the flounder fishery is now very direct and fewer sea bass were landed in the winter fishery in 1999 and 2000.

Possible inequities have also been created by the current management system as landings have shifted to the north. In fact, preliminary data for quarter 4 in 2000 indicate that 41% of the landings for that quarter occurred in one state, Massachusetts. A shift in abundance of black sea bass to the north may account for these higher landings. However, some fishermen have also indicated that more restrictive possession limits have favored fishing operations in the north where black sea bass are caught closer to shore.

Some states have no or little associated landings of black sea bass. As such, this amendment addresses the need to establish *de minimus* specifications under the Commission's Interstate Fisheries Management Program Charter. *De minimus* status is granted when, under existing conditions of the stock and scope of the fishery, conservation and enforcement actions taken by an individual state would not be expected to contribute significantly to a coastwide conservation program required by an FMP or amendment. Any state that has commercial landings of less than 0.1% of the total coastwide commercial landings in the last preceding year for which data are available is eligible for *de minimus* status.

This amendment also addresses permit restrictions for fishermen that have both a NER BSB permit and a SER S/G permit and fish for black sea bass north and south of Cape Hatteras, North Carolina. Current regulations restrict fishermen with the Northeast permit from fishing south of Cape Hatteras during a northern closure unless they relinquish their permits for a period of 6 months. These fishermen have indicated that this requirement is unnecessarily burdensome, given the fact that only a few fishermen have both permits and the reporting system in North Carolina can accurately track landings north and south of Cape Hatteras.

This amendment also addresses the potential problems related to the wet storage of black sea bass pots/traps. Wet storage is a practice where commercial black sea bass pot/trap fishermen allow their pots/traps to remain in the water during periods when the black sea bass fishery is closed. This practice allows the pots/traps to continue to attract and capture fish. Anecdotal reports have indicated that when the fishery is closed and black sea bass cannot be landed, they die in the pots/traps.

This amendment also explores the need to limit the number of pots/traps and implement a pot/trap tagging program to reduce effort in the black sea bass fishery. The Council and Commission are concerned that pot/trap fishermen have continued to fish with a large number of pots/traps even though their landings are controlled by possession (landing) limits. This level of effort may be associated with an increased level of discards and mortality of black sea bass that die in traps before they can be harvested.

Finally, this amendment addresses the disapproved portions of Amendment 12 relating to the potential impacts of fishing gear on summer flounder, scup, and black sea bass EFH. Pursuant to Section 303(a)(7) of the SFA, the Councils shall minimize to the extent practicable adverse effects on EFH caused by fishing. Additionally, 50 CFR part 600.815 (a)(3) states that the Councils must act to prevent, mitigate, or minimize adverse effects from fishing, to the extent practicable, if there is evidence that a fishing practice is having an identifiable adverse effect on EFH. Sections 3.2.7.1, 3.2.7.2, and 3.2.8 of this Amendment detail the possible impacts of fishing gear on summer flounder, scup, and black bass EFH (sections 2.2.3.6, 2.2.3.7, and 2.2.4 in Amendment 12, respectively). In addition, management alternatives that could be used to prevent, mitigate or minimize adverse effects from fishing are described below. Section 600.815

(a)(4) states that, fishery management options may include, but are not limited to: (i) fishing equipment restrictions, (ii) time/area closures, and (iii) harvest limits.

1.1 AMENDMENT/EIS PROCESS

This amendment was prepared under both the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) of 1976, as amended by the SFA of 1996, and the Atlantic Coastal Fisheries Cooperative Management Act of 1993 (ACFCMA). The MSFCMA requires that the management measures proposed in an FMP be consistent with ten National Standards for fishery conservation and management. Under ACFCMA, if a state does not implement management measures required by an FMP or amendment, the federal government may impose a moratorium on the landing of the species covered by the FMP in that state.

FMPs and amendments must meet the requirements of a number of federal laws and regulations. In addition to MSFCMA, these include the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), Migratory Bird Treaty Act (MBTA), Executive Order 12866 (EO 12866), Regulatory Flexibility Act (RFA), Paper Reduction Act (PRA), and Coastal Zone Management Act (CZMA). This document has been developed to meet these federal requirements and contains all elements of a FMP Amendment, Environmental Impact Statement (EIS), Regulatory Flexibility Analysis, Regulatory Impact Review (RIR). and Social Impact Assessment (SIA).

The Council is required to prepare an EIS under NEPA to assess the potential effects of the proposed actions on the human environment. Because the prior EIS was prepared in 1992 for summer flounder and in 1996 for scup and black sea bass, NMFS advised the Council to draft a completely new EIS for these species. This new EIS, which is part of this document, would replace the information presented in Amendments 2, 8, and 9 for summer flounder, scup, and black sea bass, respectively.

The notice of intent to prepare an EIS was published in the Federal Register on March 7, 2001. NEPA requires that the Council conduct one or more scoping meetings to inform interested parties of the proposed action and alternatives, and to solicit comments on the range and type of analysis to be included in the EIS. The Council held a public scoping hearing on March 21, 2001 and accepted scoping comments from March 7, 2001 through April 6, 2001. The Council evaluated a reasonable range of alternatives under each of the proposed actions in the amendment/EIS. These alternatives were approved in a public hearing draft on August 8, 2001. The Council did not choose preferred alternatives for the public hearing draft. The public had a chance to comment on Amendment 13 through a public hearing process. Specifically, the Notice of Availability for the draft amendment/EIS was released on March 1, 2002 and the comment period ended on April 15, 2002. The Council and Commission also held 7 public hearings to allow input on Amendment 13. After the public hearing process was complete, the Council considered all public comments and chose the following as preferred alternatives: a) a federal coastwide quota with a state-by-state allocation system managed by the Commission (Alternative 5f; section 2.1.5.6); b) removal of the permit requirement that restricts fishermen from using a SER S/G Permit during a northern closure (Alternative 9b; section 2.1.9.2); c) no additional regulations regarding the wet storage of black sea bass pots/traps during a closure (Alternative 10a: status quo; section 2.1.10.1); d) no initiation of a pot/trap tag program (Alternative 11a:

status quo; section 2.1.11.1); e) no restrictions on the numbers of pots/traps used by fishermen (Alternative 12a: status quo; section 2.1.12.1); and f) rely on current management measures to minimize adverse effects of fishing on EFH (EFH Alternative 1: status quo; section 2.2.1).

1.2 HISTORY OF FMP DEVELOPMENT

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

It was decided that the initial plan would be prepared by the Commission. The Council arranged for NMFS to make some of the Council's programmatic grant funds available to finance preparation of the Commission's plan. New Jersey was designated as the state with lead responsibility for the plan. The state/federal draft was adopted by the Commission at its annual meeting in October 1982. The original Council Summer Flounder FMP (MAFMC 1988) was based on the Commission's management plan. NMFS approved the original FMP on 19 September 1988.

Amendment 1 to the FMP was developed in the summer of 1990 solely to protect the 1989 and 1990 year classes by imposing a minimum net mesh size comparable to the 13" minimum fish size included in the original FMP. On 15 February 1991 the Council was notified that NMFS had approved the overfishing definition for summer flounder contained in Amendment 1, but had disapproved the minimum net mesh provision.

Amendment 2, which was fully implemented in 1993, was a comprehensive amendment designed to rebuild a severely depleted summer flounder stock. Amendment 2 was approved by NMFS on 6 August 1992. It contained a number of management measures to regulate the commercial and recreational fisheries for summer flounder. These included a rebuilding schedule, commercial quotas, recreational harvest limits, size limits, gear restrictions, and permit and reporting requirements. Amendment 2 also established the Summer Flounder Monitoring Committee, which meets annually to review the best available biological and fisheries data and make recommendations regarding the commercial quota and other management measures.

Amendment 3 to the Summer Flounder FMP was developed in response to fishermen's concerns that the demarcation line for the small mesh exempted fishery bisected Hudson Canyon and was difficult to enforce. Amendment 3 revised the Northeast exempted fishery line to 72°30.0'W. In addition, Amendment 3 increased the large mesh net threshold to 200 pounds during the winter fishery, 1 November to 30 April. Furthermore, Amendment 3 stipulated that otter trawl vessels fishing from 1 May through 31 October could only retain up to 100 pounds of summer flounder before using the large mesh net. Amendment 3 was approved by the Council on 21 January 1993 and submitted to NMFS on 16 February 1993.

Amendment 4 adjusted Connecticut's commercial landings of summer flounder and revised the state-specific shares of the coastwide commercial summer flounder quota as requested by the

Commission. Amendment 5 allowed states to transfer or combine the commercial quota. Amendment 6 allowed multiple nets on board as long as they were properly stowed and changed the deadline for publishing the overall catch limits and commercial management measures to 15 October and the recreational management measures to 15 February. Amendment 7 revised the fishing mortality rate reduction schedule for summer flounder.

The Council began the development of an FMP for black sea bass in 1978. Although preliminary work was done to support the development of an FMP, a plan was not completed. Work on an FMP began again in January, 1990 when the Council and the Commission began the development of an FMP for black sea bass. 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.

In 1996, NMFS requested that the black sea bass and scup regulations be incorporated into another FMP to reduce the number of separate fisheries regulations issued by the federal government. As a result, the Scup FMP and the Black Sea Bass FMP were incorporated into the summer flounder regulations as Amendment 8 and 9 (included EISs) to the Summer Flounder FMP, respectively. Amendment 8 established management measures for scup and Amendment 9 established a management program for black sea bass. Both of these were major amendments that implemented a number of management measures for scup and black sea bass including commercial quotas, commercial gear requirements, minimum size limits, recreational harvest limits, and permit and reporting requirements.

The Council was notified at a June, 1996 meeting that the Regional Director planned to disapprove the provision in Amendment 9 that would implement a state-by-state commercial quota. The official disapproval letter was dated July 16, 1996. In the letter, the Regional Director concluded that the state-by-state quota provision was not consistent with National Standard 7. Specifically, he stated that the provisions that apply to the area of north of Cape Hatteras, North Carolina would impose significant administrative and enforcement costs on NMFS and the state of North Carolina. The letter referenced the fact that Cape Hatteras separates two distinct stocks of black sea bass, a northern stock that would be managed by Amendment 9 regulations and a southern stock regulated by the Snapper/Grouper FMP. The disapproval letter stated that the amendment failed to address how a commercial quota that bifurcated the state of North Carolina and only applied to the northern stock of black sea bass would be implemented. Based on these comments, the Council voted to replace the state-by-state quota system with a coastwide quota allocated in quarterly periods over the year.

Amendment 10 made a number of changes to the summer flounder regulations implemented by Amendment 2 and later amendments to the Summer Flounder, Scup and Black Sea Bass FMP. Specifically this amendment modified the commercial minimum mesh regulations, continued the moratorium on entry of additional commercial vessels, removed provisions that pertain to the expiration of the moratorium permit, prohibited the transfer of summer flounder at sea, and established a special permit for party/charter vessels to allow the possession of summer flounder parts smaller than the minimum size.

Amendment 11, approved by NMFS in 1998, was implemented to achieve consistency among Mid-Atlantic and New England FMPs regarding vessel replacement and upgrade provisions, permit history transfer, splitting, and renewal regulations for fishing vessels issued Northeast Limited Access federal fishery permits.

Amendment 12 was developed to bring the Summer Flounder, Scup, and Black Sea Bass FMP into compliance with the new and revised National Standards and other required provisions of SFA. Specifically, the amendment revised the overfishing definitions (National Standard 1) for summer flounder, scup, and black sea bass and addressed the new and revised National Standards (National Standard 8 - consider effects on fishing communities; National Standard 9 - reduce bycatch; and National Standard 10 - promote safety at sea) relative to the existing management measures. The amendment also identified essential habitat for summer flounder, scup and black sea bass. In addition, Amendment 12 added a framework adjustment procedure that allows the Council to add or modify management measures through a streamlined public review process. Amendment 12 was partially approved on 28 April 1999.

It should be noted that any management measure implemented by an earlier amendment not specifically referenced in this amendment is intended to continue in force.

1.3 MANAGEMENT OBJECTIVES

The objectives of the FMP are:

1. Reduce fishing mortality in the summer flounder, scup and black sea bass fishery to assure that overfishing does not occur.

2. Reduce fishing mortality on immature summer flounder, scup and black sea bass to increase spawning stock biomass.

3. Improve the yield from these 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.

1.4 MANAGEMENT UNIT

The management units for summer flounder, scup and black sea bass remain unchanged in this amendment. Specifically, the management unit is summer flounder in US waters in the western Atlantic Ocean from the southern border of North Carolina northward to the US-Canadian border, and scup and black sea bass in US waters in the western Atlantic Ocean from Cape Hatteras, North Carolina northward to the US-Canadian border.

1.5 MANAGEMENT STRATEGY

This amendment will provide the information and analyses necessary to implement a commercial management system that will modify the current quota system for black sea bass. This modification will allow for a more equitable allocation of the quota to fishermen and increase the probability that exploitation targets will be met. The Council intends to continue the management programs detailed in the summer flounder, scup, and black sea bass FMP and reduce overfishing and rebuild the summer flounder, scup, and black sea bass stocks. Finally, this amendment remedies the deficiencies associated with the EFH requirements for summer flounder, scup and black sea bass and replaces the existing EIS for all three species.

2.0 MANAGEMENT MEASURE ALTERNATIVES (EIS)*

The following is a description of the alternatives adopted by the Council and Commission for analysis and public hearing comment. The complete analysis of the biological, economic, and social impacts are presented in section 4.0 of this document. In addition, several alternatives were considered by the Council and Commission but were rejected for further analysis. They are described in sections 2.1.13 and 2.2.6.

Note that in the final deliberations on Amendment 13, and after a review of public comment, the Council and Commission considered all the alternatives and comments and chose the following preferred alternatives: a) a federal coastwide quota to facilitate the state-by-state allocation system implemented by the Commission (Alternative 5f; section 2.1.5.6); b) removal of the permit requirement that restricts fishermen from using a SER S/G Permit during a northern closure (Alternative 9b; section 2.1.9.2); c) no additional regulations regarding wet storage of black sea bass pots/traps during a closure (Alternative 10a: status quo; section 2.1.10.1); d) no initiation of a pot/trap tag program (Alternative 11a: status quo; section 2.1.11.1); e) no restrictions on the numbers of pots/traps used by fishermen (Alternative 12a: status quo; section 2.1.12.1); and f) rely on current management measures to minimize adverse effects of fishing on EFH (EFH Alternative 1: Status Quo; section 2.2.1). This combination will be submitted to the Secretary of Commerce for approval.

The Commission adopted state-by-state quotas to manage the commercial fishery for black sea bass. These quotas will be implemented by the states on January 1, 2003. This state-by-state system will give states the ability to manage their quota for the greatest benefit of the commercial black sea bass industry in their state. The Council supports this action by the Commission.

The coastwide quota alternative selected by the Council to facilitate the state-by-state quotas implemented by the Commission is an alternative that falls within the range of state-by-state quota alternatives considered in the public hearing document. Specifically, the preferred quota management program is essentially the same as the state-by-state alternatives considered in the DEIS with the difference being that the states would manage the program. As such, the resulting impacts would be consistent with those described in the public hearing document.

2.1 BLACK SEA BASS COMMERCIAL MANAGEMENT ALTERNATIVES

A number of alternatives that would affect the black sea bass commercial fishery are identified below. Alternatives 1 through 8 relate to the black sea bass commercial quota and were proposed by the Council and Commission as possible ways of allocating the quota each year. The annual quota setting process and associated regulations as detailed in Amendment 9 would apply to all of the alternatives that involve an allocation of an annual quota.

Most of the quota alternatives base allocation formulas on landings between the years 1988 and 1997. The landings prior to 1988 are available and are used in the state-by-state allocation formulas detailed in Alternative 2.1.5.4. However, many states do not have accurate landings reports for some of those years. In fact, that was the reason that the Council and Commission used 1988-1992 data in Amendment 9 to allocate the quota. In addition, the landings data for 1998 and 1999 were affected by the restrictive quotas and possession limits that were imposed in those years. As such, those years should be left out of any allocation formula.

Alternatives 9 through 12 contain other black sea bass commercial management measures. These alternatives would modify regulations related to pots/traps as well as commercial fishing permits.

2.1.1 Status Quo: Quarterly Quota System Currently in Effect (Alternative 1)

This is a "no action" alternative that would allow the current system to remain in effect. This alternative is required by NEPA. It is the "standard" or base to which the other proposed alternatives are compared for biological, economic, and social impacts. Specifically, the annual commercial quota is allocated to four quarters based on 1988-1992 landings data. The allocation periods and the associated percent of the total quota are: January through March (38.64%), April through June (29.26%), July through September (12.33%), and October through December (19.77%; Table 1). Possession limits are implemented each period. Any landings in excess of the quota that occurred during a quarter are subtracted from the following year's quota for that quarter.

2.1.2 A Quarterly Quota System With a Rollover Provision (Alternative 2)

2.1.2.1 A quarterly quota system with a change in the allocation formula based on 1988-1997 landings data and a rollover provision (Alternative 2a)

This alternative would continue the present system with a change in the allocation formula based on landings data from 1988-1997 (Table 1). The allocation periods and the associated percent of the total quota would be: January through March (36.16%), April through June (29.45%), July through September (13.61%), and October through December (20.78%). Specifically, the annual commercial quota would be allocated to four quarters based on landings data for these years. In addition, unused quota from the previous quarters could be added to the next quarters allocation within the year, e.g., unused quota from quarter 1 could be added to the quarter 2 allocation that year. However, unused quota could not be added to the following year's quota. Possession limits would be implemented for each period. Any landings in excess of the quota that occurred during a quarter would be subtracted from the following year's quota for that quarter.

The rationale for this alternative is that with the knowledge that any unused quota will not be "wasted," but rather rolled over to the next quarter, derby-style fishing effort may not ensue, i.e., there would be no need to use or lose the quota. Under the current system, the "use it or lose it" mentality can result in harvesting the quarterly quota quickly, or even overharvesting it.

The Council and Commission did not choose this rollover provision alternative because this alternative did not address the problems stated in section 1.0. Specifically, given that all four quarters in 2001 closed early, 100% of the quota was landed in the first quarter of 2002, and the second quarter in 2002 closed early, it is unlikely that adding a rollover provision would allow the black sea bass fishery to remain open throughout the year. Furthermore, a quarterly quota system with or without a rollover provision would not allow for the flexibility required by the states to manage the fisheries under a state-by-state allocation system. Coastwide quarterly quotas would not be compatible with the state-by-state quota implemented by the Commission. Specifically, they would not allow states the flexibility to design their own management systems because of the temporal constraints imposed by a quarterly federal quota.

2.1.2.2 A quarterly quota system with a change in the allocation formula based on 1993-1997 landings data and a rollover provision (Alternative 2b)

The same as Alternative 2.1.2.1 except the base years used in the allocation formula would be 1993-1997 (Table 1).

2.1.3 Quota Allocation by Permit Category (Alternative 3)

2.1.3.1 Quota allocation by permit category - 3 separate categories based on landings data from 1988-1997 (Alternative 3a)

This alternative would create three permit categories or sectors based upon documented landings from 1988 to June 5, 2001 by any vessel with a NER BSB permit. Vessels qualifying for each sector would be required to meet the following criteria:

1) A1 permits - documented landings were >= 10,000 pounds per 12 month period (June 6 to June 5) for at least 3 annual periods;
2) A2 permits - documented landings were >= 2,000 pounds per 12 month period (June 6 to June 5) for at least 3 annual periods;
3) A3 permits - documented landings of black sea bass in a 12 month period (June 6 to June 5) for 3 annual periods, but did not meet A1 or A2 permit criteria.

Each sector would be allocated a share of the quota based on landings data from 1988-1997 for each permit category. Based on 1988-1997 data, 81.7% of the annual quota would be allocated to A1 permit holders, 12.8% to A2 permit holders, and 5.5% to A3 permit holders (Table 2a).

It would be the responsibility of the states to cooperate with NMFS to monitor each sector's performance to ensure that the quota for each sector was not exceeded. If it is projected that a sector would reach its quota, it would be the responsibility of NMFS and the states to close the fishery. If, in any given year, a sector does exceed its quota, the overage would be deducted from the following year's quota for that sector.

It is possible that allocations could be subdivided over the year. Specifically, the Council and Commission could choose to further divide the allocations by permit category into two periods, January through April and May through December. Possession limits would then be implemented for each category and period to allow for an even distribution of the landings throughout the year.

This alternative was considered because allocation of the annual quota into three permit categories may result in a more equitable distribution of landings among user groups. The Council and Commission did not choose any of the permit category alternatives because these alternatives would introduce the additional burden of enforcing individual permit allocations. Additionally, the burden of monitoring the fishery for NMFS and the states would increase, relative to the current system. The reporting requirements for dealers would also increase under the permit category alternatives. The permit category alternatives would not be compatible with the state-by-state quota implemented by the Commission. Specifically, they would not allow states the flexibility to design their own management systems, because of the constraints that would be placed on the federal permit holders in the different permit categories.

2.1.3.2 Quota allocation by permit category - 3 separate categories based on landings data from 1993-1997 (Alternative 3b)

The same as Alternative 2.1.3.1 except the base years used in the allocation formula to the permit categories would be 1993-1997 (Table 2b).

2.1.3.3 Quota allocation by permit category - 2 separate categories based on landings data from 1988-1997 (Alternative 3c)

This alternative would create two permit categories or sectors based upon documented landings from 1988 to June 5, 2001 by any vessel with a NER BSB permit. Vessels qualifying for each sector would be required to meet the following criteria:

> 1) B1 permit - documented landings were >= 4,000 pounds per 12 month period (June 6 to June 5) for at least 3 annual periods;
> 2) B2 permit - documented landings of black sea bass per 12 month period (June 6 to June 5) but did not meet B1 permit criteria.

Each sector would be allocated a share of the quota based on average annual landings from 1988-1997 for each permit category. Based on 1988-1997 data, 89.8% of the annual quota would be allocated to B1 permit holders and 10.2% to B2 permit holders (Table 3a).

It would be the responsibility of the states to cooperate with NMFS to monitor each sector's performance to ensure that the quota for each sector was not exceeded. If it is projected that a sector would reach its quota, it would be the responsibility of NMFS and the states to close the fishery. If, in any given year, a sector does exceed its quota, the overage would be deducted from the following year's quota for that sector.

It is possible that allocations could be subdivided over the year. Specifically, the Council and Commission could choose to further divide the allocations by permit category into two periods, January through April and May through December. Possession limits would then be implemented for each category and period to allow for an even distribution of the landings throughout the year.

This alternative was considered because allocation by two permit categories may result in a more equitable distribution of landings among user groups. Furthermore, a subdivision into two categories may be more equitable than three categories.

2.1.3.4 Quota allocation by permit category - 2 separate categories based on landings data from 1993-1997 (Alternative 3d)

The same as Alternative 2.1.3.3 except the base years used in the allocation formula to the permit categories would be 1993-1997 (Table 3b).

2.1.4 Quota Allocation to Separate Subregions (Alternative 4)

2.1.4.1 Quota allocation to separate subregions based on 1988-1997 landings data with additional period allocations January through April and May through December (Alternative 4a)

The annual quota would be allocated to a northern and southern subregion based on 1988-1997 landings data. The northern subregion would include the states from Maine to New York and the southern subregion would include states from New Jersey to North Carolina (Cape Hatteras). Subregional quotas would be further divided into two periods, January through April and May through December, based on the same landing years used in the subregional allocation, that is, 1988-1997. The associated allocations for each subregional period are presented in Table 4.

Possession limits would be implemented for each subregion and period. Possession limits could be modified over the period based on a recommendation of the Monitoring Committee to the Council and Commission and implementation by the Regional Administrator and the states as part of the annual specification process.

The quota would apply throughout the management unit, including both state and federal waters. All commercial landings in a state would count toward the quota in that state's subregion. Fishermen would be allowed to land in any port in their subregion. Any landings in excess of the quota that occurred during a period in a subregion would be subtracted from the following year's quota for that period and subregion.

The reason that this alternative was proposed because an allocation of the quota to subregions may account for geographic difference in the fishery. As such, it would recognize that fishing practices differ from north to south. The Council and Commission did not choose the subregion alternatives because they felt that the state-by-state allocation system implemented by the Commission and facilitated by a federal coastwide quota would allow for the most equitable distribution of the commercial quota to fishermen, without the additional burden of federal monitoring by NMFS. Quota allocation to separate subregions would not be compatible with the state-by-state quota implemented by the Commission. Specifically, they would not allow states the flexibility to design their own management systems because of the geographic constraints imposed by a subregional allocation.

2.1.4.2 Quota allocation to separate subregions based on 1993-1997 landings data with additional period allocations January through April and May through December (Alternative 4b)

The same as Alternative 2.1.4.1 except the base years used in the allocation formula would be 1993-1997 (Table 4).

2.1.5 State-by-State Allocations (Alternative 5)

2.1.5.1 State-by-state allocations based on 1988-1997 landings data (Alternative 5a)

A state-by-state system to distribute and manage the annual commercial quota would be implemented by the Council and Commission. Quotas would be distributed to the states based on their percentage share of commercial landings for the period 1988-1997 (Table 5). States would be expected to adopt appropriate measures to prevent quota overages and to indicate these measures in their annual report to the Commission Management Board. States would have the responsibility for implementing closures in their state. The Regional Administrator would be required to prohibit landings by federally permitted individuals in any state that had reached its quota. States would be allowed to trade or combine quotas and the states could impose possession limits or other measures to manage their quotas.

The state shares could be revised based on the recommendations of the Commission to account for any changes in the landings data for the base years 1988-1997. Specifically, changes in state landing data could modify the allocation percentages. In addition, the Council and Commission could modify the allocations based on a consideration of state regulations that were in place during the base years, 1988 to 1997. For example, the Commission may develop a methodology to adjust landings to account for the different size limits in various states.

The quota would apply throughout the management unit, that is, in both state and federal waters. All black sea bass landed for sale in a state would be applied against the state's annual commercial quota regardless of where the black sea bass were harvested. Any overages of the commercial quota landed in a state would be deducted from that state's annual quota for the following year. Individuals or vessels with commercial permits could not land black sea bass in any state that had not been allocated a commercial quota.

The coastal states would work with NMFS to administer the quotas and coordinate data collection. NMFS has indicated in a letter to the Council and Commission that the implementation and administration of state-by-state quotas for black sea bass would be difficult due to the small quota that would be allocated to some of the states. As such, this alternative would require a cooperative program initiated by the states and NMFS to accurately track black sea bass landings. NMFS and the states would monitor the fishery to determine when a quota was reached. The Commission has also established compliance criteria as a part of the interstate management process (section 5.4.4). These compliance criteria would require states to submit dealer reports to NMFS for state permitted dealers.

The Regional Administrator would close the EEZ to commercial fishing for black sea bass when the quota was landed. Each state would close its waters to commercial fishing for black sea bass when its share of the quota was landed.

This alternative was proposed because a state-by-state quota system could allow for the most equitable distribution of the commercial quota to fishermen. Specifically, under this set of alternatives, states 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 state specific landing patterns using possession limits and seasons to ensure a continuous and steady supply of product over the season for producers and/or a fair an equitable distribution of black sea bass to all fishermen who have traditionally landed black sea bass in their state. 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.

2.1.5.2 State-by-state allocations based on 1993-1997 landings data (Alternative 5b)

The same as Alternative 2.1.5.1 except the base years used in the allocation formula would be 1993-1997 (Table 5).

2.1.5.3 State-by-state allocations based on the best five landing years for each state during the period 1988 to 1997 (Alternative 5c)

The same as Alternative 2.1.5.1 except the base years used in the allocation formula would be the best five landing years for each state during the period 1988-1997 (Tables 5 and 6).

2.1.5.4 State-by-state allocations based on the best five landing years for each state during the period 1980 to 1997 (Alternative 5d)

The same as Alternative 2.1.5.1 except the base years used in the allocation formula would be the best five landing years for each state during the period 1980-1997 (Table 5).

2.1.5.5 *De minimus* specifications (Alternative 5e)

This alternative is a sub-alternative under each state-by-state quota alternative. Under this alternative, states must specifically request *de minimus* status each year, and requests for *de minimus* status will be reviewed by the Monitoring Committee as part of the annual FMP review process. Recommendations from the Committee will follow the procedures outlined in section 9.1.2.2 on page 46 of Amendment 9. The Committee will consider the most recent available data, as well as projections of future landings, in determining whether or not a state meets the *de minimus* requirements. They will also consider the intended regulatory program of the state to ensure that the state is taking reasonable steps to prevent a sudden and unexpected increase in landings. It is the requesting states responsibility to provide the Committee with sufficient detailed information to evaluate the intended regulatory program. The Monitoring Committee will then make a recommendation to the Demersal Committee and the Summer Flounder, Scup, and Black Sea Bass Management Board to either accept or deny the *de minimus* request. The Demersal Committee will then make a recommendation to the Council which will then make a recommendation to the Regional Administrator. The Regional Administrator will review the recommendation of the Council and will grant or deny the state *de minimus* status. The Management Board will review the Technical Monitoring Committee recommendation and will grant or deny the *de minimus* classification. Upon reviewing the Monitoring Committee's recommendation the Summer Flounder, Scup, and Black Sea Bass Management Board must make a specific motion to grant a state *de minimus* status.

If *de minimus* status is granted, the *de minimus* state is required to implement the minimum size of possession, all permitting and reporting requirements, all gear restrictions required by the FMP, and must monitor its fishery. A *de minimus* state would be required to report landings annually. The Regional Administrator will close a state's fishery if the *de minimus* allocation is projected to be landed. If commercial landings in the state exceed the *de minimus* threshold, the state will lose its *de minimus* classification and will be required to implement all the commercial fishery requirements of the FMP. Any *de minimus* state that exceeds the *de minimus* allocation will be required to repay all of the overage through a reduced quota the following year. For example, if a *de minimus* state exceeds the *de minimus* allocation by 1,000 pounds, that state's allocation for the following year will be decreased by 1,000 pounds. If the overage of the *de minimus* allocation exceeds a state's annual allocation, that state's commercial black sea bass fishery will remain closed until the overage is repaid.

The rationale for this alternative is that some states have small amounts of associated black sea bass landings. By deeming a given state *de minimus*, the Regional Administrator and Management Board are recognizing that the state has a minimal commercial black sea bass fishery. As such, they recognize that the overall burden of implementing the complete commercial management and monitoring requirements of the FMP outweigh the conservation benefits of implementing those measures in that state and also that there is no risk to the health of the black sea bass stock if that state does not implement the full suite of management measures.

This alternative was not chosen because the Commission adopted state allocation percentages, including an allocation of 0.5% for the state of Maine. As such all states will be responsible for monitoring their landings and closing their fisheries when their allocation is reached. The de minimus language will not apply to the state-by-state allocation system.

2.1.5.6 Coastwide quota to facilitate state-by-state allocations implemented by the Commission (Alternative 5f: preferred alternative)

The Council and Commission met on May 1, 2002 to adopt a preferred alternative for the black sea bass commercial quota system and other commercial management measures. They considered the material in the public hearing draft, the supplement (Appendix A) that was drafted in response to comments from the Regional Administrator, the public hearing summaries, and all the public comments received on the draft Amendment/EIS. After considerable discussion, the Commission adopted and will implement a state-by-state allocation system beginning January 1, 2003. In a complementary action, the Council voted to adopt an annual coastwide allocation system which will facilitate the state-by-state allocation system that was adopted by the Commission.

Since black sea bass is a shared resource between the states and federal governments, a federal system that does not compete with the system implemented by the Commission is needed. The fishery is a multi-jurisdictional fishery that demands cooperation between the Council and Commission. Without the cooperation of the states, no federal action could meet the National Standards. The coastwide quota is a system that recognizes and facilitates the state-by-state allocation system implemented by the Commission. This system will result in less conflicts between the management bodies than any other system. This system would replace the quarterly quota system that is currently in place.

An example of the state-by-state allocations are the allocations chosen by the Commission for the 2003 and 2004 fishing season. After considerable debate, the Commission adopted allocation percentages for 2003 and 2004 that represented a compromise between the allocation percentages associated with the various base periods presented in the public hearing draft for this amendment and the current fishing patterns, i.e. 2001 landings (Table 5). Specifically, allocations adopted by the Commission for 2003 and 2004 were as follows: Maine 0.5%, New Hampshire 0.5%, Massachusetts 13%, Rhode Island 11%, Connecticut 1.0%, New York 7%, New Jersey 20%, Delaware 5%, Maryland 11%, Virginia 20%, and North Carolina 11% (Table 9b). After that (2005 and beyond) the Commission would have to take action to continue or modify the allocation formulas. If the Commission fails to take action to adopt state-by-state allocations in 2005 or beyond, and/or the system does not meet the requirements of the National Standards, the Council would take action through a framework to reinstate the status quo quarterly quota system or take other mitigating actions. A complete description of the manner in which the Commission will implement a state-by-state allocation system and the compliance criteria required by each state is fully described in the document entitled "Amendment 1 to the Black Sea Bass Fishery Management Plan" (Appendix B).

The annual coastwide quota would be implemented and administered by NMFS. The current data reporting and monitoring system would continue. The fishery would close when the quota was projected to be taken. This closure would occur regardless of whether or not individual states still had quota available. However, given the states experience with other state-by-state quota systems, as well as their ability to transfer quota, it is unlikely that this situation would occur.

This alternative was chosen as the preferred alternative, because a federal coastwide quota would facilitate a state-by-state allocation system, which would allow for the most equitable distribution of the commercial quota to fishermen. In fact, the Commission has decided to allocate the black sea bass quota to states taking into consideration historical landings and current fishing trends. Additionally, this alternative would not place a burden of federal monitoring on NMFS. Specifically, under this alternative, states 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 state specific landing patterns using possession limits and seasons to ensure a continuous and steady supply of product over the season for producers and/or a fair an equitable distribution of black sea bass to all fishermen who have traditionally landed black sea bass in their state. 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.

2.1.6 Hybrid Quota System: Coastwide Quota From January Through April and State-by-State Quotas From May Through December (Alternative 6)

2.1.6.1 Hybrid quota system based on 1988-1997 landings data: coastwide quota from January through April and state-by-state quotas from May through December (Alternative 6a)

Under this alternative, the annual quota would be divided into two periods based on 1988-1997 landings data. The allocation would be 45.23% for the period from January through April and 54.77% for May through December (Table 7).

During the first period, the quota would be allocated to the coast. Possession limits would be implemented during this period. Possession limits could be modified over the period based on a recommendation of the Monitoring Committee to the Council and Commission and implementation by the Regional Administrator and the states as part of the annual specification process.

The quota would apply throughout the management unit, including both state and federal waters. All commercial landings in any state would count toward the quota during that period. Any landings in excess of the quota that occurred during this period would be subtracted from the following year's quota for that period.

During the period May through December, the quota would be allocated to the states based on 1988-1997 landings data. During this period, the quota system would operate as detailed in Alternative 2.1.5.

This alternative recognizes that different gear types are used by the fishery along the coast throughout the year. Bottom/mid water trawls, pots/traps, and hook and line were the major gear types used to land black sea bass from 1988 to 1997. Based on monthly black sea bass landings by gear type for the 1988 to 1997 period, bottom/mid water trawls landed 75 to 86% of the total black sea bass landings each month from January through April. This gear is highly mobile, therefore a coastwide quota for this period is logical. Pot/trap gear comprised 67 to 85% of the black sea bass landings from May through December. Since pot/trap fisheries operate differently in different states, a state-by-state quota for the May through December period would be appropriate. Since the allocations would more closely complement the spatial and temporal characteristics of the fishery, this alternative may allow for landings to be distributed evenly amongst user groups and throughout the year.

The Council and Commission did not choose any of the hybrid quota alternatives because they felt that the collaborative program with a federal coastwide quota and a state-by-state allocation system implemented by the Commission could allow for the most equitable distribution of the commercial quota to fishermen, without the additional burden of federal monitoring by NMFS. Additionally, the burden of monitoring the fishery, for NMFS and the states, would increase under the hybrid quota systems, relative to the current system. Hybrid quotas would not be compatible with the state-by-state quota implemented by the Commission. Specifically, they would not allow states the flexibility to design their own management systems throughout the entire year.

2.1.6.2 Hybrid quota system based on 1993-1997 landings data: coastwide quota from January through April and state-by-state quotas from May through December (Alternative 6b)

The same as Alternative 2.1.6.1 except the base years used in the allocation formula would be 1993-1997 (Table 7).

2.1.6.3 Hybrid quota system based on the best five years in the 1980-1997 landings data: coastwide quota from January through April and state-by-state quotas from May through December (Alternative 6c)

The same as Alternative 2.1.6.1 except the base years used in the allocation formula would be the best five years from 1980-1997 (Table 7).

2.1.7 Hybrid Quota System: Coastwide Quota From January Through April and Subregional Quotas From May Through December (Alternative 7)

2.1.7.1 Hybrid quota system based on 1988-1997 landings data: coastwide quota from January through April and subregional quotas from May through December (Alternative 7a)

Under this alternative, the annual quota would be divided into two periods based on 1988-1997 landings data. The allocation would be 45.23% for the period from January through April and 54.77% for May through December (Table 8).

During the first period, the quota would be allocated to the coast. Possession limits would be implemented during this period. Possession limits could be modified over the period based on a recommendation of the Monitoring Committee to the Council and Commission and implementation by the Regional Administrator and the states as part of the annual specification process.

The quota would apply throughout the management unit, including both state and federal waters. All commercial landings in any state would count toward the quota during that period. Any landings in excess of the quota that occurred during this period would be subtracted from the following year's quota for that period.

During the period May through December, the quota would be allocated to two subregions based on 1988-1997 landings data. The northern subregion would include the states from Maine to New York and the southern subregion would include states from New Jersey to North Carolina (Cape Hatteras). The associated allocations for each subregion during this period would be 16.56% and 83.44% (Table 8).

Possession limits would be implemented for each subregion during this period. Possession limits could be modified over the period based on a recommendation of the Monitoring Committee to the Council and Commission and implementation by the Regional Administrator and the states as part of the annual specification process.

The quota would apply throughout the management unit, including both state and federal waters. All commercial landings in a subregion would count toward the quota in that subregion. Fishermen would be allowed to land in any port in their subregion. Any landings in excess of the quota that occurred in a subregion during this period would be subtracted from the following year's quota for that subregion.

This alternative recognizes that different gear types are used by the fishery along the coast throughout the year. Bottom/mid water trawls, pots/traps, and hook and line were the major gear types used to land black sea bass from 1988 to 1997. Based on monthly black sea bass landings by gear type for the 1988 to 1997 period, bottom/mid water trawls land 75% to 86% of the total black sea bass landings each month from January through April. This gear is highly mobile, therefore a coastwide quota for this period is logical. Pot/trap gear comprised 67% to 85% of the black sea bass landings from May through December. Because pot/trap fisheries operate differently in different geographic locations, a subregional quota from May through December may be appropriate. This alternative would also be less burdensome in terms of administrative costs relative to state-by-state allocations during this period. In addition, since the allocations would more closely complement the spatial and temporal characteristics of the fishery, this alternative may allow for landings to be distributed evenly amongst user groups and throughout the year.

The Council and Commission did not choose any of the hybrid quota alternatives because they felt that the collaborative program with a federal coastwide quota and a state-by-state allocation system implemented by the Commission could allow for the most equitable distribution of the commercial quota to fishermen, without the additional burden of federal monitoring by NMFS. Additionally, the burden of monitoring the fishery, for NMFS and the states, would increase under the hybrid quota systems, relative to the current system. Hybrid quotas would not be compatible with the state-by-state quota implemented by the Commission. Specifically, they would not allow states the flexibility to design their own management systems throughout the entire year.

2.1.7.2 Hybrid quota system based on 1993-1997 landings data: coastwide quota from January through April and subregional quotas from May through December (Alternative 7b)

The same as Alternative 2.1.7.1 except the base years used in the allocation formula would be 1993-1997 (Table 8).

2.1.8 Allocation System by Gear Type (Alternative 8)

2.1.8.1 Quota allocation by gear type based on 1988-1997 landings data (Alternative 8a)

Under this alternative, the quota would be allocated by gear type based on 1988-1997 landings data. The percentages by gear type would range from 0.40% for gillnets to 45.82% for bottom/mid water trawl gear (Table 9a).

To allow for equitable distribution of landings to the northern and southern contingents of the fishery, further allocations may be required by period. Specifically, trawl allocations would be further divided into two periods - January through April and May through December. Possession limits would be implemented for each gear type and period. Possession limits could be modified based on a recommendation of the Monitoring Committee to the Council and Commission and implementation by the Regional Administrator and the states as part of the annual specification process.

The quota would apply throughout the management unit, including both state and federal waters. All commercial landings would count toward the quota for each respective gear types. Any landings in excess of the quota that occurred for any gear type would be subtracted from the following year's quota for that gear type.

This alternative was considered because it recognizes that different gear types are used in the black sea bass fishery over the year. Bottom/mid water trawls, pots/traps, and hook and line were the major gear types used to land black sea bass from 1988 to 1997. Allocating the quota to the different gear types and tailoring management measures to the specific needs of each fishery may work to distribute landings equitably throughout the year. As such, overharvesting the quota or harvesting the quota too quickly may be avoided.

The Council and Commission did not choose these gear type alternatives because these alternatives would redistribute landings among gear types relative to the status quo. In addition to the economic impacts this may cause, this alternative could redistribute fishing effort relative to gear types which could have had negative consequences to EFH and protected resources. Additionally, the burden of monitoring the fishery for NMFS and the states would increase, relative to the current system. The reporting requirements for dealers would also increase under this system. Allocations by gear types would not be compatible with the state-by-state quota implemented by the Commission. Specifically, they would not allow states the flexibility to design their own management systems because of the constraints on gear types.

2.1.8.2 Allocation system by gear type based on 1993-1997 landings data (Alternative 8b)

The same as Alternative 2.1.8.1 except the base years used in the allocation formula would be 1993-1997 (Table 9a).

2.1.9 Modify the Permit Requirements for Fishermen That Have Both a Northeast Black Sea Bass Commercial Permit and a Southeast Snapper/Grouper Permit (Alternative 9)

2.1.9.1 Status quo (Alternative 9a)

Current regulations restrict fishermen with a NER BSB permit from fishing south of Cape Hatteras during a northern closure unless they relinquish their permit for a period of 6 months.

The permit requirements were implemented to ensure that in the event of a closure in the EEZ north of Cape Hatteras, vessels with moratorium permits could not possess black sea bass either north or south of Cape Hatteras, in order to maintain the integrity of that closure. In such a situation it would be impossible to determine the harvest location of the black sea bass on board. As a consequence, owners of vessels that have both a moratorium permit and a SER S/G permit would be prevented from using their SER S/G permit to land black sea bass south of Cape

Hatteras, unless they relinquished their moratorium permit. Therefore, to allow vessel owners with moratorium permits greater flexibility to fish for and land black sea bass south of Cape Hatteras, vessel owners could voluntarily relinquish their moratorium permit during a closure and fish the southern stock of black sea bass under their valid SER S/G permit. After a 6-month delay for administrative and enforcement purposes, they could reapply for a moratorium permit and again be subject to the provisions of that permit. These restrictions were implemented to ensure the implementation and enforcement of the current quota system.

This alternative is required by NEPA. It is the "standard" or base to what the other proposed alternatives are compared to for the biological, economic, and social impact analyses.

2.1.9.2 Remove the permit requirement that restricts fishermen from using a Southeast Snapper/Grouper Permit during a northern closure (Alternative 9b: preferred alternative)

This alternative would remove the regulation that requires a fisherman with a NER BSB permit to surrender that permit for six months, to catch and land black sea bass south of Cape Hatteras during a northern closure. However, this does not change any other requirements in place to obtain a NER BSB permit.

Permit data from the Northeast and Southeast Region indicate that this requirement only affects 5 vessels which held both a NER BSB and a SER S/G permit in 2000. Fishermen (located in Virginia and North Carolina) indicate that this restriction creates undue hardship on those that possess both permits. These fishermen are fishing on two different stocks of fish, therefore the current regulations have no apparent benefit to the stock.

2.1.10 Prohibit the Wet Storage of Black Sea Bass Pots/Traps During a Closure (Alternative 10: preferred alternative)

2.1.10.1 Status quo (Alternative 10a: preferred alternative)

This alternative is the status quo alternative. Under the current system, commercial black sea bass pot/trap fishermen allow their pots/traps to remain in the water during periods when the black sea bass fishery is closed.

This alternative is required by NEPA. It is the "standard" or base to what the other proposed alternatives are compared to for the biological, economic, and social impact analyses.

Since Council has no information on the number pots/traps and areas fished by individual fishermen, nor how long it takes for fishermen to deploy and haul back their pots/traps, the Council decided to adopt the status quo alternative. This allows pots/traps to remain fishing during a closure. During the public hearing process, the Council received anecdotal evidence that pots/traps are fished for other species such as tautog, ocean pout, lobsters, etc. during black sea bass closures; and that it may take more than two to four weeks to retrieve and deploy pots/traps for some fishermen. Additionally, the Council feels that the management measures adopted to reallocate the quota should keep the black sea bass fishery open throughout the year.

2.1.10.2 Prohibit the wet storage of black sea bass pots/traps during a closure of longer than two weeks (Alternative 10b)

This alternative would require that fishermen remove all black sea bass pots/traps from state and federal waters when the fishery is closed for more than two weeks (14 days). Fishermen will have no more than 10 days, from the starting date of the closure, to remove their pots/traps. Fishermen will not be allowed to deploy pots/traps until the first day of the following open period.

This alternative is included because it is a common practice during a closure is to allow pots/traps to continue to fish. Anecdotal evidence indicates that black sea bass and other species caught in the traps either die in the traps or are harvested at the beginning of the following quarter. This can result in harvesting the next quarter's quota very quickly. A two week closure was proposed to satisfy NEPA requirements by including a range of alternatives on a management option. A closure of less than two weeks may be impracticable, i.e., it may take more than two weeks to lift all the pots/traps that an individual fisherman has set in the ocean. This information is currently unknown and may vary among fishermen.

The Council did not choose any of the alternatives that prohibit wet storage because the Council has no information on the number pots/traps and areas fished by individual fishermen, nor how long it takes for fishermen to deploy and haul back their pots/traps. The Council decided to adopt the status quo alternative which allows pots/traps to remain fishing during a closure. During the public hearing process, the Council received anecdotal evidence that pots/traps are fished for other species such as tautog, ocean pout, lobsters, etc. during black sea bass closures; and that it may take more than two to four weeks to retrieve and deploy pots/traps for some fishermen. As such, these pots would continued to be tended throughout a black sea bass closure. Additionally, the Council feels that the management measures adopted to reallocate the quota should keep the black sea bass fishery open throughout the year.

2.1.10.3 Prohibit the wet storage of black sea bass pots/traps during a closure of longer than four weeks (Alternative 10c)

This alternative would require that fishermen remove all black sea bass pots/traps from state and federal waters when the fishery is closed for more than four weeks (28 days). Fishermen will have no more than 10 days, from the starting date of the closure, to remove their pots/traps. Fishermen will not be allowed to deploy pots/traps until the first day of the following open period.

This alternative is included because common practice during a closure is to allow pots/traps to continue to fish. Anecdotal information indicates that black sea bass and bycatch either die in the traps or fishermen are harvested at the beginning of the following quarter. This can result in harvesting the next quarter's quota very quickly. A four week closure was included to satisfy NEPA requirements by including a range of alternatives on a management option. A closure of less than four weeks may be impracticable, i.e., it may take more than four weeks to lift all the pots/traps a fishermen has set in the ocean. This information is currently unknown and may vary among fishermen.

2.1.11 Black Sea Bass Pot/Trap Tag Program (Alternative 11)

2.1.11.1 Status quo (Alternative 11a: preferred alternative)

This alternative is the status quo alternative. Under the current system, black sea bass pot/trap tags would not be required.

This alternative is required by NEPA. It is the "standard" or base to what the other proposed alternatives are compared to for the biological, economic, and social impact analyses.

The Council and Commission do not feel that a pot/trap tag program is necessary at this time because a pot/trap tag program is only necessary if pot/trap limit is implemented. The Council is not implementing a pot/trap limit at this time.

2.1.11.2 Pot/trap tag requirements for federal permit holder fishing with black sea bass pots/traps (Alternative 11b)

This alternative would require that any black sea bass pot/trap fished must have a valid black sea bass pot/trap tag permanently attached to the trap bridge or central cross-member. A black sea bass trap is defined as any pot/trap gear that is capable of catching black sea bass. Black sea bass pot/trap tags would be purchased from the NMFS Northeast Region Permit Office.

This alternative was included for public hearing because a tag program would be necessary to implement limits on the number of pots/traps used by fishermen. This alternative would also allow for an accurate count of the number of pots/traps used by fishermen. The Council decided not to implement pot/trap tag program because they felt that a pot/trap limit is not necessary at this time. A pot/trap tag program is only necessary if the Council implements a pot/trap limit. The Council is not implementing a pot limit because of the lack of information on the number of pots fished by individual fishermen. Without this information, economic, biological, EFH, and protected resources impacts cannot be analyzed. Additionally, pot/trap limits are not necessary because trip limits constrain landings. Under the preferred alternative adopted by the Council and Commission, individual states can implement pot/trap tag programs and limits, if necessary.

2.1.12 Limit the Number of Pots/Traps Used by Fishermen (Alternative 12)

2.1.12.1 Status quo (Alternative 12a: preferred alternative)

This alternative is the status quo alternative. Under the current system, there is no limit to the number of black sea bass pots/traps that federal permit holders are allowed to fish with, deploy, possess in, or haul back from state or federal waters.

This alternative is required by NEPA. It is the "standard" or base to what the other proposed alternatives are compared to for the biological, economic, and social impact analyses. There is currently no such effort control on pots/traps and the number of pots/traps used by fishermen is unknown. However this information was requested during the public hearing process. Commenters indicated that pot/trap fishermen could fish anywhere from 100 to 4,000 pots/traps. Additionally, some fishermen may travel at least 60 miles offshore to deploy pots/traps.

Due to the lack of information on the number of pots fished by individual fishermen, a pot/trap limit was not adopted by the Council and Commission. Without this information, economic, biological, EFH, and protected resources impacts cannot be analyzed. Additionally, pot/trap limits are not necessary because trip limits constrain landings. Under the preferred alternative adopted by the Council and Commission, individual states can implement pot/trap tag programs and limits, if necessary.

2.1.12.2 Limit fishermen to no more than 400 black sea bass pots/traps (Alternative 12b)

Under this alternative federal permit holders may not fish with, deploy, possess in, or haul back from state or federal waters, more than 400 black sea bass pots/traps. A black sea bass trap is defined as any pot/trap gear that is capable of catching black sea bass.

This program is dependent upon the implementation of the black sea bass pot/trap tag program. In any fishing year, each permit holder would be authorized to purchase a set number of tags, up to a maximum of 400 pot/trap tags.

This alternative is being proposed to limit the number of pots/traps used by fishermen. There is currently no such effort control and the number of pots/traps used by fishermen is unknown. The Council is not implementing a pot limit because of the lack of information on the number of pots fished by individual fishermen. Without this information, economic, biological, EFH, and protected resources impacts cannot be analyzed. Additionally, pot/trap limits are not necessary because trip limits constrain landings. Under the preferred alternative adopted by the Council and Commission, individual states can implement pot/trap tag programs and limits, if necessary.

2.1.12.3 Limit fishermen to no more than 800 black sea bass pots/traps (Alternative 12c)

Under this alternative federal permit holders may not fish with, deploy, possess in, or haul back from state or federal waters, more than 800 black sea bass pots/traps. A black sea bass trap is defined as any pot/trap gear that is capable of catching black sea bass.

This program is dependent upon the implementation of the black sea bass pot/trap tag program. In any fishing year, each permit holder would be authorized to purchase a set number of tags, up to a maximum of 800 pot/trap tags.

This alternative is being proposed to limit the number of pots/traps used by fishermen. There is currently no such effort control and the number of pots/traps used is unknown.

2.1.13 Alternatives Considered but Rejected for Further Analysis

2.1.13.1 Allocation of quota to three subregions

This alternative would allocate the quota to three subregions based on historic landings data for the region. The subregions would be North (Maine to New York), Mid (New Jersey and Delaware), and South (Maryland to North Carolina). The Council and Commission did not consider this alternative for further analysis because of concerns related to the state groupings and possible impact on historic landing patterns. Specifically, the Council and Commission indicated that this subdivision may create inequities between border states, e.g., Delaware and Maryland.

2.1.13.2 An F-based management system

This system would be similar to the management system implemented by the Commission for weakfish and striped bass. States would be required to develop management measures designed to achieve a target fishing mortality rate. This alternative would require the development of a document to detail the guidelines that the states would use to determine their management program.

This alternative could work if there was a good estimate of the current F and the time to develop the methodology that would be used by the states to establish their individual management programs. This alternative was rejected because both the F and the time are lacking. Specifically, the current assessment is based on an analysis of Northeast Fishery Science Center (NEFSC) spring survey data. That data is combined with landings information to develop a relative exploitation index that is compared to previous estimates of mortality to assess current exploitation levels. However, the mortality estimates are highly uncertain and, as such, would not support the detailed analysis necessary to support an F-based management system. The Council and Commission are supporting a tagging program that may be initiated in 2002 to collect additional data that could be used to develop fishing mortality estimates.

2.1.13.3 An individual allocation of effort or quota

2.1.13.3.1 Days-at-Sea (DAS) option, based on separate permit categories and defined possession limits

Under this alternative, permit categories would be established based on past performance. Allocations would then be established for each category based on historic landings and the overall quota. Each permit holder would receive a DAS allocation based on the quota for category and a daily possession limit. The number of days would be determined by dividing the quota by the possession limit (e.g., a 1000 lb quota would have 100 lb possession limit for 10 DAS). A day would be defined as any possession within a 24-hour period and each permit holder could then determine when they wanted to fish.

The Council and Commission did not consider this alternative for additional analysis because of concerns related to the pot/trap fishery and the DAS approach. Specifically, it would be difficult to define a "day" for fishermen using pot/trap gear. In addition, the Council and Commission were advised that this alternative could violate the congressional ban on individual quota (IQ) systems since this alternative would result in an individual allocation.

2.1.13.3.2 Individual quotas (IQ) based on historic performance

Each vessel would receive an allocation based on a landings history percentage and an overall quota. Landings would be tracked by individual vessel permits. Individual allocations could be used in conjunction with the information on permits to allocate IQs to those vessels that land the majority of the black sea bass. The other permit categories would have allocations that could be managed by possession limits. Because IQ systems cannot be implemented until the Congressional ban on IQs is lifted, this alternative could not be implemented at this time. However, this does not preclude the use of IQ systems in future years. This alternative was rejected for further analysis in this amendment because of the length of time associated with determining an appropriate allocation formula (e.g., allocations of individual transferrable quotas [ITQs] in the surfclam fishery took 4 years to develop and implement) and the possible effect on the timely implementation of Amendment 13.

2.1.13.4 Harvest cooperative sector allocation

A harvest cooperative sector allocation would permit vessels within a harvest cooperative to pool harvesting resources and/or to make joint harvesting decisions while staying within the sector's designated allocation. For example, if a cooperative was formed from 74 vessels that averaged more than 4,000 pounds of black sea bass per vessel from 1988-1997, the cooperative would receive a quota allocation of 86.94%. This quota allocation is the portion of the landings these vessels were responsible for during this time period. The cooperative may choose to fish the allocation using whatever combination of vessels/gears generates the greatest benefit to the cooperative. Once the cooperative is assigned an overall quota, the members could buy/sell/trade/lease their respective shares of the quota within the cooperative. Initial individual shares would be determined by the cooperative. Most likely, this would be based on fishing history. This alternative was rejected from further analysis because of the potential difficulties associated with implementing a cooperative for fishermen over such a large geographic range, i.e., Maine through North Carolina.

2.1.13.5 The use of base years before 1988 and/or after 1997 for allocation formulas

The above alternatives focus primarily on allocations based on landings from 1988 to 1997. The landings prior to 1988 are available and are used in the state-by-state allocation alternatives. However, many states do not have accurate landings reports for some of those years. In fact, that was the reason that the Council and Commission used 1988-1992 data in Amendment 9 to allocate the quota. In addition, the landings data for 1998 and 1999 were affected by the restrictive quotas and possession limits that were imposed in 1998 and 1999. As such, those years should be left out of any allocation formula.

2.2 SUMMER FLOUNDER, SCUP, AND BLACK SEA BASS EFH ALTERNATIVES

Options available to the Council to minimize impacts of fishing gear on essential fish habitat include, but are not limited to: 1) area and/or seasonal closures; 2) specific gear modifications/restrictions; and 3) harvest limits. Viable management alternatives that could be used to prevent, mitigate or minimize adverse effects from fishing are described below and are analyzed for biological, economic, and social impacts to the environment in section 4.0. In addition, several alternatives were considered by the Council but were rejected for further analysis described in section 2.2.6.

2.2.1 Status Quo: Current Management Measures (EFH Alternative 1: Preferred Alternative)

This is the "no action alternative." It would result in no additional management measures to minimize the effects of fishing on EFH.

This alternative is required by the NEPA. It is the "standard" or base to what the other proposed alternatives are compared to for the biological, economic, and social impact analyses. The Council has implemented many regulations that have indirectly acted to reduce fishing gear impacts on EFH. These include many of the current regulations which have restricted fishing effort to achieve the target mortalities implemented by the rebuilding schedules in the FMPs. Such regulations include restrictive harvest limits, gear restricted areas, and restriction on the size of roller rig gear to 18" rollers for scup and black sea bass (which makes some areas inaccessible to trawling).

Currently, 40 out of 51 stocks managed by in NMFS Northeast Region are designated as overexploited (NEFSC 1998a). These designations have resulted in a reduction of fishing effort from Maine through Florida. A reduction of effort due to decreased target mortalities in an FMP translates into a decrease in gear impacts on habitat throughout the western Atlantic ocean. Additionally, the majority of habitat in the Mid-Atlantic region is dynamic sandy bottom. Current research shows that bottom tending mobile gear has a short-term impact on this type of habitat (Appendix C). As such, further EFH regulations may not be necessary at this time. A complete discussion of management measures that are already in place, and how these measures work to minimize the impact of gear on habitat can be found in section 4.2.1.

2.2.2 Prohibit Bottom Tending Mobile Gear from the Nearshore Areas Surrounding Estuaries (EFH Alternative 2)

Alternative 2 would prohibit fishermen from using bottom tending mobile gear in the nearshore areas of Albemarle Sound, Chesapeake Bay, Delaware Bay, and New York Harbor (Table 10, Figure 1). Bottom tending mobile gear in these areas include: bottom otter trawls, clam dredges, and scallop dredges.

This alternative was included because these estuaries are important nursery areas and EFH for summer flounder, scup, and black sea bass. Additionally, the closed areas include important summer flounder spawning habitat, and are areas where all three species congregate in warmer months. Many states currently restrict trawling in estuaries. This alternative would extend the restriction from the 3-mile line to offshore areas. In addition, this alternative includes reef areas and structured habitat in federal waters, which are considered EFH for scup and black sea bass, thus complementing the Special Management Zone (SMZ) program.

It was suggested by the EFH Steering Committee that the Council consider implementing a SMZ as an alternative to protect habitat. Amendment 9 established a process that allows the Council to develop management measures to control fishing on specific artificial reefs on a case by case basis. The intent of the SMZ program, as stated in Amendment 9, is to protect artificial reefs from: "a) entanglement of other boating and fishing gear: b) entanglement in reef structure ('ghost gear'); and c) damage to or movement of reef structure." Structured habitat, such as reef habitat is more complex and thus more vulnerable to fishing gear. Since the implementation of Amendment 9, no specific SMZs have been established. Because SMZs were established to protect a user group's right to a particular structure (e.g., recreational fishermen) it is currently impractical to establish SMZs as a mechanism to protect habitat.

2.2.3 Prohibit Bottom Tending Mobile Gear in the Area Surrounding the Hudson Canyon (EFH Alternative 3)

Alternative 3 would prohibit fishermen from using bottom tending mobile gear in the area surrounding the Hudson Canyon, between the 200-foot and 500-foot isobaths (Table 11, Figure 1). Bottom tending mobile gear in these areas include: bottom otter trawls, clam dredges, and scallop dredges.

This alternative was included for public consideration because this is an area that has been identified as an important overwintering area for summer flounder, scup, and black sea bass in NRDC (2001). A portion of the proposed closed area has been identified as tilefish EFH and tilefish burrows may be vulnerable to mobile gear. As such, a potential benefit associated with closing this area would be the impact on tilefish.

2.2.4 Roller Rig and Rock Hopper Gear Restrictions (EFH Alternative 4)

Alternative 4 would restrict the size or prohibit the use of roller rig and rock hopper gear in the EEZ, from Maine through North Carolina. Alternatives for roller rig gear would include 8 inches, 12 inches, or 18 inches for maximum roller size, or a complete prohibition of roller rig gear. Alternatives for rock hopper gear include 8 inches, 12 inches, 18 inches, or 22 inches for maximum roller and rubber disk size, or a complete prohibition of rock hopper gear. Specific regulations would prohibit the use of this gear or the use of roller rigs or rock hoppers with rollers and disks larger than the maximum size.

The summer flounder, scup, and black sea bass FMP currently restricts vessels issued a moratorium permit for scup and/or black sea bass from using roller rig trawl gear equipped with rollers greater than 18 inch diameter. As such, a restriction on the diameter of rock hopper gear is reasonable. An 18 inch diameter corresponded to the maximum roller diameter limitation imposed by the states of Massachusetts and North Carolina to regulate this gear in state waters. In the Gulf of Maine rock hopper gear is restricted to a maximum 12 inch diameter. Information is needed on the size of rollers that are currently used, the habitat types in which they are used, and the extent of the use. However, no additional information on roller rig or rock hopper gear was received during the public comment period.

This alternative is included because limitations on roller size would make some areas of the ocean inaccessible to trawls by preventing fishermen from trawling in the harder, rough bottom areas. As a result, habitat in these areas would be protected. However, information is lacking as to the relationship between roller diameter and the size of the habitat obstruction that it can clear. In general, 10 inch to 12 inch diameter rollers can be used for fishing over rough bottom that includes ledges and cliffs (MAFMC 1996a, b). It is important to note that current regulations prohibit fishing with rock hopper gear with roller diameter greater than 18 inches for scup and black sea bass.

Roller diameter also correlates 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 (hp) of 800-900 required to tow a net with 18 inch to 24 inch rollers, whereas 10 inch to 12 inch rollers can be pulled by a boat using a 175 to 200 hp engine (Simpson pers. comm.).

2.2.5 Prohibit Street-Sweeper Gear (EFH Alternative 5)

Alternative 5 would prohibit fishermen from using street-sweeper gear in the EEZ. Street-sweeper gear is a newly developed trawl gear that is constructed of a series of rubber disc spacers and bristle brushes, as found in actual street sweepers. The distinguishing component of this sweep is the brushes are made of stiff bristles mounted on a cylinder core. The brush cylinders are up to 31 inches in diameter and have smaller diameter rubber discs placed between them. The discs are strung on a cable or chain and aligned in series forming the sweep of the trawl net.

This alternative is included because it may afford additional protection to structured habitat. Structured habitat is more complex and thus more vulnerable to fishing gear. Preliminary evidence suggests that this prohibition may make some areas of the ocean inaccessible to trawls by preventing fishermen from trawling in the harder, rough bottom areas.

Additionally, the NEFMC prohibited street sweeper gear as a precautionary measure. They prohibited this type of gear because they received testimony from the public that this gear was more effective at catching flat fish than a typical trawl. Prohibiting this gear would make regulations consistent along the coast.

More information needs to be collected on the relative use of this gear and its effect on habitat. There is the possibility that this gear is not currently in use, thus the implementation of this alternative may not result in any benefit to EFH. No additional information on street-sweeper gear was received during the public comment period.

2.2.6 Alternatives Considered but Rejected for Further Analysis

2.2.6.1 Prohibit all bottom tending mobile gear

This alternative would prohibit fishermen from using all bottom tending mobile gear in the EEZ. The commercial fishing industry from Maine through North Carolina landed approximately 1.3 billion pounds of fish in 2000 (NMFS 2001). A large proportion of these landings were landed by bottom tending mobile gear in the EEZ. This alternative would result in a significant burden on the fishing industry and coastal community, i.e., both in compliance cost and loss of revenue from fishing. For some fisheries, suitable alternative fishing gear do not exist. As such, this is the extreme end of the range of alternatives and not very practicable.

Additionally, the impact of bottom tending mobile gear is still unclear and the impacts may be minimal or short lived, depending on the intensity of fishing and the complexity of the habitat. Considering that most of the Mid-Atlantic is comprised of a dynamic, sandy bottom, a prohibition on all mobile gear in the EEZ would cause a large economic and social impact with minimal or unknown benefit to habitat. As such, this alternative was rejected from further analysis.

2.2.6.2 Prohibit bottom tending mobile gear from the nearshore corridor (from Long Island Sound, New York extending south to Cape Fear, North Carolina) from the shore extending to 22 miles offshore

This alternative would prohibit fishermen from using bottom tending mobile gear in the nearshore corridor (from Long Island Sound, New York extending south to Cape Fear, North Carolina) from the shore extending to 22 miles offshore. Figures 10 and 15 in Appendix C indicate that the bulk of the otter trawl and dredge trips take place in this area. As such, this alternative is extreme and not very practicable. This alternative would result in a significant burden on the fishing industry and community, both in compliance cost and loss of revenue from fishing. For some fisheries, suitable alternative fishing gear do not exist.

The impact of bottom tending mobile gear is unclear. The impacts may be minimal or short lived depending on the intensity of fishing and the complexity of the habitat. Considering that most of the Mid-Atlantic is comprised of a dynamic, sandy bottom, a prohibition on mobile gear would cause a large economic and social impact with unknown benefit to habitat. Even if an area closure proves to be effective in reducing gear impacts to EFH, a reduction in landings of targeted species would also occur. In addition, effort could be redirected elsewhere in the region and as such, this large area closure may result in smaller reductions of impacts to EFH and/or landings of targeted species than estimated. Therefore, this alternative was rejected from further analysis.

2.2.6.3 Prohibit the use of bottom tending mobile gear in submerged aquatic vegetation (SAV) beds (summer flounder habitat area of particular concern [HAPC])

This alternative would prohibit fishermen from using bottom tending mobile gear in submerged aquatic vegetation (SAV) beds (summer flounder habitat area of particular concern [HAPC]). Summer flounder HAPC is identified as all SAV beds which is found in state waters. While the Council can prohibit federal permit holders from fishing with bottom tending mobile gear in state waters, the majority of the trawlers operating in state waters are not federal permit holders. Therefore, this alternative would not be effective because the number of federal permit holders operating in state waters and subjected to this prohibition would be minimal.

Additionally, although many states are in the process of mapping SAV beds, the location of many SAV beds is largely unknown. Therefore this measure would be difficult to enforce. Finally, many states regulate trawling and other types of mobile gear in state waters, where SAV is located. For these reasons, this alternative was considered but rejected for further analysis.

Stephan *et al.* (2000) offers mitigation strategies for the impacts from fishing activities to SAV. The Council endorses the recommendations in the Stephan *et al.* (2000) report. The Council encourages the mitigation strategies identified in Stephan *et al.* (2000) for addressing fishing impacts to SAV including avoidance and minimization. The Council encourages agencies to adopt measures and or policies that recognize the importance of inshore habitats (especially SAV) and foster cooperation among the Commission, NMFS, and the states in protecting these important areas. This includes a coordinated effort between states to restrict the use of mobile gear in state waters.

2.2.6.4 Require a reduction in fishing effort to minimize impact on bottom habitats

Currently, the MAFMC manages summer flounder, scup, and black sea by setting commercial quotas and recreational harvest limits based on the total allowable catch (TAC) for each species. These management systems include rebuilding schedules which are mandated by National Standard 1. The rebuilding schedules establish annual fishing mortality targets in order to rebuild the stocks. While the stocks are in the process of rebuilding (i.e., the biomass is increasing), the management measures used to lower fishing mortality should translate into lower fishing effort. A reduction in fishing effort should translate into a reduction in fishing intensity. Once the stocks are rebuilt, fishing effort should remain at a low level due to an increase in catchability at higher stock levels. Since the current system reduces fishing effort, and is believed to have a positive impact on essential fish habitat, additional controls on fishing effort are not be needed to protect habitat. As such, this alternative was rejected from further analysis.

2.2.6.5 Prohibit bottom tending mobile gear from summer flounder, scup, and black sea bass offshore overwintering areas, from Lydonia Canyon east of Cape Cod, Massachusetts to Cape Hatteras, North Carolina between the 200-foot to 500-foot isobaths

This alternative would prohibit fishermen from using bottom tending mobile gear in summer flounder, scup, and black sea bass offshore overwintering areas, from Lydonia Canyon east of Cape Cod, Massachusetts to Cape Hatteras, North Carolina between the 200-foot to 500-foot isobaths. Figures 13 and 17 in Appendix C indicate that a large portion of the scallop otter trawl and scallop dredge trips take place in this area. This alternative would result in a significant burden on the scallop industry and communities dependent on the scallop industry both in compliance cost and loss of revenue from fishing. Suitable alternative fishing gear may not exist for this species.

Additionally, the impact of bottom tending mobile gear is still unclear and the impacts may be minimal or short lived, depending on the intensity of fishing and the complexity of the habitat. Considering that most of the Mid-Atlantic is comprised of a dynamic, sandy bottom, a prohibition on mobile gear would cause a large economic and social impact with unknown benefit to habitat. Finally, the area proposed under this alternative is a large offshore area that may make this alternative expensive to enforce. As such, this alternative was rejected from further analysis.

2.2.6.6 Modify otter trawl footrope to raise the net off the bottom, using a 42 inch long chain connecting the sweep to the footrope, which results in the trawl fishing about 18-24 inches above the bottom

This alternative would require fishermen to modify the otter trawl footrope to raise the net off the bottom using a 42 inch long chain connecting the sweep to the footrope. This results in the trawl fishing about 18-24 inches above the bottom (Carr and Milliken 1998). The raised footrope allows the net to be lifted off the bottom, but the trawl doors would still come in contact with the bottom. The net was specifically designed to catch whiting, red hake, and dogfish, while avoiding groundfish such as cod (NMFS 2001). A raised footrope trawl would not effectively catch summer flounder and other flatfish and therefore would not be practicable in directed summer flounder fisheries. It is also not likely to be effective in catching scup and black sea bass. Without a suitable alternative gear for these fisheries, it is not currently feasible to require that trawls be modified to raise the net off the bottom. As such, this alternative was rejected for further analysis.

It is important to note that studies are currently being conducted to reduce the weight of trawl doors, which would reduce the impact of groundfish trawling to habitat while making the trawls more effective at catching groundfish, such as summer flounder, scup, and black sea bass.

2.2.6.7 Prohibit trawling in estuaries

This alternative would prohibit fishermen from trawling in estuaries. The Council only has the authority to restrict trawling by federal permit holders. The majority of the summer flounder, scup, and black sea bass commercial landings occurred in the EEZ in 1999 (Tables 12, 13, and 14). This alternative would not be effective because the federal permit holders operating in estuaries and subjected to this prohibition would be minimal. As such, a federal prohibition may not effectively protect habitat in estuaries from federally permitted trawlers.

Currently, most states have some restrictions on trawling and other mobile gear which may help to protect summer flounder, scup, and black sea bass nursery habitat. The state of Maine has a groundfish spawning closure in North Bay and Sheepscot Bay from May 1 to June 30. The state of New Hampshire does not allow mobile gear in state waters between April 16 and December 14. The state of Massachusetts prohibits trawling in Buzzards Bay year-round, while state waters from Nauset Light around Monmoy west to Succonessett Point, Mashpee are closed to trawling from May 1 to October 31. In Rhode Island, trawling is prohibited in the upper portion of Narragansett Bay from November 1 to July 1. In Connecticut, trawling is prohibited in rivers, coves, and harbors, as well as in portions of Long Island Sound. Night trawling is also prohibited in the western two-thirds of Long Island Sound. In New York, there are numerous locations where trawl gear is prohibited. In New Jersey, trawling and purse-seining is prohibited within two miles of the coast. In Delaware, trawls, purse-seines, power-operated seines, and run-around gillnets are prohibited. In Maryland, trawls are prohibited within one mile of the coastline, and in the Chesapeake Bay. Additionally, there are numerous specific locations where trawling is restricted in Maryland state waters. In Virginia, trawls and encircling nets are prohibited in state waters. In North Carolina, trawls are prohibited within one-half mile of the beach between the Virginia line and Oregon Inlet. The Council encourages a state-coordinated program to restrict the use of mobile gear in estuaries.

However, a full prohibition of trawling in estuaries is an extreme alternative that would result in a significant burden on the fishing industry and some fishing communities, both in compliance cost and loss of revenue from fishing. As such, this alternative was considered but rejected for further analysis.

3.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT (EIS)*

3.1 DESCRIPTION OF THE STOCK (EIS)*

3.1.1 Summer Flounder

3.1.1.1 Range and distribution

The following information on summer flounder range is taken directly from "Life History and Habitat Requirements of Summer Flounder, *Paralichthys dentatus*" (Packer *et al.* 1999). This document is referred to hereafter as the summer flounder EFH background document.

The geographical range of the summer flounder or fluke (*Paralichthys dentatus*) encompasses the shallow estuarine waters and outer continental shelf from Nova Scotia to Florida (Ginsburg 1952, Bigelow and Schroeder 1953, Anderson and Gehringer 1965, Leim and Scott 1966, Gutherz 1967, Gilbert 1986, Grimes *et al.* 1989), although Briggs (1958) gives their southern range as extending into the northern Gulf of Mexico. The center of its abundance lies within the Middle Atlantic Bight from Cape Cod, Massachusetts, to Cape Hatteras, North Carolina (Hildebrand and Schroeder 1928). The management unit is summer flounder in US waters in the western Atlantic Ocean from the US-Canadian border southward to the southern border of North Carolina, it is not managed south of there. North of Cape Cod and south of Cape Fear, North Carolina, summer flounder numbers begin to diminish rapidly (Grosslein and Azarovitz 1982). South of Virginia, two closely related species, the southern flounder (*Paralichthys lethostigma*) and the gulf flounder (*Paralichthys albigutta*) occur and sometimes are not distinguished from summer flounder (Hildebrand and Cable 1930, Byrne and Azarovitz 1982).

Summer flounder exhibit strong seasonal inshore-offshore movements, although their movements are often not as extensive as compared to other highly migratory species. Adult and juvenile summer flounder normally inhabit shallow coastal and estuarine waters during the warmer months of the year and remain offshore during the fall and winter.

It is important to note that throughout the EEZ, summer flounder is managed and assessed as a single stock. In the past, there have been several attempts to identify several stocks of summer flounder that may exist throughout its range. Since genetically distinct stocks can have unique rates of recruitment, growth, and mortality (Cushing 1981), identification of the various stocks or subpopulations of summer flounder and their stock-specific biological traits, as well as their habitat distribution and overlap, is necessary for proper management. Older stock identification studies have suggest that significant differences exist between summer flounder north and south of Cape Hatteras, i.e., between those in the Mid-Atlantic Bight and South Atlantic Bight (Wilk *et al.*1980, Fogarty *et al.* 1983, Able *et al.* 1990, Wenner *et al.* 1990a). However, in a more recent genetic study, Jones and Quattro (1999) revealed no significant population subdivision that centered around Cape Hatteras, which is consistent with the definition of the management unit.

3.1.1.2 Abundance and present condition

The status of the summer flounder stock is re-evaluated annually. The most recent assessment, was completed in June, 2000. The complete assessment is detailed in the "31st Stock Assessment Review Committee (Consensus Summary of Assessment" (NEFSC 2000).

The latest assessment indicates that the stock is overfished and overfishing is occurring relative to the Amendment 12 overfishing definitions. However, the fishing mortality rate estimated for 1999 is 0.32, a significant decline from the 1.31 estimated for 1994. In addition, total stock biomass has increased substantially since 1991 and spawning stock biomass has increased each year since 1993 to 64.8 million pounds, the highest value in the time series. Projections indicate that if the TAL in 2000 is not exceeded, total stock biomass will exceed the biomass threshold in January, 2001. At this level, the stock will no longer be overfished.

Year-class estimates indicate that the 1996, 1997 and 1998 year classes were about average size at 32 to 38 million fish. The assessment estimated the 1999 year class to be the smallest since 1988 at 19 million fish. However, "retrospective analysis shows that the virtual population analysis (VPA) tends to underestimate recent year-classes."

3.1.1.3 Stock characteristics and ecological relationships

3.1.1.3.1 Spawning

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

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

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

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

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

3.1.1.3.2 Age and growth

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

In June of 1990, the Commission and NMFS sponsored an ageing workshop at Northeast Fisheries Science Center (NEFSC). This 1990 workshop (Almeida *et al.* 1992) concluded that the convention derived at a previous 1980 workshop, that the first mark on the structures represented the second year, was in error. Summer flounder biologists now agree more closely with the information presented by Poole (1961), in that summer flounder exhibit very rapid growth in their first year and reach mean lengths at age 1 of 10 - 13 inches.

Mean lengths at age from samples collected during NEFSC bottom trawl surveys in the spring and autumn, following the standard convention of a common 1 January birth date, demonstrate the rapid growth of the species (Table 15). Females grow faster and attain greater lengths than males (Almeida pers. comm.).

The length-weight relationship for summer flounder has been well described by Morse (1981). The results of this study showed that there are both seasonal and slight sexual differences in the relationship (Table 16). This difference between the sexes was also noted by Smith and Daiber (1977), Eldridge (1962), Lux and Porter (1966), and Wilk *et al.* (1978).

Parameters of the von Bertalanffy growth equation (Table 17) were determined for summer flounder (USDC 1986) using length at age data for 1,947 males and 2,030 females collected from bottom trawl surveys between 1976 and 1983. The maximum size of male and female summer flounder was estimated as 26 inches and 33 inches, respectively, based on these growth equations. Previous estimates of the maximum size for summer flounder ranged from 35 to 37 inches (Smith and Daiber 1977; Richards 1970). Henderson (1979) provided an estimate of 36 inches for both sexes combined based on analysis of commercial samples. Bigelow and Schroeder (1953) reported a maximum verified length of 37 inches. Recent values (USDC 1986) of the Brody growth coefficient (k) are comparable to those calculated in Fogarty (1981) using data which included both inshore and offshore collections.

A team of five experienced NEFSC readers was formed to re-examine scales from the 1997 winter survey because of major expansion in the size range of 1-year old summer flounder collected during the 1995, 1996, and 1997 NEFSC winter bottom trawl surveys, low levels of agreement between NEFSC and North Carolina Division of Marine Fisheries (NCDMF) age readers, and differences in scale and otolith ages obtained from the same fish in 1997 winter bottom trawl survey. The team determined that re-ageing all fish from the 1995-1997 winter, spring, and autumn samples from the NEFSC and Massachusetts Division of Marine Fisheries (MADMF) bottom trawl surveys and the all samples from the commercial fishery would be appropriate. The age determination criteria used remained the same as developed at the 1990 summer flounder workshop and described in the standard ageing manual utilized by the NEFSC staff (Dery 1997).

3.1.1.3.3 Catch at age

The following discussion was taken from the "31st Stock Assessment Review Committee Consensus Summary of Assessment" (NEFSC 2000).

Age composition data from the NEFSC spring trawl survey indicate a substantial reduction in the number of ages in the stock between 1976-1990 (Table 18). Between 1976 and 1981, fish of ages 5-8 were captured regularly in the survey with the oldest individuals ages 8-10. Between 1982-1986, fish ages 5 and older were only occasionally observed in the survey and by 1986, the oldest fish observed in the survey were age-5. In 1990 and 1991, only three ages were observed in the survey catch, and there was an indication that the 1988 year class survey was very weak. Since 1991, the survey age composition has begun to expand. There is strong evidence in the 1998-2000 NEFSC spring surveys of increasing abundance of age-3 and older fish, due to increased survival of the 1994 and subsequent year classes.

The NEFSC autumn survey catches age-0 summer flounder in abundance, providing an index of summer flounder recruitment. Fall survey indices suggest improved recruitment since the late 1980s, and evidence of an increase in abundance at age-2 and older since 1995. The NEFSC autumn surveys indicate that the 1995 year class of summer flounder is the most abundant in recent years, and that subsequent, weaker year classes are experiencing increased survival. The 1998 and 1999 autumn survey indices are the highest of the 1982-1999 aged series (Table 19).

A series of NEFSC winter trawl surveys was begun in February 1992 specifically to provide improved indices of abundance for flatfish, including summer flounder. Indices of summer flounder abundance from the winter survey indicated stable stock size during 1992-1995. The winter survey index increased by 290% over the 1995 value. Most of the increased catch in 1996 consisted of age-1 summer flounder from the 1995 year class. In 1997 the index dropped due to a decrease in catch of age-1 fish. As with the other two NEFSC surveys, there is strong evidence in recent winter surveys of increased abundance of age-3 and older fish relative to earlier years in the time series, due to the abundance of the 1995 year class and increased survival of subsequent year classes (Table 20).

Catch at age matrices were developed for Northeast Region total commercial fisheries landings and discards at age, Marine Recreational Fisheries Statistics Survey (MRFSS) recreational landings and discards at age, North Carolina winter trawl fishery landings and discards at age, from 1982-1999 were summed to produce a total fishery catch at age matrix (Table 21). The percentage of age-3 and older fish in the total catch in numbers has increased in recent year from only 4% in 1993 to 40% in 1998 and 1999.

3.1.1.3.4 Sex ratio

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

Morse (1981) calculated sex ratios by year and season to determine possible variations related to sampling intensity or differential distribution of sexes during the spring and fall migrations. There appeared to be no annual or seasonal effects on observed sex ratios (Table 22) even though sample sizes varied greatly between years and seasons.

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

3.1.1.3.5 Length and age at maturity

The following discussion was taken from the "31st Stock Assessment Review Committee Consensus Summary of Assessment" (NEFSC 2000).

The maturity schedule for summer flounder used in the 1990 11th Stock Assessment Workshop (SAW 11) and subsequent stock assessments through 1999 was developed by the SAW 11 Working Group, using NEFSC Fall Survey maturity data for 1978-1989 and mean lengths at age from the NEFSC Fall Survey (Shepherd, NEFSC pers. comm.; NEFSC 1990; Terceiro 1999). The SAW 11 work indicated that the median length at maturity (50th percentile, L_{50}) was 10.1 inches for male summer flounder, 10.9 inches for female summer flounder, and 10.2 inches for both sexes (NEFSC 2000).

Under the ageing convention used in the SAW 11 and subsequent assessments (Smith *et al.* 1981; Almeida *et al.* 1992; Szedlmayer and Able 1992), the median age at maturation (50th percentile, A_{50}) for summer flounder was determined to be 1.0 years for males and 1.5 years for females. Combined maturities indicated that 38% of age-0 fish are mature, 72% of age-1 fish are mature and 90% of age-2 fish are mature. The maturities for age-3 and older fish were rounded to 100% in the SAW 11 and subsequent assessments (NEFSC 2000).

In response to a research recommendation (included in the summer flounder stock assessments since 1994), that the true spawning contribution of young summer flounder to the spawning stock biomass (SSB) be investigated, University of Rhode Island (1999 in NEFSC 2000) examined the histological and biochemical characteristic of female summer flounder oocytes. First, to determine if age-0 and age-1 female summer flounder produce viable eggs; and second to develop an improved guide for classifying maturity of summer flounder collected in NEFSC surveys (Specker *et al.* 1999, Merson *et al.* In Press). The URI study examined 333 female summer flounder (321 aged fish) sampled during the NEFSC Winter 1997 Bottom Trawl Survey (February 1997) and 227 female summer flounder (210 aged fish) sampled during the NEFSC Autumn 1997 Bottom Trawl Survey (September 1997). The NEFSC and URI maturity criteria disagreed for 13% of the aged fish, with most (10%) of the disagreement due to NEFSC mature fish classified as immature by the URI histological and biochemical criteria. The potential effect of applying the URI maturity criteria in the most recent assessment would be to decrease the proportion of ages 0 and 1 female summer flounder, judged to be mature. The 31st Stock Assessment Review Committee (SARC 31) concluded that some contribution to spawning from ages 0 and 1 fish should be included in the assessment. Given the relatively minor changes in the absolute magnitude of spawning stock biomass that would result from consideration of the recent work , the SAW 11 schedule was retained for the 2000 assessment. SARC 31 indicated that more biological and histological work for both male and female summer flounder, should be done for additional years to determine if the results of the URI study will be applicable over the full VPA time series (NEFSC 2000).

3.1.1.3.6 Fecundity and reproductive strategy

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

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

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

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

The intercept (a) and slope (b) values for the equations are listed in Table 23.

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

The reproductive strategy of summer flounder tends to maximize reproductive potential and avoid catastrophe. The strategy is a combination of extended spawning season with variable duration, early maturation (age 1 or 2), high fecundity, serial spawning, and extensive migrations across the continental shelf during spawning. The half year spawning season reduces larval crowding and decreases the impact of predators and adverse environmental conditions on egg and larval survival. The migration pattern disperses the eggs over large areas of the shelf and probably aids in maintaining spawning fish in areas where bottom temperatures are between 54^{o}

and 66° F (Smith 1973). The October/November spawning peak coincides with the breakdown of thermal stratification on the continental shelf and the maximum production of autumn plankton which is characteristic of temperate ocean waters of the northern hemisphere. Thus the timing of peak spawning assures a high probability of adequate larval food supplies (Morse 1981).

3.1.1.3.7 Mortality

SAW-31 assumed instantaneous natural mortality rate (M) to be 0.2 for age 1 and older fish, although alternative estimates of M were considered in the SAW 20 assessment (NEFSC 2000). This equates to an annual rate of 18%.

Fishing mortality on fully recruited ages 3-5 summer founder was high for most of the VPA time series, varying between 0.9 and 2.2 during 1982-1997 (55%-83% exploitation), far in excess of the revised Amendment 12 overfishing definition, $F_{threshold}=F_{target}=F_{max}=0.26$ (21% exploitation; NEFSC 2000). The fishing mortality rate has declined substantially since 1997 and was estimated to be 0.32 (25% exploitation) in 1999, 23% higher than the overfishing definition.

3.1.1.3.8 Yield per recruit

The calculation of biological reference points based on yield per recruit (YPR) for summer flounder using the Thompson and Bell (1934) model was detailed in SAW 11 (NEFSC 2000). The overfishing Definition Review Panel (Applegate *et al.* 1998) recommended that MAFMC base maximum sustainable yield (MSY) proxy reference points on YPR analysis, and this recommendation was adopted in formulating the reference points for Amendment 12. Current yield per recruit analysis indicates that $F_{threshold}=F_{target}=F_{max}=0.26$, YPR at F_{max} is 2.8127 kg/recruit. The median number of summer flounder recruits estimated from VPA for the 1982-1998 time period from the Terceiro (1999) assessment was 37.844 million fish.

Spawning stock biomass per recruit declines markedly with increasing fishing mortality. The spawning stock biomass per recruit concept allows egg production for the population to be directly linked with F. Egg production is highest without any F and can be increased by decreasing or delaying mortality. Spawning stock biomass declined 72% from 1983 to 1989, but has since increased with improved recruitment and decreased fishing mortality. However, recent recruitment per unit SSB has been lower than that observed at comparable abundance of SSB during the early 1980's (NEFSC 2000).

3.1.1.3.9 Feeding, predation, and species coexistence

According to Section 600.815 (a)(8), actions that reduce the availability of a major prey species, either through direct harm or capture, or through adverse impacts to the prey species' habitat that are known to cause a reduction in the population of the prey species may be considered adverse effects on a managed species and its EFH. The following discussion on feeding and predation was taken from the summer flounder EFH source document.

3.1.1.3.9.1 Feeding

The timing of peak spawning in October/November coincides with the breakdown of thermal stratification on the continental shelf and the maximum production of autumn plankton which is characteristic of temperate ocean waters of the northern hemisphere, thus assuring a high probability of adequate larval food supply (Morse 1981).

Initiation of feeding is a function of the rate and efficiency at which yolk-sac material is consumed, which in turn is dependent on incubation temperature. As reported previously by Johns and Howell (1980) and Johns *et al.* (1981), total yolk-absorption was complete in 67 hours and 105 hours at 70° F (21° C) and 61° F (16° C), respectively. Within those 3 to 4 days from hatching, summer flounder larvae complete the morphological differentiation of the digestive tract, jaw suspension, and accessory organs necessary for independent exogeneous feeding (Bisbal and Bengtson 1995b).

Bisbal and Bengtson (1995a) showed the interdependence of temperature and food availability (i.e., delay of initial feeding) and their effects on survival and growth of summer flounder larvae hatched from Narragansett Bay and Long Island Sound broodstock. Their laboratory observations occurred from the time of hatching throughout the period of feeding on rotifers. The larvae withstood starvation for longer times at lower temperatures. They possessed sufficient reserves to survive starvation for 11 to 12 days when temperatures were maintained close to the experimentally determined lower tolerance limit (55° F; 12.5° C; Johns *et al.* 1981). At temperatures close to the highest thermal limit reported to occur in their environment (70° F; 21° C; Smith 1973), larvae only survived for 6 to 7 days. At either temperature, best survival occurred when the larvae began to feed at the time of mouth opening, thus survival is also significantly affected by the time at which they first have access to exogenous food. At 55° F (12.5° C), every treatment group was represented by a low number of survivors which did not grow significantly from the initial figures at mouth opening. Growth of the larvae at 70° F (21° C) was inversely proportional to the duration of early starvation; the size distribution of the survivors of the 70° F (21° C) experiment showed an increase in mean size and weight when the initial feeding delay was shorter.

Bisbal and Bengtson (1995c) also determined the nutritional status of lab raised larvae and juveniles from the same areas. Mortality due to starvation occurs later in the older ontogenetic states; i.e., 60 hours in 6 day old larvae, 72 hours in 16 day old larvae, 8 d in 33 day old larvae, and 10 d in 60 day old juveniles at a temperature of around 66° F (19° C).

In the laboratory, Peters and Angelovic (1971) reared postlarvae on a diet of zooplankton (mostly copepods) and *Artemia* nauplii; Buckley and Dillmann (1982) also used *Artemia* for their larval feeding experiments. The larvae exhibited an exponential increase in daily ration with age and a linear increase with weight (Buckley and Dillmann 1982). Other investigators have raised larvae on rotifers (e.g., Bisbal and Bengtson 1995a).

Previous studies have inferred that larval and postlarval summer flounder initially feed on zooplankton and small crustaceans (Peters and Angelovic 1971, Powell 1974, Morse 1981, Timmons 1995). Grover (1998) studied the food habits of oceanic larval flounder collected north and east of Hudson Canyon. The diets of all stages of larvae was dominated by immature copepodites. The size of other prey was directly related to larval size. Preflexion larvae (0.076-0.276 inches; 1.9-6.9 mm standard length [SL]) fed on, in order of importance: immature copepodites, copepod nauplii, and tintinnids, as well as bivalve larvae and copepod eggs. Flexion larvae (0.148-0.288 inches; 3.7-7.2 mm SL) fed on immature copepodites (mostly calanoids) and adult calanoid copepods. Premetamorphic (0.192-0.304 inches; 4.8-7.6 mm SL) and metamorphic (0.232-0.36 inches; 5.8-9.0 mm SL) larvae also fed on immature copepodites, but adult calanoid copepods (mostly *Centropages typicus*) and appendicularians were also prey items.

Food habits studies on late larval and juvenile estuarine summer flounder reveal that while they are opportunistic feeders and differences in diet are often related to the availability of prey, there also appears to be ontogenetic changes in diet. Smaller flounder (usually less than 4 inches; 100 mm) seem to focus on crustaceans and polychaetes while fish become a little more important in the diets of the larger juveniles. In Great Bay-Little Egg Harbor estuary, New Jersey, Grover (1998) found that the primary prey of metamorphic (0.324-0.584; 8.1-14.6 mm SL) summer flounder was the calanoid copepod *Temora longicornis*, indicating pelagic feeding. Evidence of benthic feeding was observed only in late-stage metamorphic flounder (H+ and I), where the prey included polychaete tentacles and harpacticoid copepods. Incidence of feeding, defined as the percentage of frequency of larvae with prey in their guts, in relation to the total number of specimens examined in a time block, declined as metamorphosis progressed, from 19.1% at stage G to 2.9% at stage I. Rountree and Able (1992b) also discovered that young-of-year summer flounder in Great Bay-Little Egg Harbor marsh creeks preyed on creek fauna in order of abundance (Rountree and Able 1992a): Atlantic silversides (*Menidia menidia*), mummichogs (*Fundulus heteroclitus*), grass shrimp (*Paleomonetes vulgaris*), and sand shrimp (*Crangon septemspinosa*) contributed most importantly to their diets. Seasonal shifts in diet reflected seasonal changes in creek faunal composition, and Rountree and Able (1992a) note that the maximum abundance of young-of-year summer flounder in August coincided with the peak in Atlantic silverside abundances. In Little Egg Harbor estuary, New Jersey, Festa (1979) reported that fish, including anchovies, sticklebacks and silversides, comprised 32.6% of the diet volume of 2.34-9.36 inches (6-24 cm) summer flounder. The fish component was supplemented by mysid and caridean shrimp, of which the sand shrimp *Crangon septemspinosa* was of somewhat more importance.

Timmons (1995) reports that juvenile (2.964-9.711 inches; 7.6-24.9 cm TL) summer flounder from Rehoboth Bay, Delaware, fed mostly on the shrimp *Paleomonetes vulgaris* as well as portunid and blue crabs. Flounder from Indian River Bay, Delaware fed mostly on mysids.

Postlarvae (0.42-0.568 inches; 10.5-14.2 mm SL) in Chesapeake Bay have been found with guts full of the mysid *Neomysis americana* (Olney 1983). In Magothy Bay, Virginia, small summer flounder (1.638-7.722 inches; 4.2-19.8 cm) also fed mainly on *Neomysis americana*, but in addition, consumed larger proportions of amphipods, small fishes, small gastropod molluscs, and plant material than the larger fish (Kimmel 1973). Wyanski (1990) found that mysids were also the dominant prey of 4-8 inches (100-200 mm) TL summer flounder in the lower Chesapeake Bay and Eastern Shore of Virginia. Lascara (1981) reports that larger juveniles and adults (avg. length 10.686 inches [27.4 cm] SL) from lower Chesapeake Bay fed on juvenile spot (*Leiostomus xanthurus*), pipefish (*Syngnathus fuscus*), the mysid *Neomysis americana*, and shrimps (*P. vulgaris*, *C. septemspinosa*).

Burke (1991, 1995) in his North Carolina field surveys in the Newport and North Rivers discovered that late larval and early juvenile summer flounder are active infaunal predators. Prey of summer flounder during the immigration period (0.44-0.88 inches [11-22 mm] SL) consisted of common estuarine crustaceans including harpactacoid copepods, polychaetes, and parts of infaunal animals such as polychaete tentacles (primarily from the dominant spionid *Streblospio benedicti*) and gills, and clam siphons. The appendages of benthic animals appear to be the most important prey item for postlarval flounders. The increasing importance of polychaetes and clam siphons was suggested with development, while feeding on harpactacoid copepods and amphipods was independent of stage. For juveniles 0.8-2.4 inches (20-60 mm) SL, polychaetes, primarily spionids (*S. benedicti*), were the most important part of the diet. Burke (1991, 1995) suggests that the distribution of these dominant polychaetes may influence the distribution of summer flounder in this estuary and could explain the movement of juvenile summer flounder into marsh habitat (Burke *et al.* 1991, note the Malloy and Targett [1994b] study mentioned in the Substrate section, above). Other prey items for this size class of summer flounder included invertebrate parts, primarily clam siphons; shrimp, consisting of the mysids *Neomysis americana* and palmonid shrimp; calanoid copepods, primarily *Paracalanus*; amphipods of the genus *Gammarus*; crabs, primarily *Callinectes sapidus*; and fish. Powell and Schwartz (1979) reported that larger juvenile (4-8 inches [100-200 mm] TL) summer flounder feed mainly on mysids (mostly *Neomysis americana*) and fishes throughout the year in Pamlico Sound, North Carolina. Mysids were found in relatively greater quantities in the smaller flounder, but as their size increased, the diet consisted of shrimps and fishes in similar quantities.

In South Carolina, Wenner *et al.* (1990a) reported that juveniles between 2-5 inches (50-125 mm) TL consumed only mysids and caridean shrimps (*Paleomonetes* spp., *P. pugio*, *P. vulgaris*). The importance of fish (mostly bay anchovy, *Anchoa mitchilli*, and mummichogs) in the diet increased as summer flounder sized increased.

In Georgia, Reichert and van der Veer (1991) found that juveniles from the Duplin River of around less than 1.6 inches (40 mm) SL fed principally on harpacticoid copepods; they also report that *Paralichthys* species greater than 1 inches (25 mm) fed on increasing numbers of other crustaceans including mysids, crabs, *Paleomonetes*, as well as polychaetes. Summer flounder greater than 4 inches (100 mm) also fed on fish.

Adult summer flounder are opportunistic feeders with fish and crustaceans making up a significant portion of their diet. Differences in diet between habitats or locations may be due to prey availability. The flounder are most active during daylight hours and may be found well up in the water column as well as on the bottom (Olla *et al.* 1972). Included in their diet are: windowpane (Carlson 1991), winter flounder, northern pipefish, Atlantic menhaden, bay anchovy, red hake, silver hake, scup, Atlantic silverside, American sand lance, bluefish, weakfish, mummichog, rock crabs, squids, shrimps, small bivalve and gastropod molluscs, small crustaceans, marine worms and sand dollars (Hildebrand and Schroeder 1928, Ginsburg 1952, Bigelow and Schroeder 1953, Poole 1964, Smith and Daiber 1977, Allen *et al.* 1978, Langton and Bowman 1981).

In Little Egg Harbor estuary, New Jersey, Festa (1979) reports that at least seven species of fish occurred in the stomachs of 1-2.6 inches (25-65 cm) summer flounder. These included silversides, anchovies, sticklebacks, silver perch, searobins, winter flounder and pipefish. Fish remains comprised 74.3% of the diet volume. Brachyuran crabs, primarily *Callinectes*, were of secondary importance in the diet. In Hereford Inlet near Cape May, New Jersey, Allen *et al.* (1978) found that adult and juvenile summer flounder (8-16 inches; 200-400 mm) fed mostly on *Crangon septemspinosa*, mysids and fish.

Smith and Daiber (1977) reported that Delaware Bay adults less than 18 inches (45 cm) TL fed more on invertebrates, while those greater than 18in. (45 cm) TL ate more fish. Food items found, in order of percent frequency of occurrence, included decapod shrimp (*Crangon septemspinosa*), weakfish (*Cynoscion regalis*), mysids (*Neomysis americana*), anchovies (*Anchoa* spp.), squids (*Loligo* spp.), silversides (*Menidia menidia*), herrings (*Alosa* spp.), hermit crabs (*Pagurus longicarpus*), and isopods (*Olencira praegustator*).

In Magothy Bay, Virginia, large summer flounder (7.8-18.6 inches; 20.1-47.6 cm) fed mainly on *Neomysis americana*, as well as large crustaceans such as *Squilla empusa*, xanthid crabs, and squids. The fish from this area are not mainly piscivorous, but the larger specimens (greater than 16 inches; 40.0 cm) did contain a higher percentage of fishes than did the smaller ones (Kimmel 1973). Lascara (1981) reports that larger juveniles and adults (avg. length 10.7 inches [27.4 cm] SL) from lower Chesapeake Bay fed on juvenile spot (*Leiostomus xanthurus*), pipefish (*Syngnathus fuscus*), the mysid *Neomysis americana*, and shrimps (*P. vulgaris*, *C. septemspinosa*).

In South Carolina, Wenner *et al.* (1990a) showed that flounder 2-12.5 inches (50-313 mm) TL consumed mostly decapod crustaceans, especially caridean shrimps (*Paleomonetes* spp., *P. pugio*, *P. vulgaris*). The importance of fish (mostly bay anchovy, *Anchoa mitchilli*, and mummichogs) in the diet increased as summer flounder sized increased.

3.1.1.3.9.2 Predation

Larval and juvenile summer flounder undoubtedly are preyed upon until they grow large enough to fend for themselves. Results of food habit studies by NMFS from 1969-1972 showed that Pleuronectiformes occurred in the stomachs of the following piscivores: spiny dogfish, goosefish, cod, silver hake, red hake, spotted hake, sea raven, longhorn sculpin, and fourspot flounder (Bowman *et al.* 1976). These data do not indicate the proportion of summer flounder among the flatfish prey taken, but it is likely that they are represented.

Following a thermal shock of 50° F (10° C) above an acclimation temperature of 59° F (15° C), larvae were actually less susceptible to predation by striped killifish (*Fundulus majalis*) than control larvae (Deacutis 1978).

Witting and Able (1993), working in the laboratory with 0.43-0.63 (11-16 mm) TL transforming larvae from Great Bay-Little Egg Harbor, New Jersey, suggest that these small summer flounder are vulnerable to predation by a large size range of *Crangon septemspinosa* (around 0.4-2 inches [10-50 mm] TL) in New Jersey's estuaries. Laboratory experiments by Keefe and Able (1994) in New Jersey demonstrated that predation on metamorphic summer flounder influences burying behavior and perhaps substrate preference. The type and abundance of predators could determine whether a metamorphic summer flounder stays in the substrate or the water column. For example, Keefe and Able's (1994) experiments showed that buried *C. septemspinosa* may reduce burying by the flounder, while pelagic mummichogs may cause more burying by the flounder during the day.

Timmons (1995) reports a preference for sand by juvenile (2.9-9.7 inches [7.6-24.9 cm] TL) summer flounder from the south shores of Rehoboth Bay and Indian River Bay, Delaware. In her study, the flounder were captured near large aggregations of the macroalgae *Agardhiella tenera* only when large numbers of their principal prey, the shrimp *Paleomonetes vulgaris*, were present. Timmons (1995) suggests that the summer flounder are attracted to the algae because of the presence of the shrimp, but the flounder remain near the sand to avoid predation ("edge effect"). Indeed, in her laboratory experiments, the juvenile summer flounder did not show a preference for the macroalgae, and in caging experiments, blue crabs were least able to prey on the flounder in cages with sand bottoms only, but had an advantage in capturing the flounder in cages containing macroalgae. Laboratory studies by Lascara (1981) on flounder from lower Chesapeake Bay also suggest that in patchy seagrass/sand habitats, the flounder may avoid predation by staying in the sand near the seagrass beds, rather than in the grass beds themselves.

Lab studies in Georgia by Reichert and van der Veer (1991) on juveniles from the Duplin River found potential predators to be blue crabs (*Callinectes* spp.) and sea robins (*Prionotus* spp.).

All of the natural predators of adult summer flounder are not fully documented, but larger predators such as large sharks, rays, and goosefish probably include summer flounder in their diets.

Spatial co-occurrence and dietary overlap among summer flounder, scup, and black sea bass have been previously documented (Musick and Mercer 1977, Gabriel 1989, Shepherd and Terceiro 1994). For example, the composition and distribution of fish assemblages in the Middle Atlantic Bight was described by Colvocoresses and Musick (1979) by subjecting NMFS bottom trawl survey data to the statistical technique of cluster analyses. Summer flounder, scup, northern sea robin, and black sea bass, all warm temperate species, were regularly classified in the same group during spring and fall. In the spring this group was distributed in the warmer waters on the southern shelf and along the shelf break at depths of approximately 500 ft (152 m). During the fall this group was distributed primarily on the inner shelf at depths of less than 200 ft (61 m) where they were often joined by smooth dogfish.

3.1.1.3.10 Parasites, diseases, injuries, and abnormalities

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

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

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

3.1.1.4 Overfishing definition

Overfishing for summer flounder is defined to occur when the fishing mortality rate exceeds the threshold fishing mortality rate of F_{msy}. Since F_{msy} cannot be reliably estimated, F_{max} is used as a proxy for F_{msy}. When an estimate of F_{msy} is available, it will replace the proxy. F_{max} is 0.26 under current stock conditions. The target fishing mortality rate is also equal to 0.26. The summer flounder stock is overfished when the biomass falls below the minimum biomass threshold of ½ B_{msy}. The biomass target is specified to equal B_{msy}. Since B_{msy} cannot be reliably estimated, the maximum biomass based on YPR analysis and average recruitment is used a proxy. As such, the threshold and target biomass would be 234.6 million pounds (106,400 mt) and 117.3 million pounds (53,200 mt), respectively (SARC 31).

3.1.1.5 Probable future condition

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

SAW-31 SARC indicates that the stock is overfished and overfishing is occurring relative to the Amendment 12 overfishing definitions. However, the fishing mortality rate estimated for 1999 is 0.32, a significant decline from the 1.31 estimated for 1994. In addition, total stock biomass has increased substantially since 1991 and spawning stock biomass has increased each year since 1993 to 64.8 million pounds, the highest value in the time series.

Fishing mortality calculated from the average of the currently fully recruited ages (3-5) of summer flounder has been high, varying between 0.9 and 2.2 during 1982-1997 (55%-83% exploitation), far in excess of the revised Amendment 12 overfishing definition, $F_{threshold}=F_{target}=F_{max}=0.26$ (21% exploitation). The fishing mortality rate has declined substantially since 1997 and was estimated to be 0.32 (25% exploitation) in 1999, but is still 23% higher than the overfishing definition. The annual partial recruitment of age-1 fish decreased from near 0.50 during the first half of the VPA series to 0.25 since 1994; the partial recruitment of age-2 fish has decreased from 1.00 in 1993 to 0.72 in 1998-1999. These decreases in partial recruitment at age are in line with expectations given recent changes in commercial and recreational fishery regulations.

The NEFSC spring survey stock biomass index (1968-1999) peaked during 1976-1977, and in 1999 was 90% of that peak. Total stock biomass on January 1, estimated by VPA (1982-1999) reached 48,300 mt in 1983, before falling to 16,100 mt in 1989. Total stock biomass has increased since 1991, has been stable since 1994 at about 41,000 mt, and in 1999 was estimated to be 41,400 mt, which is 39% of the biomass target of B_{msy}=106,400 mt, and 78% of the biomass threshold of one-half B_{msy}=53,200 mt.

The arithmetic average recruitment from 1982 to 1999 was 40 million fish at age 0, with a median of 38 million fish. The 1982 and 1983 year-classes are the largest in the VPA time series, at 74 and 80 million fish, respectively, at age 0. Recruitment declined from 1983 to 1988, with the 1988 year-class the weakest at only 13 million fish. Recruitment since 1988 has generally improved, and the 1995 year-class, at 47 million fish, was above average. The 1996-1998 year-classes, ranging between 32 and 38 million fish, are estimated to be about average. The 1999 year-class, at 19.2 million fish, is estimated to be below average. Recent recruitment per unit of SSB has been lower than that estimated at a comparable abundance of SSB during the early 1980s.

Spawning stock biomass declined 72% from 1983 to 1989 (18,800 mt to 5,200 mt), but has since increased with improved recruitment and decreased fishing mortality to 29,300 mt in 1999. The age structure of the spawning stock has expanded, with 78% at ages 2 and older, and 10% at ages 5 and older. Under equilibrium conditions at F_{max}, however, about 85% of the spawning stock biomass would be expected to be ages 2 and older, with 50% at ages 5 and older.

Projections indicate that if the TAL in 2000 is not exceeded, total stock biomass will exceed the biomass threshold in January, 2001. At this level, the stock will no longer be overfished (NEFSC 2000).

3.1.2 Scup

3.1.2.1 Range and distribution

The following information on scup range is taken directly from the document "FMP-EFH Source Document, Scup, *Stenotomus chrysops*, Life History and Habitat Requirements" (Steimle *et al.* 1999a). This document is referred to hereafter as the scup EFH background document.

Scup occur as far north as Bay of Fundy and Sable Island Bank, Canada, although rarely above Massachusetts (Bigelow and Schroeder 1953, Fritz 1965, Scott and Scott 1988) and as far south as South Carolina and occasionally Florida in the South Atlantic Bight (Morse 1978, Manooch, 1984). The management unit is scup in US waters in the western Atlantic Ocean from the US-Canadian border southward to Cape Hatteras, North Carolina. South of there scup are managed by the South Atlantic Fishery Management Council. The "southern porgy", *S. aculeatus*, referred to in a number of South Atlantic Bight studies or reviews (e.g., Morse 1978, Powles and Barans 1980, Sedberry and Van Dolah 1984), is currently not considered a separate species by the American Fisheries Society nomenclature committee (Robins *et al.* 1991) leading to some taxonomic confusion (Munroe pers. comm.). Miller and Richards (1980) list both *S. chrysops* and *S. aculeatus*, separately, as reef dwellers in the South Atlantic Bight. Although there can be some mixing of the Middle and South Atlantic scup populations in North Carolina waters, the Middle Atlantic population is treated separately here, because only the Middle Atlantic Bight population appears to make extensive seasonal migrations and few fish tagged in New England or New York waters have been caught south of Cape Hatteras (Nesbit and Neville 1935, Finkelstein 1971). Within this range they are commonly found during warmer seasons from within larger estuaries and in coastal waters, and along the outer continental shelf to about 656 ft (200 m) and occasionally deeper. Beebe and Tee-Van (1933) also reported that scup was introduced to Bermuda in about the 1920s, but the status of this introduction is unknown. Archeological evidence suggests scup have been common in southern New England waters for several thousand years and was used as food by native Americans (Waters 1967).

Scup in the Middle Atlantic Bight population spawn along the inner continental shelf waters off southern New England from May through August, with peaks in June-July. Larvae are found in coastal waters during the warmer seasons, feed upon small zooplankters, and are preyed upon by any variety of planktivores that might be present, including medusae, crustaceans and fish. Larval settlement to the seabed appears to occur in coastal-estuarine waters when the larvae are about 1 inches (25 mm) in length, but this event is poorly known. Juveniles and adults are common in most larger estuaries and coastal areas in both open and structured (sheltering) habitats during the summer and early fall where they feed upon a variety of small benthic invertebrates. Scup begin to mature at age 2 (Finkelstein 1969b) and at about 6.2 inches (15.5 cm) FL (O'Brien *et al.* 1993) and most fish are mature at 3 years and at a length of 8.3 inches (21 cm) FL (Gabriel 1995). In the last century, scup were reported up to 18 inches (45 cm) FL (Baird 1873). Scup can live up to 20 years and weigh up to about 4.4 pounds (2 kg) (Bigelow and Schroeder, 1953). In 1996, the population in the Middle Atlantic Bight was composed primarily of younger fish, with few fish being older than 7 years and longer than 13.2 inches (33 cm) FL (NEFSC 1997).

In the winter, scup leave the cold (less than 46-48° F; 8-9° C) inshore waters and migrate to warmer outer continental shelf waters. They overwinter from south of the Hudson Canyon to North Carolina in depths of 250-610 ft (75-185 m; Morse 1978, Bowman *et al.* 1987). With falling inshore water temperature, juveniles follow adults to wintering areas on the mid to outer continental shelf south of Long Island, although during warmer winters some may remain in larger and deeper estuaries. During this migration they move south along the coast (within the 60 ft [18 m] isobath) and offshore (Hamer 1970) as bottom water temperature decline below 50° F (10° C). Adults use slightly deeper coastal waters during the summer but also move offshore with falling coastal temperatures to winter offshore, south of Hudson Canyon. Phoel (1985), assuming one species and no population mixing, reported scup migrates south of Cape Hatteras to about Cape Fear, North Carolina in the winter and spring.

With rising temperatures in the spring, scup return inshore with the larger fish arriving first. During seasonal migrations and perhaps at other times, scup appear to move in schools of similarly sized fish, and in the spring, schools of subadults have been report to appear in southern New England waters at a slightly later time then adults (Sisson 1974). They reach Chesapeake Bay by April (Hildebrand and Schroeder, 1928) and southern New England by early May (Baird 1873, Perlmutter 1939, Neville and Talbot 1964, Finkelstein 1971). Larger fish are usually in the lead during these migrations and it has been suggested that the population moves in schools of similarly sized individuals (Baird 1873, Hildebrand and Schroeder 1928, Neville and Talbot 1964, Sisson 1974, Morse 1978). Fish that arrive early inshore can be caught in pockets of residual cold waters and may become inactive or dormant (Kessler and Wicklund 1966).

Scup can be considered as being part of an offshore-wintering guild of fish species, whose movements, residencies and feeding generally coincide with those of several other fishes (Musick and Mercer 1977, Colvocoresses and Musick 1984, Austen *et al.* 1994, Brown *et al.* 1996), especially summer flounder *Paralichtys dentatus*, black sea bass *Centropristis striata*, northern sea robin *Prionotus carolinus*, and smooth dogfish *Mustelus canis*, suggesting some biological interactions (Gabriel 1992, Shepherd and Terceiro 1994), although there may slight differences in environmental tolerances and habitat preferences or uses among these species (Neville and Talbot 1964).

3.1.2.2 Abundance and present condition

The most recent assessment on scup, SAW-31 indicates that scup are overfished and overfishing is occurring (NEFSC 2000). The SARC concluded that "the current index of spawning stock biomass is low (1998-2000 average=0.10 SSB kg/tow) and less than 5% of the biomass threshold (2.77 SSB kg/tow)." The SARC also stated that "fishing mortality should be reduced substantially and immediately. Reduction in fishing mortality from discards will have the most impact on the stock, particularly considering the importance of 1999 and all future good recruitment to rebuilding the stock."

SAW-31 does indicate an increase in stock abundance in 1999 and 2000 based on NEFSC spring survey results. Spring survey results indicate that spawning stock biomass increased each year since 1998 and the NEFSC autumn survey results (kg/tow) for 1999 are the highest in the time series since 1985. These survey results reflect the effects of a strong 1997 year class and a moderate to strong 1999 year class on the stock (NEFSC 2000).

Commercial and recreational landings also indicate that the 1997 year class was strong and has persisted over time to support landings in both 1999 and 2000. Recreational catch per trip increased substantially in 1999. Increased abundance of larger fish has also been noted by commercial fishermen who have suggested that more than the 1997 year class accounts for the availability of larger fish. However, ageing studies conducted by Connecticut Department of Environmental Protection (CTDEP) personnel suggest that scup from the 1997 year class have grown at a faster rate than previous year classes. As such, the 1997 year class probably accounts for most of the larger fish in the commercial and recreational catches (NEFSC 2000).

Estimates of fishing mortality rates for scup are uncertain. SARC 31 conducted several analyses that indicated that F was at least 1.0 for ages 0-3 scup for the 1984 to 2000 time series. The SARC could not estimate F's on older fish because they are not well represented in the surveys. However, the SARC did note that it was likely that the current F was "significantly higher than the reference point." The SARC noted that the truncation in lengths and ages in the surveys and landings suggest that the stock has experienced high fishing mortality rates.

Although the magnitude of the mortality rates is unknown, relative exploitation rates have changed over the period. Relative exploitation rates based on total landings and the spring survey suggest a general increase in exploitation from 1981 to 1995. Since then, relative exploitation rates have declined; the 1999 value is almost half of the 1997 value (NEFSC 2000).

3.1.2.3 Stock characteristics and ecological relationships

3.1.2.3.1 Spawning and early life history

Approximately 50% of scup are sexually mature by age 2 at a fork length of 6.1 inches (total length of approximately 6.8 inches) (NEFSC 1993). Scup spawn only once a year with spawning occurring over weed and sandy covered areas (Morse 1978). The sex ratio of scup on inshore spawning grounds was approximately 1:1 based on studies conducted by NMFS (Morse 1978).

The following discussion was taken directly from the scup EFH source document.

Scup spawn once a year. The mean fecundity of 7 -9 inches (17.5-23.0 cm) FL scup has been reported to be about 7000 (standard deviation; SD=4860) eggs/female (Gray 1990). Spawning begins in the spring during inshore migration (Kendall 1973) where water temperatures are above 50° F (10° C), e.g., May to June in eastern Long Island (New York) bays and Raritan Bay (NY-NJ) (Breder 1922, Finkelstein 1969a). It continues to July along coastal Rhode Island (Werme *et al.* 1983) and extends to August when temperature were about 75° F (2° C; Herman 1963), with a peak in June (O'Brien *et al.* 1993). In southern Massachusetts, spawning fish are found in less than 33 ft (10 m) shoal areas until late June, then they move to deeper waters (MAFMC 1996a). Although scup were common in the spring, Eklund and Targett (1990) did not observe spring spawning over a hard bottom, reef habitat off Maryland-Virginia; the scup they observed appeared to be migrants as few remained summer residents in the study area. Spawning has been reported monthly in southern New England (including eastern Long Island Sound and Peconic and Garner's Bays) from Massachusetts Bay south and into the New York Bight (Goode 1884, Kuntz and Radcliffe 1918, Nichols and Breder 1926, Perlmutter 1939, Bigelow and Schroeder 1953, Wheatland 1956, Richards 1959, Finkelstein 1969a, Sisson 1974, Morse 1978, Clayton *et al.* 1978), including Raritan Bay (Breder 1922). Spawning was not reported south of New Jersey (Morse 1982) and near or in Chesapeake Bay (Hildebrand and Schroeder 1928, Pearson 1932). However, Berrien and Sibunka (in press) show that eggs are present in this area between 1978 and 1987, although not abundant or widespread. Able and Fahay (1998) note that there has been no reported evidence of spawning in a number of specific areas within the overall areas were eggs have been found, e.g., Block Island Sound, Great South Bay (New York), the Hudson River estuary, and Great Bay (New Jersey). Although Breder (1922) reported ripe scup in the Hudson-Raritan estuary (presumed to be spawning), more recent studies in the estuary usually do not list the collection of scup eggs or larvae, e.g., Croker (1965), Berg and Levinton (1985); Esser's (1982) note on scup spawning in the estuary is unreferenced and most likely is based on Breder (1922).

Ferraro (1980) suggests that scup spawn in the morning in Peconic Bay Long Island, which is atypical of most fish, which generally spawn in the evening or at night. Morse (1978) reported that spawning is usually over weedy or sandy areas. Fertilization is external with no parental care (Morse 1978). Scup may abstain from feeding during spawning (Baird 1873, Bigelow and Schroeder 1953, Morse 1978). Some years spawning is considered a failure, e.g., 1958 (Edwards *et al.* 1962), even though spawning stocks were still near peak abundance, based on landings (MAFMC 1996a); the relationship of this apparent failure to environmental or habitat variables are unknown. Spawning coincides with that of several other fish, such as weakfish *Cynoscion regalis*, tautog *Tautoga onitis* and northern sea robin (Morse 1978).

Scup produce transparent, buoyant eggs that are spherical and approximately 0.3-0.4 inches in diameter (Kuntz and Radcliffe 1918; Wheatland 1956). They require two to three days (40-75 hours) to hatch, depending on water temperature (Griswold and McKenney 1984). Finkelstein (1969) found that the ratio of ovary weight to body weight was highest during May for female scup collected in the Peconic Bays, New York. In addition, Howell and Simpson (1985) collected

36 female scup, 175 to 230 mm (9 inches) FL, during the spawning season and found an estimated mean fecundity of 7,000 eggs per female. The mean fecundity of scup 6.9-9.1 inches FL is about 7,000 (± 4,860 SD) eggs per female (Gray 1990).

Fertilized scup eggs hatch in 40 hours at a temperature of 72° C. Kuntz and Radcliffe (1918) described the embryonic and larval phase of scup and Griswold and McKenney (1984) completed a more complete morphological description of scup larvae. Larvae are pelagic until they are about 15 to 30 mm (0.1 in) in length, assuming the basic shape of adults at 40 to 60 mm (0.24 inches) in length (Morse 1978). Juvenile scup are 50 to 80 mm (3.15 inches) long during September, 60 to 100 mm (3.9 inches) long in November, and about 160 mm (6.3 inches) in length the following spring (Morse 1978).

3.1.2.3.2 Age and growth

Scup are characterized as slow-growing, relatively long-lived fish (Crecco *et al.* 1981). Scup length-age data have been reported by Smith and Norcross 1968), Finkelstein (1969), Hamer (1979), Pierce (1980), Crecco *et al.* (1981), and Howell and Simpson (1985). Although difficulty in ageing scup scales has been identified by several researchers (Smith and Norcross 1968, Sisson 1974, Hamer 1979), scup up to age 19 have been aged (Campbell *et al.* unpub. manuscript). These age-growth studies indicated that mean lengths for scup doubled between ages 1 and 3, with a steady decline in growth thereafter (Table 24). Total lengths at age 1 ranged from 2.9 to 5.6 inches, whereas the lengths at age 2, when some scup become sexually mature, ranged from 6.2 to 8.6 inches.

The von Bertalanffy growth equation was also developed from length-age data in each of these separate studies. This equation, which relates age to length, is:

$L_t = L_{inf} (1 - e^{-k(t-t0)})$

where L_t is mean length at age, L_{inf} is theoretical maximum length, K is the rate at which L_t approaches L_{inf}, $t_0$is the age at zero length, and t is the age of the fish (years). The L_{inf} (asymptotic size) estimates for the separate studies ranged from 14.4 to 18.8 TL inches and the K values from 0.22 to 0.34 (Table 25).

Most studies on age-length relationships for scup report lengths in fork length (FL). However, minimum size regulations in the states, as well as those proposed in this FMP, refer to total length (TL) measurements. Hamer (1979) developed a relationship between TL and FL (both lengths in centimeters) of scup based on a sample of 129 fish:

$$TL = 1.14 * FL - 0.44.$$

3.1.2.3.3 Length-weight relationship

Length-weight relationships have been developed for scup in several studies (Smith and Norcross 1968, Briggs 1968, Hamer 1979, Pierce 1980, Crecco *et al.* 1981, Howell and Simpson 1985). Wilk *et al.* (1978) developed the following length-weight relationship for 2,234 scup, 27 to 380 mm in length, collected in the New York Bight from June 1974 to June 1975:

$$\log W = 3.1693 (\log FL) - 5.0222$$

where W is weight (grams) and FL is fork length in mm. The length-weight exponent (b=3.1693) is similar to the value reported by the other researchers (Smith and Norcross 1968, Briggs 1968, Hamer 1970, Howell and Simpson 1985). Wilk *et al.* (1978) found no significant difference between length-weight relationships of male and female scup.

3.1.2.3.4 Mortality

The instantaneous natural mortality rate (M) is defined as annual losses experienced by scup from all natural and anthropogenic factors except commercial and recreational fishing. Crecco *et al.* (1981) used the von Bertalanffy parameters in Campbell *et al.* (unpub. manuscript) to derive an estimate of M for scup of 0.2. Using a maximum age of 20 years, Howell and Simpson (1985) derived an identical value (0.2) using Hoenig's (1982) equation which relates natural mortality to longevity. SAW-31 assumed a natural mortality rate of 0.2 (NEFSC 2000).

Studies conducted by the NEFSC and personnel from the state of Connecticut indicate that the level of instantaneous fishing mortality (F) has risen significantly over the last two decades. Mayo (1982) used catch at age data from the Southern New England scup fishery to determine that the level of F from 1974 to 1980 was approximately 0.3. Based on length frequencies of commercial and experimental trawl samples collected from 1981 to 1983, Howell and Simpson (1985) estimated that F was approximately 0.38.

Howell (1990) used annual age and length frequencies for scup collected in Connecticut and Massachusetts surveys to derive estimates of mortality using both catch curve and length-based (Parrish and Macall 1978) methods. Estimates of fishing mortality from the two surveys indicated that F had increased from a level of 0.4 in the late 1970s to over 1.0 in the mid to late 1980s. Estimates based on Connecticut survey data indicated that F was 1.11 based on 1986-1988 data.

Additional analyses conducted with Connecticut trawl survey data (1984-1991) indicate that total mortality has fluctuated between 1984 and 1991. Age based mortality estimates based on cohorts and pooled cohorts indicated that total mortality rates (Z) were approximately 1.4 in 1991. Based on this analysis, the Commission Scup technical committee concluded that current fishing mortality rates were 1.2 or higher.

SARC 31 concluded that although an estimate of the fully-recruited F is not available, catch curve analyses of survey indices indicate that F for ages 0-3 exceeds 1.0 and is considerably above the fishing mortality rate threshold (F_{max}=0.26) for the 1994-1998 year classes. The stock has a highly truncated age structure which likely reflects prolonged high fishing mortality.

3.1.2.3.5 Feeding and predation

According to Section 600.815 (a)(8), actions that reduce the availability of a major prey species, either through direct harm or capture, or through adverse impacts to the prey species' habitat that are known to cause a reduction in the population of the prey species may be considered adverse effects on a managed species and its EFH. The following sections are taken directly from the scup EFH source document.

3.1.2.3.5.1 Feeding

Although specific data is unknown, larvae probably feed naturally upon small zooplankters as suggested in larval rearing experiments (Griswold and McKenney 1984).

Juvenile scup in Long Island Sound feed during the daytime, and principally on polychaete worms (e.g., maldanids, nephthids, nereids, and flabelligerids), epibenthic amphipods, other small crustacea, small molluscs, and fish eggs and larvae, with copepods and mysids being especially important to post-larvae and early juveniles, while bivalve molluscs were more commonly eaten by larger fish (Richards 1963b; Bowman *et al.* 1987, Michelman 1988). Allen *et al.* (1978) reported amphipods, polychaetes, copepods and other small crustaceans were eaten by a small sample of juvenile scup in southern New Jersey; this finding is generally consistent with NEFSC data. Michelman (1988) reported that scup only eat when in a school and the relative importance of major prey taxa varied seasonally. Baird (1873) reported prey were "rooted out of the sand or mud". Juvenile and adult scup in lower Delaware Bay, near an artificial reef, ate amphipods (caprellids and others), razor clams, hydroids, blue mussels, anemones, mysids, i.e., a mix of hard-surface epifauna and sand bottom infaunal prey (F. Steimle unpub. data), while a collection of 3.5-4.7 inches (9-12 cm) FL scup examined seasonally from Raritan Bay ate a diversity of benthic infaunal and epifaunal invertebrates whose composition in the diets varied among areas within the Bay (F. Steimle unpub. data). Michelman (1988) estimated the daily food ration of juvenile scup to be about 3.49% to 3.99% of dry body weight - depending on method used, or about 5% of their body weight per day.

Adult scup continue to be benthic feeders and eat a wide variety of food, including small crustacea (including zooplankton), polychaete worms, molluscs, small squid, vegetable detritus, insect larvae, hydroids, sand dollars and small fish (Goode 1884, Nichols and Breder 1927, Hildebrand and Schroeder 1928, Bigelow and Schroeder 1953, Oviatt and Nixon 1973, Maurer and Bowman 1975, Morse 1978, Sedberry 1983). Bowman *et al.* (1976) reported differences in the diets of scup collected in southern New England and the Middle Atlantic Bight; polychaetes were more important in southern New England waters and anthozoans more important in the Middle Atlantic Bight. During fall migration off New Jersey, Sedberry (1983) reported that scup fed mainly on amphipods and polychaetes, but also ate decapod crustacea, copepods, snails, and other small invertebrates. There has been a significant decline in the average size of scup since the 1930s and small scup have slightly different habitat and prey requirements than larger scup (Smith and Norcross 1968). Adults also prey upon small benthic invertebrates, although feeding and growth appears to be reduced during the winter. Larger fish were found to eat larger prey.

At times and in certain areas, scup diets overlapped that of red hake *Urophycis chuss*, and, depending on scup length, with silver hake *Merluccius bilinearis* and gulf stream flounder *Citharichthys arctifrons*. Langton (1982) also reported the diets of scup overlap those of several other demersal species. He reported that there is little prey use overlap with cod *Gadus morhua* or silver hake off New England, although they have similar benthic diets. Jeffries and Terceiro (1985) hypothesized that one possible reason for an expanding scup population that seemed to be replacing winter flounder in Narragansett Bay was that both species have similar diets, and a low abundance of winter flounder made more benthic food available for benthic-feeding species such as scup. They also suggested that, since scup and winter flounder, *Pleuronectes americanus*, have similar diets, there can be competition for prey. This diet congruence of similarly sized fish was also found in a recent (1996-1997) fish trophodynamics study in Raritan Bay, New Jersey (F. Steimle, unpub. data).

During the inshore residency, there is a gradual accumulation of stored food by scup from the spring into the fall, evident as higher mean caloric content of whole scup per unit total body weight (Steimle and Terranova 1985). This stored energy can support the extra energy demands of migration, possible reduced winter feeding, and gonadal development. Feeding is thought to be minimal during the winter because there is so little growth (Bigelow and Schroeder 1953).

3.1.2.3.5.2 Predation

Larvae are probably preyed upon by any variety of planktivores that might be present, including medusae, crustaceans and fish. Small or juvenile scup are heavily preyed upon by bluefish *Pomatomus saltatrix*, halibut *Hippoglossus hippoglossus*, cod, sharks, striped bass *Morone saxatilus*, weakfish, goosefish *Lophius americanus*, silver hake and other coastal fish predators (Baird 1873, Smith 1898, Jensen and Fritz 1960, Schaefer 1970, Morse 1978, Sedberry 1983). Baird (1873) reported large numbers of small scup were eaten by cod in late November on Nantucket Shoals. The NEFSC food habits database lists the following species as being documented predators of scup: dusky shark *Carcharhinus obscurus*, sandbar shark *C. plumbeus*, smooth dogfish, spiny dogfish *Squalus acanthias*, Atlantic sharpnose shark *Rhizoprionodon terranovae*, Atlantic angel shark *Squatina dumeril*, Atlantic torpedo ray *Torpedo nobiliana*, bluntnose stingray *Dasyatis say*, silver hake, bluefish, summer flounder, black sea bass, weakfish, northern stargazer *Astroscopus guttatus*, goosefish, inshore lizardfish *Synodus foetens*, and king mackerel *Scomberomorus cavalla*. Other predators are possible, as well, including fish-eating birds in shallow waters.

Another potential source of habitat-related mortality or impairment is some diseases. Scup was listed as a species found with fin rot in the polluted inner New York Bight and Hudson-Raritan Estuary (Mahoney *et al.* 1975). Disease can be initiated by direct epidermal exposure or through feeding on contaminated prey. Benthic invertebrate prey commonly eaten in the New York Bight have been found contaminated with several toxic heavy metals (Steimle *et al.* 1994).

3.1.2.3.6 Parasites, diseases, injuries and abnormalities

Yamaguti (1963) found the parasitic Branchiuran *Argulus intectus* on scup and *Vibriosis* infection was found on scup held in tanks for tagging experiments (Sisson 1974). Stunkard (1980) identified scup as a host for the digenetic trematode *Neopechona cablei*. Scup collected from the Beaufort-Cape Hatteras area were found to be parasitized by three species of monogenetic trematodes (Suydam 1971).

3.1.2.4 Overfishing definition

The Amendment 12 overfishing definition for scup is when the fishing mortality rate exceeds the threshold fishing mortality rate of F_{msy}. Since F_{msy} cannot be reliably estimated, F_{max} is used as a proxy for F_{msy}. When an estimate of F_{msy} is available, it will replace the proxy. F_{max} is 0.26 under current stock conditions. The maximum value of the spring survey index based on a three year moving average (2.77 kg/tow), is a proxy for the biomass threshold. B_{msy} cannot be reliably estimated for scup (MAFMC 1998).

3.1.2.5 Probable future condition

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

SARC 31 indicates that scup was last assessed at SAW 27 in 1998. Reliable estimates of commercial fishery discards are not available due to limited sample size and uncertainty as to their representative nature of the sea sampling data for scup. VPA and production models were not undertaken. Stock status was estimated from survey abundance indices. Standardized indices of abundance from the NEFSC autumn survey and the MRFSS (recreational) catch per tow show similar patterns over time (1981-1999). Total mortality rates were estimated from survey based calculations using both annual and cohort catch curves. Fishing mortality rates were then estimated by subtracting the assumed natural mortality rate of 0.2.

Catch curve analyses of survey indices indicate that F for ages 0-3 greatly exceeded the fishing mortality rate threshold (F_{max}=0.26) during 1984 – 1998. F could not be estimated on older animals because they are currently absent from the NMFS spring and autumn surveys. A relative exploitation index (landings/relative biomass) indicates that exploitation reached a time series (1981-1999) high in 1995 and has declined each subsequent year.

Age 0 indices from the NEFSC, MADMF, Rhode Island Department of Fish and Wildlife (RIDFW), and CTDEP autumn trawl surveys indicate a moderate to strong 1999 year-class. Commercial catches indicate that the 1997 year-class was exceptionally strong in 1999. The 1996 index of age 0 abundance from the NEFSC autumn survey (inshore and offshore strata) was the lowest of the 1984-1999 series. The 1996 index of age 1 abundance from the NEFSC spring survey (inshore and offshore strata) was the second lowest in the 1984-1997 series.

Indices of stock biomass and abundance for 1999 were slightly higher than the time series lows seen in 1995-1996 in the NEFSC, MADMF, CTDEP, RIDFW, and New Jersey Bureau of Marine Fisheries (NJBMF) research survey time series.

SARC 31 concluded that "the current index of spawning stock biomass is low (1998-2000 average=0.10 SSB kg/tow) and less than 5% of the biomass threshold (2.77 SSB kg/tow)." Deterministic projections of the NEFSC spring survey SSB show that starting with year 2000 survey index values the biomass threshold is achieved in 6 years at F=0.24 and in 10 years at F=0.34 (M=0.20). Starting with 1993-2000 geometric mean survey index values the biomass threshold is achieved in 10 years with an F of 0.02 or less. "The time to achieve the biomass threshold will decrease with good recruitment, especially if coupled with reduced fishing mortality due to discarding."

3.1.3 Black Sea Bass

3.1.3.1 Range

The following information on black sea bass range is taken directly from the document "FMP-EFH Source Document, Black Sea Bass: Life History and Habitat Requirements" (Steimle *et al.* 1999b). This document is referred to hereafter as the black sea bass EFH background document.

Black sea bass are basically warm-temperate in distribution, and usually strongly associated with structured, sheltering continental shelf and coastal habitats, such as reefs and wrecks. Black sea bass have been collected or reported from southern Nova Scotia and Bay of Fundy (Scott and Scott 1988) to southern Florida (Bowen and Avise 1990) and into the Gulf of Mexico. The management unit is black sea bass in the western Atlantic Ocean from the US-Canadian border southward to Cape Hatteras, North Carolina. South of there, black sea bass are managed by the South Atlantic Fishery Management Council. Beebe and Tee-Van (1933) also reported that they were once introduced to Bermuda; but the status of that introduction is unknown. Brown *et al.* (1996) reported that the summer migrant fish assemblage, that black sea bass is associated with, has also been reported from scattered sites on the Grand Banks of Canada; however, it is rarely found in the cool waters north of Cape Cod and into the Gulf of Maine (Scattergoode 1952, DeWitt *et al.* 1981, Short 1992). Over this wide distribution, the species is considered as three populations or stocks (northern, southern, Gulf of Mexico), with the northern stock, occurring north of Cape Hatteras, being the focus of this summary review. The life history and habitat uses of the southern and Gulf of Mexico populations, occurring south of Cape Hatteras, are covered in the Southeast Fishery Management Council's Snapper/Grouper FMP.

Beginning with the eggs and larvae of this species, they are generally collected on midshelf to coastal waters in the late spring to late summer (see below for details). Larvae are believed to settle in coastal waters and then as early juveniles move into estuarine or sheltered coastal nursery areas. Boehlert and Mundy (1988) suggest that this may be a two-step process of nearshore accumulation and estuarine passage. During the warmer months, juveniles are found in estuaries and coastal areas, and adults are found in slightly deeper coastal areas, between North Carolina and Massachusetts, often near some kind of shelter. Adults summer in coastal areas, usually containing some structured habitat, along the Middle Atlantic Bight and into the Gulf of Maine. As coastal waters cool in the fall, the population gradually migrates south and offshore to winter on the slightly warmer outer continental shelf off and south of New Jersey. Temperature appears to be the limiting factor in black sea bass distribution, not the availability of structured habitat, north of Cape Cod. In Middle Atlantic Bight waters they are usually the most common fish found on these structured habitats, especially south of New Jersey where the abundance of cunner, *Tautogolabrus adspersus,* declines. These structured habitats have been reported to include shellfish (oyster and mussel) beds, rocky areas, shipwrecks and artificial reefs (Verrill 1873, Bigelow and Schroeder 1953, Musick and Mercer 1977, Steimle and Figley 1996).

One major distinguishing characteristic of the Middle Atlantic Bight population is that it migrates south and offshore to winter in deeper waters between central New Jersey and North Carolina, generally, as bottom water temperatures decline below about 57° F (14° C) in the fall. This population then migrates inshore to reside in southern New England and Middle Atlantic Bight coastal areas and bays as bottom waters warm again above about 45° F (7° C) in the spring (see juvenile and adult distribution discussions below for details). The southern population is not known to make this extensive migration but may move away from shallow coastal areas during periods of cold winter conditions, especially in the Carolinas. Larger fish are commonly found in deeper waters and usually associated with rough bottom (Smith 1907, Hildebrand and Schroeder 1928, Bigelow and Schroeder 1953). Black sea bass have been reported to attain lengths of over 24 inches (60 cm) and weights of 7.7 pounds (3.5 kg) or greater in the Middle Atlantic Bight (Bigelow and Schroeder 1953) and live to up to 20 years; these largest and oldest fish being almost always males.

As previously mentioned, one of the characteristics of this population of black sea bass is its seasonal migrations. The summer coastal population migrates in scattered aggregates in the fall (Musick and Mercer 1977) by generally unknown routes across the continental shelf from the inshore areas to the outer continental shelf wintering areas south of New Jersey as bottom temperatures decline. The locations of a time series of tag returns from adult fish tagged in Nantucket Sound, Massachusetts suggests that this local group of fish migrates directly south to the outer shelf near Block Canyon and moves southwest along this outer shelf zone to the vicinity of Norfolk Canyon, and returned by the same route (Kolek 1990). Offshore migrations are stimulated in the fall as coastal bottom water temperatures approach 45° F (7° C) and the return inshore migration begins in the spring (about April) as inshore bottom water temperatures rise above this 45° F (7° C) level (Nesbit and Neville 1935, June and Reintjes 1957, Colvocoresses and Musick 1984, Chang 1990, Shepherd and Terceiro 1994). Larger fish (again with a high proportion of males) begin migrating offshore sooner than smaller fish (Kendall 1977).

Black sea bass appear to be part of a migratory group of warm temperate species that are intolerant of colder inshore winter conditions. These migrant associate species can include scup, summer flounder, northern sea robin, spotted hake, butterfish and smooth dogfish (Musick and Mercer 1977, Colvocoresses and Musick 1984). The composition of the seasonally migrating group that typically contains black sea bass is reported to vary inshore between spring-summer and fall (Phoel 1985). Any interactions among these species and their shared use of the habitat they transit are unknown, although juvenile-subadult black sea bass could be preyed upon by larger summer flounder and dogfish (see above). All other species, except butterfish, would be competitors for food an0d perhaps shelter, even if it were only a depression in the sediment or a exposed clam shell.

3.1.3.2 Abundance and present condition

The most recent assessment on black sea bass, completed in June 1998, indicates that black sea bass are over-exploited and at a low biomass level (SAW 27). Fishing mortality for 1997, based on length based methods, was 0.73. The complete assessment is detailed in the "Report of the 27th Northeast Regional Stock Assessment Workshop" (NEFSC 1998b).

The NEFSC has provided spring survey results for 2000. Amendment 12 to the Summer Flounder, Scup and Black Sea Bass FMP, which was partially approved by NMFS in 1999, established a biomass threshold based on this survey. Specifically, the biomass threshold is defined as the maximum value of a three-year moving average of the NEFSC spring survey catch-per-tow (1977-1979 average of 0.9 kg/tow).

Survey results indicate black sea bass biomass has increased in recent years; the 1999 value was the highest value in the series since 1979. However, the 1999 index is large because of a single tow that caught a large number of black sea bass in an area slightly north of Cape Hatteras. If that tow is removed from the estimate, the index drops from 0.433 to 0.093 for 1999.

Because of the potential influence of extremely small or large number for a single tow, Gary Shepherd (pers. comm.) has suggested that the survey indices be log transformed to give a better indication of stock status. The transformed series indicates a general increase in the exploitable biomass since 1993. The preliminary index for 2000 of 0.322 is the highest in the time series since 1976 and would substantiate fishermen's observations that black sea bass have become more abundant in recent years. The three-year moving average for 1998-2000 of 0.2011 is a 42% increase relative to the 1997-1999 average.

The spring survey can also be used as an index of recruitment. The survey indicates good year classes were produced from 1988 to 1992 (0.2 to 0.76 fish per tow), with a moderate year class in 1995, and poor year classes in 1993, 1994, 1996 and 1997. The 1999 index was about three times the average for the period 1968-1998 and the fourth largest value since 1968. Preliminary results for 2000 indicate a strong year class; the index is 1.135, the highest in the time series.

Relative exploitation based on the total commercial and recreational landings and the moving average of the transformed spring survey index indicates a significant reduction in mortality in 1998 and 1999 relative to 1996 and 1997 levels. Based on length frequencies from the spring survey, and assuming length of full recruitment at 25 cm, the average F based on two length based methods was 0.75 (48% exploitation rate) in 1998 (Shepherd pers. comm.). Length based estimates are very sensitive to changes in the length used for full recruitment; average F's were 0.51 (37% exploitation) or 1.25 (66% exploitation) if a length of 23 or 27 cm was used in the calculations. Based on the relative index, exploitation rates in 1999 were nearly identical to those estimated for 1998.

3.1.3.3 Stock characteristics and ecological relationships

3.1.3.3.1 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 7.7 inches TL (NEFSC 1993).

The following discussion is taken from the black sea bass EFH source document. Like most of the Serranidae family, 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 (Lavenda 1949). 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 26). In the Middle Atlantic Bight, individuals begin to become sexually mature at age 1 yr (8-17 cm TL), but it is not until they grow to about 19 cm SL (age 2-3 yrs) that about 50% of that size group are mature (O'Brien *et al.* 1993). A majority of this size-maturity threshold group are females (Mercer 1978). The average size at which sexual transformation from females to male occurs was reported to be between 10-13 inches (23.9-33.7 cm; Chesapeake Bay Program 1996). In the South Atlantic Bight, Cupka *et al.* (1973) reported that both sexes matured at smaller sizes, between 14 and 18 cm SL, in South Carolina waters. However, Wenner *et al.* (1986) and Alexander (1981) found mature fish at smaller sizes, i.e., about 4.0-4.4 inches (10-11 cm; age 1+) for South Carolina and New York populations, respectively, and a majority were mature at about 19 cm, again corresponding to an age of about 2-3 years, as was found for the Middle Atlantic population. Alexander (1981) reported a decrease in the age and size of sex change since the 1940s with fewer mature males in the population; he associated this decrease with increasing fishing pressure.

Based on collections of ripe fish and egg distributions, the species spawns primarily on the inner continental shelf between Chesapeake Bay and Montauk Pt., Long Island at depths of about 66-165 ft (20-50 m; Breder 1932, Kendall 1972, 1977, Musick and Mercer 1977, Wilk *et al.* 1990, Eklund and Targett 1990, Berrien and Sibunka in press), but eggs frequently occurred or spawning have been reported as far north as Buzzards Bay and Nantucket Sound, Massachusetts (Wilson 1889, Sherwood and Edwards 1902, Kolek 1990). Mercer (1978) reported that 2-5 yr old fish release between 191,000 and 369,500 eggs each. Some larvae have been collected in Cape Cod Bay but these were considered stragglers washed there through the Cape Cod Canal from Buzzards Bay and not the product of local spawning (MAFMC 1996b). Gravid females are not generally found in estuaries (Allen *et al.* 1978). Spawning in the Middle Atlantic population is generally reported in the late spring through mid-summer, May to July (Kendall 1972, 1977, Musick and Mercer 1977, Feigenbaum *et al.* 1989, Wilk *et al.* 1990, Eklund and Targett 1990) during inshore migrations, but can extend to October-November (Fahay 1983, Berrien and Sibunka in press). Larval distributions presented in Able *et al.* (1995a) suggest spawning is earliest off Virginia-North Carolina (in the vicinity of the wintering grounds) and progresses northerly and inshore as inner shelf waters warm.

Shepherd and Idoine (1993) noted that the complex social hierarchy of reef fishes during spawning, such as the temperate black sea bass, implies that the number of males may be an important factor limiting reproductive potential. They also noted, however, that theoretical studies suggested that the current relative abundance of males may not yet be limiting in the black sea bass population to the degree that non-dominant males participate in spawning. There are no known reported observations of the actual spawning activity and whether it is near the bottom or water surface. However, in Massachusetts coastal waters, spawning fish have been reported to aggregate on sand bottoms broken by ledges, and after spawning the fish disperse to ledges and rocks in deeper water (Kolek 1990, MAFMC 1996b). From tagging studies, Kolek (1990) reported evidence of spawning ground homing, as some tagged adult black sea bass returned annually to the same spawning grounds in northwestern Nantucket Sound. Kolek (1990) also reported this local spawning group spawned earlier and in shallower waters than generally reported (Kendall 1977). Although nothing is known of the mating of this species, distinct pairing is characteristic of the family (Breder and Rosen 1966).

Black sea bass produce colorless, buoyant eggs that are spherical and approximately 0.04 inches 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.

3.1.3.3.2 Age and growth

Growth in mature black sea bass is sexually dimorphic, with faster growth but resulting in a lower maximum size in females (Lavenda 1949, Mercer 1978, Wilk *et al.* 1978). However, Shepherd and Idoine (1993) suggest that the species can have three possible sex-related growth rates: female, male, and transitional. Alexander (1981) found the males grew faster than females off New York based on otolith annuli analysis for year-1 or older fish. Dery and Mayo (1988), Kolek (1990) and Caruso (1995) reported that black sea bass from southern New England (Massachusetts) had growth rates almost double those reported for New York and Virginia, but different growth estimators were used; this observation is consistent with Mercer (1978) and Wenner *et al.* (1986) who noted that Middle Atlantic Bight fish at age were larger and grew faster than South Atlantic Bight fish. The long-term validity and habitat relationship of this observation is unknown at present. Growth is linear to about age 6, then slows; the Middle Atlantic population is larger at age than the South Atlantic population (Wenner *et al.* 1986).

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 27). 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 (TL), 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 (Shepherd pers. comm.):

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

where length is measured in millimeters.

3.1.3.3.3 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.

3.1.3.3.4 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).

The SAW-25 SARC concluded that there was inadequate information to pursue an age-based assessment at least for several years. Therefore, SAW-27 estimated fishing mortality during 1984-1997 was estimated using length-based methods. The Beverton and Holt (1956 in SAW-27) and Hoenig (1987 in SAW-27) method were both applied to length frequencies of the combined commercial and recreational landings and of the spring NEFSC survey. An L_∞=66.3 , K=0.168, and length at recruitment of 9.4 inches (24 cm) were used in the estimations. Average annual fishing mortality, estimated from length-based analyses, ranged from 0.56 to 0.79 during 1984-1997 and was 0.73 (48 percent exploitation) in 1997.

3.1.3.3.5 Feeding and predation

According to Section 600.815 (a)(8), actions that reduce the availability of a major prey species, either through direct harm or capture, or through adverse impacts to the prey species' habitat that are known to cause a reduction in the population of the prey species may be considered adverse effects on a managed species and its EFH. The following sections on feeding and predation were taken from the black sea bass EFH source document.

3.1.3.3.5.1 Feeding

The diets of black sea bass larvae are poorly known and can be expected to be mostly zooplankton. Tucker (1989) reported that black sea bass larvae are capable of surviving and growing at lower prey densities and resist prey abundance fluctuations better then bay anchovy, *Anchoa mitchilli*, larvae.

Juvenile black sea bass are reported to be diurnal, visual predators and prey often on small benthic crustacea (isopods, amphipods, small crabs, sand shrimp, copepods) and other epi- or semi-benthic, estuarine-coastal taxa, such as mysids or smaller fish (Richards 1963a, Kimmel 1973, Allen *et al.* 1978, Werme 1981). Kimmel (1973) included polychaete worms as significant dietary items and reported a diet shift with juvenile growth, from mysids (55%) and amphipods (15%) at 1.2-3.5 inches (3.0-9.0 cm) SL to xanthid and other crabs (35%), mysids (19%) and polychaetes (14%) for 3.5-5.7 inches (9.1-14.6) cm SL sub-adults. Orth and Heck (1980) reported sub-adults (5.5-6.4 inches [14.0-16.5 cm] TL) using and feeding within eelgrass beds in lower Chesapeake Bay; prey were juvenile blue crabs, eelgrass fragments, isopods, caprellid amphipods, shrimp and pipefish, *Syngnathus* sp. Festa (1979) also reported various crabs (lady, blue and mud) and caridean shrimp as major diet items in a small sampling from a central New Jersey estuary. Allen *et al.* (1978) reported small bait fish (anchovies and silversides, *Anchoa* sp. and *Menidia* sp.) became most evident in the diets of southern New Jersey coastal-estuarine black sea bass between 4.3 inches and about 7.0 inches (11 cm and about 18 cm) lengths; but so did an increase in the occurrence of plant detritus, though crustacea were still the most common prey.

While on their summer habitat, adult black sea bass continue to feed on a variety of infaunal and epibenthic invertebrates (especially crustacea, including juvenile lobster) and small fish, and on pelagic squid and baitfish (Bigelow and Schroeder 1953, Miller 1959, Richards 1963a, Mack and Bowman 1983, Steimle and Figley 1996). Feeding was reported heaviest after spawning (Hoff 1970). The diets and feeding while the population is wintering offshore is poorly known. The potential benthic invertebrate macrofaunal prey in the wintering area is known to be variable and can be dominated by echinoderms (sand dollars and sea stars), molluscs such as razor clams, and polychaetes (Wigley and Theroux 1981, Steimle 1990). Some co-wintering guild species, e.g., scup (Austen *et al.* 1994), can be competitors for habitat or food. Other guild species, such as butterfish and squid, can be prey for adult black sea bass.

3.1.3.3.5.2 Predation

There are a multitude of potential larval black sea bass predators, and "jellyfish" can be a significant source of larval mortality when they are abundant in the coastal zone (Arai 1988).

Hartman and Brandt (1995) included black sea bass, presumably juvenile, in the summer diets of one year old weakfish, *Cynoscion regalis*, and other predators in Chesapeake Bay. Summer flounder, smooth dogfish and toadfish are potential demersal predators of juvenile black sea bass, and exposed juveniles can also be prey to piscivorous bluefish, *Pomatomus saltatrix*, striped bass, *Morone saxatilus,* weakfish and other predators that use the entire water column, including fish-eating diving birds. Steimle (unpub. data) found juvenile black sea bass in the stomachs of the following predators examined in Raritan Bay during the summer 1997: clearnose skate (*Raja eglanteria*), northern and striped sea robin (*Prionotus evolans*), summer flounder, spot, and possibly others (e.g., weakfish, bluefish, toadfish, smooth dogfish, and four-spot flounder, *Paralichthys oblongus*) whose stomachs contained small unidentified, partially digested fish, similar in size and shape to juvenile black sea bass.

The NEFSC food habits database lists the following as predators of black sea bass: spiny dogfish, *Squalus acanthias*; Atlantic angel shark, *Squatina dumeril*; clearnose skate; little skate, *Raja erinacea*; spotted hake; summer flounder; windowpane, and goosefish, *Lophius americanus*. This predation undoubtedly includes many sizes of black sea bass, but smaller fish are probably most vulnerable.

3.1.3.3.6 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.

3.1.3.4 Overfishing definition

The Amendment 12 overfishing definition for black sea bass is when the fishing mortality rate exceeds the threshold fishing mortality rate of $F_{msy.}$ Since F_{msy} cannot be reliably estimated, F_{max} is used as a proxy for F_{msy}. When an estimate of F_{msy} is available, it will replace the proxy. F_{max} is 0.32 under current stock conditions. The maximum value of the spring survey index based on a three year moving average (0.9 kg/tow), is a proxy for the biomass threshold. B_{msy} cannot be reliably estimated for black sea bass (MAFMC 1998).

3.1.3.5 Probable future condition

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

In addition, the advisory report on black sea bass from SAW-27 states that "recent catches are well below the historical average, age and size structure is truncated, and survey biomass indices since the late 1980s have been one-tenth of those observed in the late 1970s. Average annual fishing mortality, estimated from length-based analyses, ranged from 0.56 to 0.79 during 1984-1997 and was 0.73 (48 percent exploitation) in 1997. Recruitment in 1997, as indicated by survey indices, was well below the 1972-1996 average." The SARC-27 advisory report concluded that "in the absence of age-based estimate of current stock size (e.g., from virtual population analysis), a forecast of future stock was not possible. However, the existing fishing mortality rate reduction schedule, if effective, should result in increased survival for recruits leading to increases in stock biomass, if recruitment does not decrease." Additional, detailed information is available in the SAW-27 documents.

3.2 DESCRIPTION OF HABITAT (EIS)*

According to Section 600.815 (a)(2)(i)(A) an initial inventory of available environmental and fisheries data sources relevant to the managed species should be used in describing and identifying essential fish habitat (EFH). This inventory on the physical and biological characteristics of the environment in the Mid-Atlantic Subregion is found in section "2.2.1 Inventory of Environmental Fisheries Data" of Amendment 12 to the Summer Flounder Scup and Black Sea Bass FMP on page 12. An additional inventory of the physical and biological characteristics of specific habitats found within the jurisdiction of the Northeast Region can be found in "The Effects of Fishing on Marine Habitats of the Northeastern United States" (NMFS 2001; Appendix C).

3.2.1 Summer Flounder

3.2.1.1 Habitat requirements by life history stage

In Section 600.815 (a)(2)(i)(B) in order to identify EFH, basic information is needed on current and historic stock size, the geographic range of the managed species, the habitat requirements by life history stage, and the distribution and characteristics of those habitats. The habitat requirements by life history stage for summer flounder are found in section 2.2.1.1.3 of Amendment 12 on page 16. No changes have been made to this section.

3.2.1.2 Importance of summer flounder in state waters

The importance of summer flounder in state waters is found in section 2.2.1.4.1 on page 48 of Amendment 12. No changes have been made to this section.

3.2.2 Scup

3.2.2.1 Habitat requirements by life history stage

The habitat requirements by life history stage for scup are found in section 2.2.1.2.3 of Amendment 12 on page 30. No changes have been made to this section.

3.2.2.2 Importance of scup in state waters

The importance of scup in state waters is found in section 2.2.1.4.2 on page 52 of Amendment 12. No changes have been made to this section.

3.2.3 Black Sea Bass

3.2.3.1 Habitat requirements by life history stage

The habitat requirements by life history stage for black sea bass are found in section 2.2.1.3.3 of Amendment 12 on page 38. No changes have been made to this section.

3.2.3.2 Importance of black sea bass in state waters

The importance of black sea bass in state waters is found in section 2.2.1.4.3 of Amendment 12 on page 54. No changes have been made to this section.

3.2.4 Description and Identification of Essential Fish Habitat

Although no changes have been made to this section it is reproduced here for the ease of the reader.

Summer flounder

Eggs: 1) North of Cape Hatteras, EFH is the pelagic waters found over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of the all the ranked ten-minute squares for the area where summer flounder eggs are collected in the MARMAP survey (Figure 2a). 2) South of Cape Hatteras, EFH is the waters over the Continental Shelf (from the coast out to the limits of the EEZ), from Cape Hatteras, North Carolina to Cape Canaveral, Florida, to depths of 360 ft. 3) Inshore, EFH is all the estuaries where summer flounder were identified as being present (rare, common, abundant, or highly abundant) in the Estuarine Living Marine Resources (ELMR) database (Table 28), in the "mixing" (defined in ELMR as 0.5 to 25.0 ppt) and "seawater" (defined in ELMR as greater than 25 ppt) salinity zones (Figure 3a). In general, summer flounder eggs are found between October and May, being most abundant between Cape Cod and Cape Hatteras, with the heaviest concentrations within 9 miles of shore off New Jersey and New York. Eggs are most commonly collected at depths of 30 to 360 ft.

Larvae: 1) North of Cape Hatteras, EFH is the pelagic waters found over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares for the area where summer flounder larvae are collected in the MARMAP survey (Figure 2b). 2) South of Cape Hatteras, EFH is the nearshore waters of the Continental Shelf (from the coast out to the limits of the EEZ), from Cape Hatteras, North Carolina to Cape Canaveral Florida, in nearshore waters (out to 50 miles from shore). 3) Inshore, EFH is all the estuaries where summer flounder were identified as being present (rare, common, abundant, or highly abundant) in the Estuarine Living Marine Resources (ELMR) database (Table 28), in the "mixing" (defined in ELMR as 0.5 to 25.0 ppt) and "seawater" (defined in ELMR as greater than 25 ppt) salinity zones (Figure 3b). In general, summer flounder larvae are most abundant nearshore (12-50 miles from shore) at depths between 30 to 230 ft. They are most frequently found in the northern part of the Mid-Atlantic Bight from September to February, and in the southern part from November to May.

Juveniles: 1) North of Cape Hatteras, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares for the area where juvenile summer flounder are collected in the NEFSC trawl survey (Figure 2c). 2) South of Cape Hatteras, EFH is the waters over the Continental Shelf (from the coast out to the limits of the EEZ) to depths of 500 ft, from Cape Hatteras, North Carolina to Cape Canaveral, Florida. 3) Inshore, EFH is all of the estuaries where summer flounder were identified as being present (rare, common, abundant, or highly abundant) in the ELMR database (Table 28) for the "mixing" and "seawater" salinity zones (Figure 3c). In general, juveniles use several estuarine habitats as nursery areas, including salt marsh creeks, seagrass beds, mudflats, and open bay areas in water temperatures greater than 37° F and salinities from 10 to 30 ppt range.

Adults: 1) North of Cape Hatteras, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares for the area where adult summer flounder are collected in the NEFSC trawl survey (Figure 2d). 2) South of Cape Hatteras, EFH is the waters over the Continental Shelf (from the coast out to the limits of the EEZ) to depths of 500 ft, from Cape Hatteras, North Carolina to Cape Canaveral, Florida. 3) Inshore, EFH is the estuaries where summer flounder were identified as being common, abundant, or highly abundant in the ELMR database (Table 28) for the "mixing" and "seawater" salinity zones (Figure 3d). Generally summer flounder inhabit shallow coastal and estuarine waters during warmer months and move offshore on the outer Continental Shelf at depths of 500 ft in colder months.

Scup

Eggs: EFH is estuaries where scup eggs were identified as common, abundant, or highly abundant in the ELMR database (Table 29) for the "mixing" and "seawater" salinity zones (Figure 4a). In general scup eggs are found from May through August in southern New England to coastal Virginia, in waters between 55° and 73° F and in salinities greater than 15 ppt.

Larvae: EFH is estuaries where scup were identified as common, abundant, or highly abundant in the ELMR database (Table 29) for the "mixing" and "seawater" salinity zones (Figure 4b). In general scup larvae are most abundant nearshore from May through September, in waters between 55° and 73° F and in salinities greater than 15 ppt.

Juveniles: 1) Offshore, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares of the area where juvenile scup are collected in the NEFSC trawl survey (Figure 5a). 2) Inshore, EFH is the estuaries where scup are identified as being common, abundant, or highly abundant in the ELMR database (Table 29) for the "mixing" and "seawater" salinity zones (Figure 4c). Juvenile scup, in general during the summer and spring are found in estuaries and bays between Virginia and Massachusetts, in association with various sands, mud, mussel and eelgrass bed type substrates and in water temperatures greater than 45° F and salinities greater than 15 ppt.

Adults: 1) Offshore, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares of the area where adult scup are collected in the NEFSC trawl survey (Figure 5b). 2) Inshore, EFH is the estuaries where scup were identified as being common, abundant, or highly abundant in the ELMR database (Tables 29) for the "mixing" and "seawater" salinity zones (Figure 4d). Generally, wintering adults (November through April) are usually offshore, south of New York to North Carolina, in waters above 45° F.

Black sea bass

Eggs: EFH is the estuaries where black sea bass eggs were identified in the ELMR database as common, abundant, or highly abundant (Table 30) for the "mixing" and "seawater" salinity zones (Figure 6a). Generally, black sea bass eggs are found from May through October on the Continental Shelf, from southern New England to North Carolina.

Larvae: 1) North of Cape Hatteras, EFH is the pelagic waters found over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all ranked ten-minute squares of the area where black sea bass larvae are collected in the MARMAP survey (Figure 7a). 2) EFH also is estuaries where black sea bass were identified as common, abundant, or highly abundant in the ELMR database (Table 30) for the "mixing" and "seawater" salinity zones (Figure 6b). Generally, the habitats for the transforming (to juveniles) larvae are near the coastal areas and into marine parts of estuaries between Virginia and New York. When larvae become demersal, they are generally found on structured inshore habitat such as sponge beds.

Juveniles: 1) Offshore, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked squares of the area where juvenile black sea bass are collected in the NEFSC trawl survey (Figure 7b). 2) Inshore, EFH is the estuaries where black sea bass are identified as being common, abundant, or highly abundant in the ELMR database (Table 30) for the "mixing" and "seawater" salinity zones. Juveniles are found in the estuaries in the summer and spring (Figure 6c). Generally, juvenile black sea bass are found in waters warmer than 43° F with salinities greater than 18 pp and coastal areas between Virginia and Massachusetts, but winter offshore from New Jersey and south. Juvenile black sea bass are usually found in association with rough bottom, shellfish and eelgrass beds, man-made structures in sandy-shelly areas; offshore clam beds and shell patches may also be used during the wintering.

Adults: 1) Offshore, EFH is the demersal waters over the Continental Shelf (from the coast out to the limits of the EEZ), from the Gulf of Maine to Cape Hatteras, North Carolina, in the highest 90% of all the ranked ten-minute squares of the area where adult black sea bass are collected in the NEFSC trawl survey (Figure 7c). 2) Inshore, EFH is the estuaries where adult black sea bass were identified as being common, abundant, or highly abundant in the ELMR database (Table 30) for the "mixing" and "seawater" salinity zones (Figure 6d). Black sea bass are generally found in estuaries from May through October. Wintering adults (November through April) are generally offshore, south of New York to North Carolina. Temperatures above 43° F seem to be the minimum requirements. Structured habitats (natural and man-made), sand and shell are usually the substrate preference.

3.2.5 Habitat Areas of Particular Concern (HAPC)

According to Section 600.815 (a)(9), FMPs should identify habitat areas of particular concern (HAPC) within EFH where one or more of the following criteria must be met: (i) ecological function, (ii) sensitive to human-induced environmental degradation, (iii) development activities stressing habitat type, or (iv) rarity of habitat.

The MAFMC identified SAV and macroalgae beds in the nursery habitats (for larvae and juvenile summer flounder) as HAPC because as is identified in the Packer and Griesbach document (page 41) "flounder appeared to utilize aquatic vegetation (eelgrass) as a 'blind;' i.e., they lie-in-wait along the vegetative perimeter, effectively capturing prey which moved from within the grass." The report continues "in the absence of the eelgrass, the spot visually detected and avoided the flounder; the flounder therefore consumed fewer spot on average in the non-vegetated treatment than in the vegetated treatments."

The MAFMC identified SAV and macroalgae beds as HAPC because of its ecological importance as shelter from predators, as well as in predation. Packer and Griesbach (1998) give an extensive review of the importance of SAV to juvenile and adult summer flounder. SAV has also been identified as refugia for juvenile and adult summer flounder, possibly important habitat for spawning summer flounder, important for prey of juvenile and possibly adult flounder (Laney 1997). Laney (1997) concluded that any loss of these areas along the Atlantic Seaboard may affect stocks. SAV as defined by ASMFC (1997) is rooted, vascular, flowering plants that, except for some flowering structures, live and grow below the water surface. In areas where SAV is absent, for example Delaware Bay, macroalgae can serve the same ecological function.

The specific designation of HAPC for summer flounder is as follows:

> All native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within adult and juvenile summer flounder EFH is HAPC. If native species of SAV are eliminated then exotic species should be protected because of functional value; however, all efforts should be made to restore native species.

The Council envisions that the designation of SAV as HAPC will give their recommendations on protecting SAV more weight during the consultation process. The Council can only regulate the activities of federal permit holder in state waters. The majority of the summer flounder, scup, and black sea bass commercial landings occurred in the EEZ in 1999 (Tables 12, 13, and 14). States are encouraged through the Commission to develop a concerted effort to protect SAV. The states of Virginia and Maryland are already considering actions

3.2.6 Other Species

Any species that could potentially be impacted by this FMP is considered part of the affected environment. General faunal assemblages specific to North and Mid-Atlantic habitat types are described in Tables 1-5 of the Appendix C. Species potentially impacted by this FMP can be described through predator/prey relationships, species with overlapping EFH, bycatch species of these fisheries, and protected species.

3.2.6.1 Predator/prey and other ecological relationships

Species that are in predator/prey and other ecological relationships with summer flounder, scup, and black sea bass are fully described in sections 3.1.1.3.9, 3.1.2.3.5, and 3.1.3.3.5 for summer flounder, scup, and black sea bass, respectively.

3.2.6.2 EFH for species overlapping with this FMP

All species managed by the Mid-Atlantic Fishery Management Council, New England Fishery Management Council, South Atlantic Fishery Management Council, and NMFS - Highly Migratory Species, have EFH that overlap with the EFH of summer flounder, scup, and black sea bass (Appendix D). Specific EFH descriptions for summer flounder, scup, and black sea bass are found in section 3.2.5. Generally, EFH is: pelagic waters, demersal waters, saltmarsh creeks, seagrass beds, mudflats, and open bay areas, from Gulf of Maine to Cape Canaveral, Florida for summer flounder; demersal waters, sands, mud, mussel, and seagrass beds, from the Gulf of

Maine or Cape Hatteras, North Carolina for scup; and pelagic waters, structured habitat (e.g., sponge beds), rough bottom shellfish, sand and shell, from Gulf of Maine to Cape Hatteras, North Carolina for black sea bass. Any actions implemented in this FMP affect the other species that have overlapping EFH with summer flounder, scup, and black sea bass, and therefore must be considered in the EFH assessment of this FMP.

3.2.6.3 Bycatch

An analysis of bycatch is one way of determining other species that could be affected by this FMP. Section 5.1.9 includes a detailed description of the bycatch of the summer flounder, scup, and black sea bass fisheries. When fishing effort is increased, incidence of bycatch may also increase. This concept is further developed under the Biological Impacts of each alternative in section 4.0, where applicable.

3.2.6.4 Protected species

Protected species, including marine mammals, sea turtles, sea birds, and two species of endangered fishes that could have interactions with summer flounder, scup, and black sea bass fisheries are fully described in section 5.4.3.1. Any impacts that the management alternatives could have on these species are described in section 4.0, where applicable.

3.2.7 Fishing Activities that May Adversely Affect EFH

3.2.7.1 Description of Fishing Gear (section 2.2.3.6 in Amendment 12)

Forty-one different kinds of fishing gear were identified that landed commercial species along the Atlantic coast, from Maine through North Carolina, based on 1999 commercial landings (Table 31). Two gears, menhaden purse seines and bottom otter trawls, combine to account for almost 50% of the commercial landings (pounds) from Maine through North Carolina. No other gear besides these two gear account for more than 8% of the total landings along the coast. Twenty-one of the 41 gear accounted for 1% or more of the total landings from Maine through North Carolina.

The 41 different fishing gears identified in Table 31 can be combined into groups as to their potential impact to EFH. For example, "otter trawl bottom, fish," "otter trawl bottom, shrimp," "otter trawl bottom, crab," and "otter trawl bottom, scallop" can be combined and examined, as bottom otter trawls. The following description is a general characterization of the consolidated groups of gear that were used to commercially harvest fish along the Atlantic coast in 1999. The following descriptions of gear used within the jurisdiction of the Northeast Region are taken from the Tilefish FMP unless otherwise noted. More detailed gear descriptions can be found in the report, "The Effects of Fishing on Marine Habitats of the Northeastern United States" (NMFS 2001; Appendix C).

3.2.7.1.1 Otter trawls

Bottom: Otter trawls (a bottom-tending mobile gear) developed as fishermen sought to increase the horizontal opening of the trawl mouth beyond that possible with cumbersome rigid beam trawls. In the late 1880s, Musgrave invented the otter board, a water-plane device that when used in pairs, each towed from a separate wire, served to open the net mouth horizontally and hold the net on the bottom. Initially, all otter boards were connected to the wing ends of the trawl, as they are today in the shrimp trawl fishery. In the 1930s, the Dan Leno gear was developed by Frenchmen, Vigarnon and Dahl. This allowed the otter boards (doors) to be separated from the trawl wing ends using cables or "ground gear." This technology increased the effective area swept by the trawl from the distance between the net wings to the distance between the doors. The ground gear can be as long as 600 feet, thus increasing the area swept by the trawl by as much as three fold. It is the spreading action of the doors resulting from the angle at which they are mounted which creates the hydrodynamic forces needed to push them apart. These forces also push them down towards the sea floor. On fine-grained sediments, the doors also function to create a silt cloud that aids in herding fish into the mouth of the trawl net (Carr and Milliken 1998).

The bottom trawl net is a funnel-shaped net composed of upper and lower sections joined at seams referred to as "gores." Some bottom trawls also have side panels to increase the vertical opening, and therefore have four seams. The mouth of the trawl net consists of jib and wing sections in both the upper and lower panels. A "square" section forms a roof over the net mouth. The body of the trawl net includes belly sections, leading to the cod-end where the catch is collected. The webbing is attached to a rope frame consisting of a headrope, along the upper panel leading edge, and a footrope, along the lower panel leading edge. The sweep, which tends bottom as the net is towed, is attached to the footrope. The headrope is equipped with floats that provide buoyancy to open the net mouth vertically. The headrope and footrope/sweep are attached to bridles (also referred to as legs) at the wing ends, that lead to the ground wires and the trawl doors. The sweep also comes in contact with the bottom as it acts to collect fish that lie or congregate before it. The configuration of the sweep can vary considerably and is dependent upon both the bottom type and species of fish targeted (Carr and Milliken 1998).

On smooth bottoms, the footrope may be weighted with chain or leadline, or may be rope wrapped with wire. This is the simplest and lightest sweep, known as a chain sweep. On soft or slightly irregular bottoms, rubber discs (known as "cookies") stamped from automobile tires can be strung along the sweep (Carr and Milliken 1998). On rougher bottoms, rubber rollers or steel bobbins are rigged to the footrope to assist the trawl's passage over the bottom. Both the rollers and the bobbins use small steel or rubber spacers between the much larger roller and bobbins. In New England, the rollers have been largely replaced with "rockhopper" gear, that uses larger rollers that are actually fixed in place, spaced with the smaller rubber discs (Carr and Milliken 1998). This setup enables the trawl to pass over, yet still effectively fish, areas with large rocks and boulders.

A newly developed gear known as "street-sweeper" trawl gear, is constructed of a series of rubber disc spacers and bristle brushes, as found in actual street sweepers. The distinguishing component of this sweep is the brushes made of stiff bristles mounted on a cylinder core, The brush cylinders are up to 31 inches in diameter have smaller diameter rubber discs placed between them. The discs are strung on a cable or chain and aligned in series forming the sweep of the trawl net. This innovation probably allows the trawl to be fished on rougher bottom than any other design and it is lighter than the rockhopper (Carr and Milliken 1998).

The raised-footrope trawl was designed especially for fishing for whiting, red hake, and dogfish. It was designed to provide vessels with a means of continuing to fish for small mesh species without catching groundfish. The configuration consists of a 42 inch long chain connecting the sweep to the footrope, which results in the trawl fishing about 18 - 24 inches above the bottom (Carr and Milliken 1998). The raised footrope keeps the net slightly above the bottom, allowing complete flatfish escapement, and theoretically it is supposed to travel over codfish and other groundfish (whiting and red hake tend to swim slightly above the other groundfish). Carr and Milliken (1998) report that studies have confirmed that the raised footrope sweep has much less contact with the sea floor than does the traditional cookie sweep that it replaces.

Bottom trawl fisheries are directed for demersal species on all coasts of the U.S. In the northeast and mid-Atlantic, vessels from 50 to 150 feet fish in waters ranging from 30 to 1200 feet in depth. Small mesh nets are used to capture northern shrimp, whiting, butterfish and squid. Large mesh trawls are used to harvest cod, haddock, flounder and other large species. These trawls are typically rigged with long ground wires that create sand clouds on the seabed, herding the fish into the trawl mouth. The largest trawlers, from 150-300 feet in length, catch, process and freeze their products onboard, and are referred to as factory, catcher, or processor trawlers (DeAlteris 1998).

Otter trawls may be modified to harvest shellfish, such as lobsters, crabs, and scallops. The characteristics and operation of these trawls are similar to those designed for finfish.

Midwater: Pelagic fishes are harvested using off-bottom or midwater trawl nets. The nets must be aimed or directed at specific concentrations of fish. Therefore, the fishermen must be able to identify the location of fish both laterally and vertically, and direct the pelagic trawl to that position. Hydroacoustic instruments are used to locate fish and deploy the fishing gear. Sonar, a forward searching acoustic device, is initially used to locate the fish ahead of the vessel. As the fisherman directs the vessel over the fish, the echosounder is used to verify the exact size and depth of the school. While approaching the fish, a net sounder is used to determine the depth and vertical opening of the trawl. By adjusting the length and speed of the tow, the fishing depth of the trawl mouth is adjusted to match the depth of the fish. In general, pelagic fish have a high visual acuity and are fast swimmers, so pelagic trawls are very large and must he towed fast. Thus, pelagic trawl vessels, must be equipped with relatively more horsepower than similarly sized demersal trawlers.

The pelagic trawl mouth is opened horizontally by high aspect otter boards that act as foils or wings oriented vertically in the water column. The net is initially opened vertically, by the floats along the headrope and weights along the footrope. After stabilizing position in the water column, water flow acting on the tapered panels of the funnel shaped net opens the net. The net is always constructed of four panels, with a gentle taper, so as to appear as an endless tunnel to the fish. Generally, the net employs webbing of multiple mesh sizes, the largest in the jibs and forward bellies, reducing to smaller mesh sizes in aft bellies, and the smallest mesh size in the cod-end, suitable for retaining the target species (DeAlteris 1998).

3.2.7.1.2 Purse seines

The purse seine is an evolution of the ring net. The ring net is a single wall of webbing that is also used to surround concentrations of pelagic fish. A discontinuous line, the hauling rope, attached to the center bunt section of the net, is used to close the bottom of the net after a school of fish has been circled. The ring net is usually a relatively small net (about 600 feet in length) and is typically used in fresh water fisheries. The discontinuous hauling line has been replaced by a continuous purse line. Functionally, purse seines are used to surround a concentration of fish, then the purse seine is hauled in so as to close the bottom of the net. Critical aspects of the design and operation of a purse seine include: sufficient weight on the leadline to achieve a rapid submersion of the net, adequate floatation to support the webbing and leadline, net sufficient length to allow enclosure of school of fish, and mesh sufficient size to prevent escapement and avoid excessive drag.

The puretic power block developed in the early 1950s, was a significant mechanization of the purse seine fishery. the V-shaped sheave, attached to a beam end, and powered by a hydraulic motor, has replaced 10 to 20 men that used to haul in the long wings of the small seines used to harvest menhaden in Chesapeake Bay. The largest purse seines now used on tuna fish in the open ocean are more than a mile in length and 600 feet in depth. Without the power block these fisheries would not have developed (DeAlteris 1998).

3.2.7.1.3 Pots, traps, pound nets, and haul seines

Pots: A pot is a small, portable, 3-dimensional device that allows the animal to enter the gear voluntarily, but makes escape difficult, if not impossible. The principle of operation of pot gear is that animals enter the device seeking food, shelter, or both. The holding area restricts the animal until the gear is retrieved. Bait is placed in a bag or cage within the pot. Culling rings or escape vents are added to the exterior wall of the pot to allow for the release of undersize sub-legal animals. Finfish, shellfish, and crustaceans are all harvested with pots in the estuarine, coastal and offshore waters of the U.S. Buoys and lines mark both the single pots, and the ends of the trawls of pots. Fishermen haul pots either by hand in shallow water, or use a hydraulically powered pot hauler in both shallow and deep water. The pot hauler was a significant mechanization introduced into the pot fishery that allowed for the development of deep water fisheries (DeAlteris 1998).

Traps: Traps are generally a large scale, 2-dimensional device that use the seabed and/or sea surface as boundaries for the vertical dimension. The gear is fixed, that is installed at a location for a season, and is passive, as the animals voluntarily enter the gear. Traps consist of a leader or fence, that interrupts the migratory pattern of the target prey along the coast. A heart or parlor that leads fish via a funnel into the bay section, and a bay or trap section that serves to hold the catch for harvest by the fishermen. The non-return device is the funnel linking the heart and bay sections. The bay, if constructed of webbing, is harvested by concentrating the catch in one corner, a process referred to as "bagging" or "hardening" the net. The catch is removed by "brailing," with a dip net. The advantages of traps are that the high quality catch is alive when harvested, gear that is fuel efficient, and potential for very large catches. The disadvantages are high initial cost of the gear, competition for space by other users of the estuarine and coastal ecosystem, and finally fish must pass by the gear to be captured so any alterations in migratory routes will radically affect catch.

Pound Nets: Pound nets are constructed of netting staked into the seabed by driven piles. Pound nets have three sections: the leader, the heart, and the pound. The leader (there may be more than one) may be as long as 1300 feet and is used to direct fish into the heart(s). One or more hearts are used to further funnel fish into the pound and prevent escapement. The pound may be 50 feet square and is the hold for the fish until the net is emptied. These nets are generally fished in waters less than 160 feet deep (Sainsbury 1996).

Haul Seines: The beach haul seine resembles a wall of netting of sufficient depth to fish from the sea surface to the sea bed, with mesh small enough that the fish do not become gilled (NEFMC 1998). A floatline runs along the top to provide floatation and a leadline with a large number of weights attached assures the tow lines are fitted to both ends. The use of a beach seine generally starts with the net on the beach. One end is pulled away from the beach, usually with a small skiff or dory, and is taken out and around and finally back in to shore. Each end of the net is pulled in towards the beach, concentrating the fish in the middle of the net. This is eventually brought onshore and the fish removed. This gear is generally used in relatively shallow inshore areas (Sainsbury 1996).

The long-haul seine is set and hauled in shallow water estuaries from a boat (about 50 feet). The net is a single wall of small mesh webbing (< 2 inches), and is usually greater than 1300 feet in length and about 10 feet in depth. The end of the net is attached to a pole driven into the bottom, and the net is set in a circle so as to surround fish on the tidal flat. After closing the circle, the net is hauled into the boat, reducing the size of the circle, and concentrating the fish. Finally, the live fish are dip-netted out of the net (DeAlteris 1998).

3.2.7.1.4 Lines, hooks, and hand lines

Hand Lines: The simplest form of hook and line fishing is the hand line. It consists of a line, sinker, leader and at least one hook. The line is usually stored on a small spool and rack and can vary in length from 3 - 330 feet. The line varies in material from a natural fiber to synthetic nylon. The sinkers vary from stones to cast lead. The hooks are single to multiple arrangements in umbrella rigs. An attraction device must be incorporated into the hook, usually a natural bait or artificial lure. There are both recreational and commercial hand line fisheries in the U.S. In fact, although this is a technologically sophisticated fishery due to the use of fish finding and navigation electronics, it is still conducted by individuals or in small boats, so it may be considered an artisanal fishery. Operationally, hand lines offered a high degree of efficiency, so that the fisherman is able to feel the fish bite the bait and set the hook. Hand lines can be used as a fixed or static gear or towed as a mobile gear. Hand lines are usually a passive gear because the fisherman attracts the target, and the fish voluntarily takes the hook. However, in certain cases the handline is equipped with a treble or ripper hook, then the handline becomes an active device, as the hook snags the prey (DeAlteris 1998).

Troll Lines: Essentially, trolling involves the use of a baited hook or lure maintained at a desired speed and depth in the water. Usually, two or more lines are spread to varying widths by the use of outrigger poles connected to the deck by hinged plates. Line retrieval is often accomplished by means of a mechanized spool. Each line is weighted to accomplish the desired depth and may have any number of leaders attached, each with a hook and bait or appropriate lure. This gear is generally fished from the surface to about 70 feet (Sainsbury 1996).

Longline: The general design of the longline is simple, consisting of a main line with a number hooks attached. Main lines are coiled without hooks on a drum until deployed; each end of the main line is attached to an anchor line and fitted with a surface float when deployed. Longlines may be fished at the surface, bottom, or intermediate depths. An advantage of longlines is that few men are needed to work a large number of hooks that can be fished over a wide geographic area (Stansby1963). Longlines are typically coiled on a drum. The longline is fair-led off the drum and the hooks are snapped onto the line at specified intervals depending upon fishing conditions. During haul-back, the longline is fair-led back to the drum as the hooks are unsnapped (Nolan pers. comm.)

Rod and Reel: Rod and reel is the typical gear used in the recreational fishery. In relatively deep waters, electric reels may be used to facilitate landing.

3.2.7.1.5 Dredges

Clam Dredge: To dig clams from sandy sediment, hydraulic dredging is often used. In hydraulic dredging, high pressure water jets ahead of the rake teeth or blade are used to scour out the shells which are then dug up by the blades and passed back into the bag. High pressure water is supplied to the jets through a hose from the operating vessel by a diesel pump and the bag is generally carried on a heavy sled.

In the ocean quahog and surfclam fishery, large vessels (often larger than100 feet), tow dredges up to 15 feet in width slowly across the seabed. The vessels are equipped with large pumps, connected to the dredges via flexible hoses, that use water and inject it into the sediment through a manifold with multiple nozzles, ahead of the blade of the dredge. The dredge must be towed slowly so as to not exceed the liquification rate. These dredges, operated correctly, are highly efficient, taking as much as 90% of clams in their path (DeAlteris 1998).

Crab Dredge or Crab Scrape: Crabs are harvested during the winter months with dredges similar to oyster dredges. The crab dredge consists of a steel frame, 1 to 6 feet in width, with an eye and "nose" or "tongue" and a blade with teeth. Attached to the frame is the tow chain or wire, and a bag to collect the catch. The bag is constructed of rings and chain-links on the bottom to reduce the abrasive effects of the seabed, and twine or webbing on top. The dredge is towed slowly (less than 3 feet per second) in circles, from vessels 20 to 60 feet in length. Stern-rig dredge boats (about 50 feet in length) tow two dredges in tandem from a single chain warp. The dredges are equipped with long teeth (4 inches) that rake the crabs out of the bottom (DeAlteris 1998).

Bay Scallop Dredge: Since scallops usually lie on the bottom, on clear bottoms no raking teeth are needed, and the dredge is a simple gear. The bay scallop dredge may be 3 to 5 feet wide and about twice as long. The simplest bay scallop dredge can be just a mesh bag attached to a metal frame that is pulled along the bottom. For bay scallops that are located on sand and pebble ground, a small set of raking teeth are set on a steel frame, and skids are used to align the teeth and the bag (Sainsbury 1996).

Sea Scallop Dredge: In the open ocean a large dredge is used to harvest sea scallops. Scallops inhabit sandy, gravelly, and cobble bottom, and live on the surface of the sea bed as epifauna.

Scallops are mobile animals and can evade a dredge approaching too slowly. Therefore, scallops dredges have to be towed at speeds up to 8 feet/second. The scallop dredge includes a steel frame with a tongue with an eye, a blade with no teeth, and a bag. Scallop dredges are usually defined by the width of the dredge frame, the width or mouth opening of which ranges from 3 to 15 feet, with the weight of the dredge varying from 50 to 2000 pounds. The New Bedford style dredge is usually between 12 and 15 feet wide. The front of the steel frame of the dredge, called the bale, usually rides up off the bottom. The bottom of the frame is called the cutting bar and it tends to ride up off the bottom about four inches on flat, smooth bottoms. On rougher bottoms, the cutting bar will come in contact with the higher areas of the sea floor.

There is a chain sweep that attaches to the ends of the frame at the shoes, reinforced bottom pads._ The bag of the dredge is known as a "ring bag" and is made of rings and chain-links on the bottom and webbing on top. Using a scallop dredge on hard bottom usually requires the addition of "rock chains" that run front to back, along with the side-to-side tickler chains used on all types of scallop dredges. The rougher the bottom, the more rock chains are used, to prevent rocks and boulders from getting into the ring bag. Selectivity of the dredge is controlled by the size of the rings in the ring bag. The smallest dredges are towed by 20 foot vessels and hauled by hand. The largest scallop vessels, about 100 feet in length, tow two 15 feet dredges, one from each side of the vessel, and use winches and navigational electronics to maintain high efficiency (DeAlteris 1998).

3.2.7.1.6 Gillnets

Drift Gillnets: Gillnets operate principally by wedging and gilling fish, and secondarily by entangling fish. The nets are a single wall of webbing, with float and lead lines. The nets are designed and rigged to operate as either sink or floating nets, and are anchored or drifting. The webbing is usually monofilament nylon due to its transparency; but multi-filament, synthetic or natural fibers, may also be used. Drift gillnets are designed so as to float from the sea surface and extend downward into the water column and are used to catch pelagic fish. In this case the buoyancy of the floatline exceeds the weight of the leadline. Floating gillnets are anchored at one end or set-out to drift usually with the fishing vessel attached at one end (DeAlteris 1998).

Sink/Anchor Gillnets: Anchored sink gillnets are used to harvest demersal fish along all coasts of the U.S. The nets are rigged so that the weight of the leadline exceeds the buoyancy of the floatline, thus the net tends the seabed, and fishes into the near bottom water column. Anchors are used at either end of the net to hold the gear in a fixed location. The nets vary in length from 300 to 600 feet, and in depth from 5 to 30 feet. Multiple nets are attached together to form a string of nets, up to a mile in length. In shallow water, sink gillnets may fish from bottom to surface, if the webbing is of sufficient depth (DeAlteris 1998).

Stake Gillnets: Generally a small boat, inshore method in which a gillnet is set across a tidal flow and is lifted at slack tide to remove fish. Wooden or metal stakes run from the surface of the water into the sediment and are placed every few feet along the net to hold it is place. When the net is lifted, the stakes remain in place. These nets are generally fished from the surface to about 150 feet deep (Sainsbury 1996).

3.2.7.1.7 Rakes and tongs

Rakes: There are two different types of rakes used in the commercial fisheries. They are the common clam rake and the bull rake. The common rake for clams is much like a garden rake except that the teeth are longer and sharper. It is equipped with a wire mesh basket or apron which holds the catch. It is generally used in very shallow water. The bull rake is a large implement with a head between twenty and thirty inches wide, It has long curved teeth about nine inches long and unlike the common hand rake it does not have a basket or apron. Its handle is usually longer and is fished in deeper water than the hand rake (Dumont and Sundstrom 1961).

Tongs: Hand tongs are actually a pair of rakes attached to the end of two long poles (up to twenty feet in length) which are fastened together like a pair of scissors, with the fulcrum near the lower end. A basketlike frame is attached to the back side of each rake in order to hold the catch. Patent tongs are a modification of the regular hand tongs. They are used mainly in the Chesapeake Bay area for oysters which are in water too deep for hand tongs (Dumont and Sundstrom 1961).

3.2.7.2 Fishing impacts to EFH (section 2.2.3.7 in Amendment 12)

3.2.7.2.1 Statutory requirements

The EFH Final Rule [50 CFR Section 600 (a)(2)(i)] indicates that:

"Each FMP must contain an evaluation of the potential adverse effects of fishing on EFH designated under the FMP, including effects of each fishing activity regulated under the FMP or other FMPs. This evaluation should consider the effects of each fishing activity on each type of habitat found within each FMP. FMPs must describe each fishing activity, review and discuss all available relevant information (such as information regarding the intensity, extent, and frequency of any adverse effect on EFH; the type of habitat within EFH that may be affected adversely; and the habitat functions that may be disturbed), and provide conclusions regarding whether and how each fishing activity adversely affects EFH."

Fishing effort data are the only way to gauge the intensity and severity of fishing activity that is required to be evaluated. Some minimal effort information, such as number of trips by area (ten minute square or statistical area), is available in the VTR data. However, area information in the VTR data has limitations because trip location is required to be reported as one location or statistical area for a trip or each time a vessel changes statistical areas, as opposed to reporting tow-by-tow or set information. Thus, available data on a vessel's trip location may represent a larger geographical area than indicated (Colosi pers. comm.). Fishermen can also be resistant to reporting effort based on location of individual tow or sets (for the obvious reason of divulging productive location to competitors and regulators). The best available information on fishing activity, for all gear used in the Northeast Region, is presented in Figures 10-29 in Appendix C (NMFS 2001).

The extent of gear impacts in various types of habitat is largely unquantified. The best available information on the habitat characteristics of the North and Mid-Atlantic are described in section 3.2.1 and Appendix C, and mapped in Figures 1 through 7 of Appendix C (NMFS 2001).

Studies indicate that stationary and mobile gear that come into contact with the bottom may adversely impact physical habitat structure, community structure, and ecosystem processes (Auster and Langton 1998; Table 32). These types of impacts are presented in Tables 33-35 (Auster and Langton 1998). They also cite several conceptual models to predict the impacts of gears on different types of habitat. However, without high resolution data on fishing effort (Table 36) and location, and location of specific habitat types on the sea floor, it is difficult to predict the extent of the impact of fishing gear. Even less understood is the relationship between the adverse impacts from trawling and dredging on habitat and the impact on any species ability to spawn, breed, feed, and grow to maturity, i.e., the sustainability of a fishery. Currently, growth and productivity data as relates to specific habitat type are not available for most stock in the Northeast Region. For most stocks, there are no indications that poor habitat conditions caused by fishing gear contribute to overfishing or to the overfished status of the stock.

Where fishing effort is constrained within particular fishing grounds, and where data on fishing effort are available, studies compare similar sites along a gradient of effort. These studies have produced the types of information on effort-impact that will be required for effective habitat management (e.g., Collie *et al.* 1996 and 1997; Thrush *et al.* in press). Unfortunately, this type of analysis is not available for summer flounder, scup and black sea bass habitat.

When considering impacts, recovery of the habitat must be considered. Recovery is difficult to predict as well. Recovery is dependent on: 1) timing, severity, and frequency of the impacts (Watling and Norse 1997); 2) natural history of the affected epibenthic fauna, i.e., recovery may depend on growth and recruitment rates; and 3) substrate type and depth of the impact. Much of the gear impact/habitat research describes the differences in impacts and recovery rates between shallow high energy sand habitats (indicative of disturbance tolerant species) versus live bottom habitats (indicative of disturbance intolerant species).

For example, sand waves may not be reformed until storm energy is sufficient to produce bedform transport of coarse sand grains (Valentine and Schmuck 1995), and storms may not be common until a particular time of year or may infrequently reach a particular depth, perhaps only on decadal time scales. DeAlteris *et al.* (1998) studied the impacts of mobile gear in Narragansett Bay, Rhode Island, and found that recovery time was influenced by depth and substrate. Sand substrates in shallow water recovered more quickly than mud substrates in deep water, where gear scars were detectable by side-scan sonar for much longer periods of time.

Sponges and corals are particularly sensitive to disturbance because they recruit aperiodically and are slow growing in deeper waters (Reiswig 1973; Witman and Sebens 1985; Witman *et al.* 1993). In the outer shelf-upper slope waters south of New England where summer flounder, scup, and black sea bass often overwinter, patches of branching soft corals, such as *Paragorgia arborea, Primnoa resedaeformis, and Pennatula aculeata* (Wigley and Theroux 1981 and Theroux and Wigley 1998), are capable of providing biogenic structure; the first two species can grow relatively large. These branching soft corals are also relatively fragile (and probably slow growing in this plankton-poor environment) and may thus be easily damaged by mobile gear. Many species, such as hydroids and ampelescid amphipods, reproduce once or more annually, and their stalks and tubes provide cover for the early benthic phases of many fish species and their prey (Auster *et al.* 1996 and 1997b).

3.2.7.2.2 Evaluation of gear impacts on EFH

According to the EFH Final Rule [50 CFR Part 600.815(a)(2)] the effects of all gears used in the summer flounder, scup, and black sea bass fisheries as well the effects of gear used in summer flounder, scup, and black sea bass EFH must be evaluated relative to impacts on habitat. NMFS weighout data indicate that bottom otter trawls and pots/traps are the major gear that landed summer flounder, scup, and black sea bass, in 2000. The predominant bottom tending mobile gear that is used in summer flounder, scup, and black sea bass EFH by federal permit holders includes bottom otter trawls, scallop dredges, and clam dredges.

Summer flounder, scup, and black sea bass are demersal species that have associations with substrates, SAV, and structured habitat (Packer and Griesbach 1998, Steimle *et al.* 199a-b). Specific habitats that are designated as EFH (section 3.2.4) include:

1) <u>Summer flounder</u>: pelagic waters, demersal waters, saltmarsh creeks, seagrass beds, mudflats, and open bay areas;

2) <u>Scup</u>: demersal waters, sands, mud, mussel, and seagrass beds;

3) <u>Black sea bass</u>: pelagic waters, structured habitat (e.g., sponge beds), rough bottom shellfish, sand and shell.

Bottom otter trawls, pots/traps, scallop dredges, and clam dredges were evaluated for impacts to EFH. These are gear that are used within summer flounder, scup, and black sea EFH or by the summer flounder, scup, and black sea bass fisheries. In October 2001, NOAA/NMFS, NEFMC, and MAFMC convened a workshop, hereafter referred to as gear workshop (NER EFH SC 2002, Appendix D), to assist NEFMC and MAFMC with: 1) evaluating the existing scientific research on the effects of fishing gear on benthic habitats; 2) determining the degree of impact from various gear types on benthic habitats in the Northeast; 3) specifying the type of evidence that is available to support the conclusions made about the degree of impact; 4) ranking the relative importance of gear impacts on various habitat types; and 5) providing recommendations on measures to minimize those adverse impacts. The workshop only focused on benthic habitat and gear types that are managed under MSFCMA, with the inclusion of lobster pots because of their widespread use. Since summer flounder scup, and black sea bass are species with benthic associations, gear that does not impact benthic habitat was determined not to have an adverse impact on EFH.

The workshop consisted of a panel of experts in the fields of benthic ecology, fishery ecology, geology, fishing gear technology, and fisheries gear operations. When drawing conclusions on the degree and duration of the impacts of gear, the panelists relied on peer reviewed literature, gray literature, and professional judgement. These are noted in the tables of impacts for each gear type in Appendix D.

At the conclusion of the workshop, participants were asked to participate in an exercise to rank the relative importance of various gear impacts on habitat. The panelists considered the three general habitat types of mud, sand and gravel, and within those habitat types four impacts: 1) removal of major physical features, 2) impacts to biological structure, 3) impacts to physical structure, and 4) changes in benthic prey. The results of this exercise are presented in Tables 8 and 9 of Appendix D and the conclusions are stated as follows:

> "Several conclusions can be drawn from this evaluation. First of all, gravel habitat was clearly considered to be most at risk, followed by sand and mud (Figure 3 of Appendix D). Secondly, impacts to biological structure were of greatest concern, particularly in gravel habitat, followed by any impacts to gravel habitat (Figure 4 of Appendix D). Impacts to physical structure ranked third and removal of major physical features ranked fourth. Thirdly, otter trawls and scallop dredges were of much greater concern than clam dredges, gillnets and longlines, and pots and traps (Figures 5 of Appendix D). Otter trawls and scallop dredges were judged to have the greatest impacts on gravel habitat (Figure 6 of Appendix D). Additionally, otter trawl effects were of concern in all three habitat types, whereas scallop dredge effects are limited to gravel and sand, and clam dredging impacts are limited to sandy bottom. Sink gillnets and bottom longlines were only of concern in gravel. Changes in benthic prey received no votes at all and only one vote was cast for pots and traps. Overall, the panelists stated that this was a valuable exercise and that the results were consistent with their discussions throughout the workshop."

The following descriptions of impacts of fishing gear are summarized from NMFS (2001 and 2002; Appendices A and B, respectively) on the impacts of specific gear types on habitats designated as EFH in the North and Mid-Atlantic. Additional documented impacts of fishing gear on the structural components of habitat and community structure were summarized by Auster and Langton (1998) and are presented in Tables 33-35. It should be noted that the impacts described are considered the baseline of fishing gear impacts on habitat. As such, when describing the impacts of alternatives relative to the status quo, impacts are described relative to the management measures currently in place.

Bottom otter trawls: NMFS weighout data indicate that bottom trawls accounted for 41% of the landings of MAFMC-managed species, from Maine through North Carolina, in 2000. In 2000, bottom otter trawls from Maine through North Carolina accounted for 18% of bluefish, 91% of butterfish, 91% of summer flounder, 81% of Atlantic mackerel, 64% of scup, 30% of black sea bass, 33% of spiny dogfish, 9% of tilefish, 98% of *Loligo*, and almost 100% of *Illex*. A total 209,486 bottom otter trawl trips reported a point location in VTR data from 1995-2000. The distribution of bottom otter trawl trips is presented in Figure 10 of Appendix C. Fishing trips are the only effort data currently available to evaluate the frequency and intensity of fishing activity, and therefore the extent of fishing gear impact. The limitations of these data are stated in section 3.2.7.2.1.

Existing information presented in Appendix C, indicates that bottom otter trawls can impact EFH. Bottom otter trawls were the most widely used gear from Maine through Cape Hatteras, from 1995 to 2000. The distribution of otter trawl trips closely resembles the distribution of summer flounder, scup, and black sea bass EFH (Figure 10 of Appendix C). Appendix C indicates that studies, specifically in the Northeast Region, indicate that the impacts of bottom otter trawls include ecological and physical impacts. The ecological impacts are exposure of prey and attraction of predators. The physical impacts are the loss of diatom mats, the reduction of total organic carbon and nitrogen in the sediment-water interface, and the reduction of mud and epifauna in a boulder habitat. Similar biological and physical impacts were observed in national and international studies.

The panel from the gear workshop (Appendix D) concluded that "the greatest impacts from otter trawls occur in low and high energy gravel habitats and in hard clay outcroppings (Table 5 of Appendix D). In gravel, the greatest effects were determined to be on major physical features, and physical and biological structure of the habitat.

"In gravel and other hard bottom habitats, the degree of impact of otter trawls on major physical features, physical structure, and biological structure were all considered to be high in both low and high energy environments. Major physical features in this habitat type are boulder mounds, which can be knocked down by trawls. Once this happens, the mounds can never be re-formed, and the resulting changes are permanent. Trawls also cause alterations to physical structure by redistributing cobbles and boulders and breaching gravel pavement. Impacts to biological structure in gravel were of greater concern to the panel than impacts to biological structure in other habitats because structural biota is more abundant on gravel bottom. Effects to physical and biological structure of these habitats were judged to last from months to years.

"Changes to benthic prey caused by trawling were considered to be unknown. In mud habitats, the panel distinguished between hard clay outcroppings that occur in deep water on the outer continental shelf and soft mud (silt and clay) sediments found in deep water basins in the Gulf of Maine and many shallower locations on the shelf. Bottom trawling takes place in both of these habitat types.

"Clay outcroppings are found on the slopes of submarine canyons that intersect the shelf on the southern edge of Georges Bank and the New York Bight. These outcroppings provide important habitat for tilefish (*Lopholatilus chamaelonticeps*) and other benthic organisms which burrow into the clay. Based on the panel's professional judgement, removal of this material by trawls was considered to be a permanent change to a major physical feature, and was rated as a high degree of impact. The panel determined that trawls could also cause a high degree of impact to the physical structure of hard clay habitat that could last from months to years.

"The panel did not reach consensus on the degree to which otter trawls affect physical and biological structure in soft mud habitats. However, most panelists agreed that impacts to biological structure (including worm tubes and burrows) and physical structure were moderate. Panelists agreed that these impacts would be expected to last from months to years.

"There was no consensus on the degree of impact to biological or physical structure, or to benthic prey, in high and low energy environments. However, with one exception, the panelists agreed that these impacts were moderate. Trawl induced changes to physical structure in high energy sand were rated as low. Recovery times for biological structure and prey were considered to range from months to years, and for physical structure from days to months.

"There was a general consensus that the acute impacts of bottom trawls (i.e., impacts caused by a single tow) on physical and biological structure are less severe than for a scallop dredge, but the chronic impacts resulting from repeated tows are more severe for trawls because a greater bottom area is affected by trawling than is affected by scallop dredging. Additionally, otter trawls are towed repeatedly in the same locations, much more so than scallop dredges and clam dredges. One panel member pointed out that the only part of a trawl that disturbs the bottom in the same manner as a scallop dredge is the door - the rest of the trawl behaves very differently. Another panel member reiterated that there are a large variety of trawls in use in the Northeast U.S. Some (squid nets, high rises) are very light trawls that barely contact the bottom at all, whereas others (flatfish nets) "hit hard" which makes it difficult to generalize the impacts associated with this gear."

A study on the lobster fishery in the Connecticut waters of the Long Island sound (Smith *et al.* 1985) draws the following conclusions regarding trawling impacts to benthic habitats: 1) minor disturbance to surface sediment (less than 1" in depth) because of "light contact with the bottom" (a study of heavily rigged gear in the UK reported similar results); 2) a possible increase in sea floor productivity due to sediment disturbance related to "wake turbulence" which suspended epifauna and flocculent material, rather than direct physical contact with the bottom, resulting in a "chumming effect that attracted motile predators;" 3) "notable" evidence of trawl passage was limited to 4-10" wide, and 2-6" deep trawl door depressions; 4) furrows created by trawls doors in soft mud substrate did not cause habitat loss and "may increase excavation sites for formation of mud lobster shelters or 'burrows'"; 5) minor alteration of mud burrows which "appeared easily reconstructable by resident lobsters." Smith *et al.* (1985) concluded that the success of trawling for lobster was dependent upon the soft sediment substrate in Long Island Sound rather than "any special gear modifications that result in a disruption or extraction for the sea bed." Smith *et al.* (1985) and others observed no evidence of mortality to lobsters or crabs by the net path or trawl riggings.

<u>Dredges</u>: Weighout data indicate that dredges accounted for 47% of the commercial landings of MAFMC species, from Maine through North Carolina in 2000. These data indicate that dredges harvested 100% of the surfclam and ocean quahog landings in 2000. Additionally, clam and scallop dredges accounted for 6% and 2%, respectively, of state and federal landings in 1999 (Table 6 in Appendix C). NMFS (2001) reports that, "Dredging (all gears) was dominated by scallop dredges, which accounted for 81.5% of all the trips that were included in this analysis. Surfclam and ocean quahog dredges accounted for an additional 13.7%." Based upon the existing information presented in Appendix C (detailed below by specific dredge type), dredges have the potential to adversely affect EFH.

<u>Clam dredges</u>: NMFS (2001; Appendix C) reviewed four regional studies that address the impacts of hydraulic clam dredges in the Northeast Region. These studies indicate that disruptions of the benthic communities, sediments, bottom water turbidity, hypoxia, and an increase in predators in silt, sand, mud, and muddy sand habitats, were short-term in nature. The longest recovery time reported was 3-10 months in muddy sand. Other national and international studies yielded similar results, with a few exceptions. One study in Florida reported that sea grasses took longer than one year to recolonize. Studies in Scotland indicated that dredging in mud, "breaks down the cohesive bonds in sediments, thus increasing the likelihood of resuspension with future disturbances, can lead to large scale redistribution of fine sediments and resorting of sediments by grain size."

Estimated fishing effort of clam dredges in presented in Table 2 of Appendix D. The distribution of dredge trips is presented in Figures 18 and 19 of Appendix C. The limitations of these data are stated in section 3.2.7.2.1.

Fishing effort is the only data currently available to evaluate the frequency, intensity, and therefore extent of fishing gear impact. The panel from the gear workshop concluded that "the habitat effects of hydraulic dredging were limited to sandy substrates, since the gear is not used in gravel and mud habitats" (Table 3 of Appendix D). The panel also indicated "that the temporal scale of the effects varies depending on the background energy of the environment. Recovery of physical structure can range from days in high energy environments to months in low energy environments, whereas biological structure can take months to years to recover from dredging, depending on what species are affected." The panel concluded that in cases of severe biological impacts only a small area is affected by this gear type.

Scallop dredges: NMFS (2001; Appendix C) reviewed two regional studies that address the impacts of scallop dredges. These studies indicate disruption of amphipod tube mats and decline in megafaunal species, although one study indicated that scallop dredges resulted in less short-term impacts than clam dredges, although increased predation seemed to be an important impact with scallop dredges. International studies yielded similar results as the clam dredge studies.

The panel from the gear workshop concluded that "the effects of scallop dredging were of greatest concern in the following three habitat types: high and low energy sand and high energy gravel. Scallop fishing does not generally occur in deep water, low energy gravel habitats (Table 4 of Appendix D; NER EFH SC 2002). Low energy sand habitat occurs in deeper water, where the bottom is unaffected by tidal currents and where the only natural disturbance is caused by occasional storm currents. In this habitat type, the primary physical bottom features are shallow depressions created by scallops and other benthic organisms. Reduction of biological structure and changes in physical structure were both considered to occur at a high level as a result of scallop dredging (Table 4 of Appendix D)." "In high energy sand habitats, effects on biological structure were considered to be low, since organisms in this environment would be adapted to a high degree of natural disturbance. Changes to physical structure such as smoothing out of sand ripples, sand waves, and sand ridges were rated as high."

A total 23,206 scallop dredge trips reported a point location in VTR data from 1995-2000. The distribution of dredge trips is presented in Figure 15 of Appendix C. Fishing trips are the only effort data currently available to evaluate the frequency and intensity of the fishing gear, and therefore, extent of the fishing gear impact. The limitations of these data are stated in section 3.2.7.2.1.

Other (Non-Hydraulic) Dredges: NMFS (2001; Appendix C) reviewed four regional studies that address the impacts of other nonhydraulic dredges in mud, seagrass, SAV, and oyster bed habitats in the Northeast Region. These studies indicate that disruptions in mud habitats were very short-term (1-3 months), while disruption of seagrass and SAV lasted from 2-5 years. While one study reported that oyster dredging flattens and eventually removes oyster reefs, another study indicated that there was very little difference between invertebrates in dredged and non-dredged sites.

A total 14,008 mussel and sea urchin dredge trips reported a point location in VTR data from 1995-2000. The distribution of dredge trips is presented in Figures 18 and 19 of Appendix C. Fishing trips are the only effort data currently available to evaluate the frequency and intensity of the fishing gear, and therefore, extent of the fishing gear impact. The limitations of these data are stated in section 3.2.7.2.1.

Pots/Traps: According to NMFS weighout data 48% of black sea bass and 7% of scup, landed from Maine through North Carolina were caught by pots/traps in 2000. A new literature review conducted by NMFS (2001; Appendix C) indicates that the stationary nature of pots/traps result in less damage to benthic habitat than mobile gear. For the most part, these gear have less bottom area contact. They do cause some bottom damage when settling on the bottom and when hauled back to the surface. Some gear configurations can also result in bottom contact, i.e., buoy lines of insufficient length and traps strung together by trotlines can cause movement along the bottom. Physical damage is highly dependent on bottom type. Three dimensional structure such as reef building corals, sponges, and gorgonians is more likely to be negatively impacted pots/traps.

The panelist from the gear workshop concluded that "the degree of impact caused by pots/traps to biological and physical structure and to benthic prey in mud, sand and gravel habitats was low (Table 6 in Appendix D). In both mud and sand, the duration of impacts to biological structure could last for months to years, whereas physical structure and benthic prey should recover in days to months. In gravel, reduction of structural biota and changes in seafloor structure and benthic prey could all persist for months to years... In all three habitats, changes in benthic prey could be negative, due to damage by the gear, and may be positive or negative due to nutrient enrichment or food availability from bait. "

A total 197,732 pot/trap trips reported a point location in VTR data from 1995-2000. The distribution of dredge trips is presented in Figure 22 of Appendix C. Fishing trips are the only effort data currently available to evaluate the frequency and intensity of the fishing gear, and therefore, extent of the fishing gear impact. The limitations of these data are stated in section 3.2.7.2.1.

Conceptual models to predict the impact of fishing gear on habitat are set forth in Auster and Langton (1998). Table 37 is a representation of the impacts of fishing gear on habitat types that are designated as EFH for summer flounder, scup, and black sea bass. This table demonstrates that not enough information is available to determine to what extent habitats are impacted by fishing gear.

3.2.7.2.2.3 Impacts to summer flounder HAPC - SAV

Although the EFH for these three species is rather broadly identified and described (section 2.2.2), the Council did make a specific designation of an Habitat Area of Particular Concern (HAPC) for summer flounder (section 2.2.2.2.1). All macro algae, seagrass, and freshwater and tidal macrophytes in summer flounder EFH is identified as an HAPC because of juvenile and adult summer flounder association. This HAPC designation connotes additional protection of SAV during the various consultation processes. It also warrants additional attention to fishing gear that can impact the HAPC.

Several studies cited by Auster and Langton (1998) demonstrated impacts to SAV by mobile gear. Two studies showed that clam rakes reduced seagrass biomass from 25% in light clam raking to 100% in intense clam raking (Peterson *et al.* 1983). Sites of light clam raking recovered within one year, sites of intense clam raking recovered in two years (Table 33). Another study noted a loss of seagrass over 45% of the study area due to trawling, although the density of seagrass increased by a factor of six within three years (Guillen *et al.* 1994; Table 33). Fonseca *et al.* (1984) noted that increased dredging resulted in a significant reduction in seagrass biomass. Although these studies do indicate that some bottom tending mobile gear can reduce seagrass biomass they also indicate that the amount of reduction is dependent on the intensity of the fishing effort. These studies also indicate that seagrass es recover in a period of one to three years after trawling has ceased (Table 33). Goldsborough (1997) indicates the types of commercial fishing in the Chesapeake Bay that are most harmful to SAV are clam dredging, crab dredging or scraping, and haul seining. All SAV beds are within state waters, primarily state internal waters.

As identified above, all the SAV beds are within state waters. The Commission has been interested in SAV because of the important role this habitat plays in critical life history stages of their managed species. Of the 24 species managed by the Commission, over half of them derive benefits from association with SAV (Laney 1997), including the jointly managed species of summer flounder, scup, and black sea bass. To enhance protection of SAV, the Commission adopted an SAV policy in 1997 with the goal of preserving SAV, and ultimately achieving a net gain in SAV distribution and abundance (ASMFC 1997).

The report by Stephan *et al.* (2000) entitled: *Evaluating Fishing Gear Impacts to Submerged Aquatic Vegetation and Determining Mitigation Strategies* that was produced for the Commission thoroughly summarizes the impact of fishing gear on SAV. All the fishing gears that are used in estuarine waters for each Atlantic coast state are identified by the various state marine fishery agency contacts between Maine and Florida. Stephan *et al.* (2000) identified fishing gear types used in the state waters and their impacts to SAV, as to whether the gear impacts the plants above-ground or below-ground and whether the bottom is hard or soft. This report concludes that below-ground disturbance to SAV, above-ground disturbance to *Halophila* spp., and disturbance to sexual production results from fishing gear. It states that these types of impacts "should be avoided at most costs."

3.2.7.2.3 Determination of adverse effects from fishing

Under the EFH Final Rule "Councils must act to prevent, mitigate, or minimize any adverse effect from fishing, to the extent practicable, if there is evidence that a fishing activity adversely affects EFH in a manner that is more than minimal and not temporary in nature..." "Adverse effect" means any impact that reduces the quality or quantity of EFH. The above evaluation, indicates that the baseline impact of otter trawls, scallop dredges, and pots and traps, on EFH is "more than minimal and not temporary in nature" (section 3.2.7.2.2). Therefore the Council must: 1) propose alternatives to prevent, mitigate or minimize adverse effects from these gear (section 2.2), and 2) evaluate those alternatives for practicability (section 4.2). The Final Rule states, "In determining whether it is practicable to minimize an adverse effect from fishing, Councils should consider the nature and extent of the adverse effect on EFH and the long and short-term costs and benefits of potential management measures to EFH, associated fisheries, and the nation, consistent with National Standard 7." The alternatives proposed for minimizing adverse effects from fishing are evaluated for practicability in section 4.2.

In Amendment 13 to the Surfclam and Ocean Quahog FMP, the Council concluded, based upon evidence from the gear workshop (Appendix D), that clam dredges do not have an identifiable adverse effect on EFH. Impacts from this gear are temporary and minimal, as the fishery is currently prosecuted. If the gear is fished improperly or in the wrong sediment clam dredges could have a negative impact. However, the clam resources are concentrated in sandy sediment. The fishing gear has evolved over the past five decades to fish most efficiently in this type of sandy sediment. The overall effect of clam dredges is to a small area, relative to a homogenous, sandy habitat that is spread over a large uniform area.

3.2.8 Options for managing adverse effects from fishing (section 2.2.4 in Amendment 12)

Pursuant to Section 303(a)(7) of the MSFCMA, the Councils shall minimize to the extent practicable adverse effects on EFH caused by fishing. Additionally, 50 CFR part 600.815 (a)(2)(ii) states that the Councils must act to prevent, mitigate, or minimize adverse effects from fishing, to the extent practicable, if there is evidence that a fishing activity adversely effects EFH in a manner that is more than minimal and not temporary in nature.

Section 600.815 (a)(4) states that, fishery management options may include, but are not limited to: (i) fishing equipment restrictions, (ii) time/area closures, and (iii) harvest limits.

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines. As previously stated in sections 3.2.7.2, the Council determined that both mobile bottom tending and stationary gear has a potential to adversely impact EFH. The same conclusion was drawn for other species with overlapping EFH. The best scientific information available indicates that ecosystem impacts from fishing gears on fishery productivity in this region are mostly unpredictable and unquantifiable. Thus, mobile and stationary gear are characterized as having a potential impact on EFH because: 1) the specific habitat types along the Atlantic coast have not been mapped or quantified and 2) fishing effort and intensity of the gear is also not recorded. Since the potential exists that mobile bottom gear and stationary gear are having adverse effects on EFH, the Council is proposing a range of alternatives to minimize the adverse effects on EFH as required pursuant to Section 303(a)(7) of the SFA. The proposed management alternatives are described in section 2.2 and the practicability for implementation are analyzed and discussed in sections 4.2 and 5.3.3.2, respectively.

3.2.9 Identification of Non-Fishing Activities and Associated Conservation and Enhancement Recommendations

NOTE: Sections 600.815(a)(5), 600.815(a)(6), and 600.815(a)(7) are all combined here, in order to better clarify the cause and effect association of actions.

According to Section 600.815 (a)(5), FMPs must identify activities that have the potential to adversely affect EFH quantity or quality, or both. Broad categories of activities which can adversely affect EFH include, but are not limited to: dredging, fill, excavation, mining, impoundment, discharge, water diversions, thermal additions, actions that contribute to non-point source pollution and sedimentation, introduction of potentially hazardous materials, introduction of exotic species, and the conversion of aquatic habitat that may eliminate, diminish, or disrupt the functions of EFH.

Non-fishing activities and associated conservation and enhancement recommendations that affect summer flounder, scup, and black sea bass EFH are found in section 2.2.5 on page 76 of Amendment 12. No changes have been made to this section.

3.2.10 Research and Information Needs

From Section 600.815 (a)(10), it states that each FMP should contain recommendations for research efforts that the Councils and NMFS view as necessary for carrying out their EFH management mandate.

Research and information needs for summer flounder, scup, and black sea bass EFH are found in section 2.2.7 on page 120 of Amendment 12. No changes have been made to this section.

3.2.11 Review and Revision of EFH Components of FMP

In Section 600.815 (a)(11), it states that Councils and NMFS should periodically review the EFH components of FMPs, including an update of the fishing equipment assessment. Each EFH FMP amendment should include a provision requiring review and update of EFH information and preparation of a revised FMP amendment if new information becomes available.

Review and revision of the EFH components of the Summer Flounder, Scup, and Black Sea Bass FMP are found in section 2.2.8 on page 124 of Amendment 12. No changes have been made to this section.

3.3 DESCRIPTION OF FISHING ACTIVITIES (HUMAN ENVIRONMENT) (EIS)*

3.3.1 Summer Flounder

3.3.1.1 Commercial fishery

Summer flounder support an extensive commercial fishery along the Atlantic Coast, principally from Massachusetts through North Carolina. Landings from Maine through North Carolina, have fluctuated widely over the last six decades (Table 38), increasing from slightly less than 10 million pounds per year prior to World War II to an average of around 20 million pounds during the 1950's and early 1960's. Landings consistently decreased during the 1960's to a low of 6.7 million pounds in 1969. Commercial landings increased in the mid 1970's until 1989, due to increased levels of effort in the southern winter trawl fishery (MAFMC 1993). Landings of summer flounder from Maine to North Carolina peaked in 1979 at nearly 40 million pounds (Table 38). Reported landings were 32.3 million pounds in 1988 and less than 18 million pounds in 1989, and further decreased in 1990 to about 9 million pounds, a decline of 71% from 1988 (Table 38).

In 1993, the first year that a coastwide quota was implemented, commercial landings were 12.8 million pounds, slightly in excess of the quota for that year. Commercial landings increased to 15.4 million pounds in 1995 and then dropped to 8.8 million pounds in 1997. Commercial landings were 10.7 million pounds in 1999.

From 1990 to 1999 the state of North Carolina had the highest commercial landings of summer flounder, accounting for 25% of the 1990 to 1999 mean, followed by Virginia (24%), New Jersey (17%), and Rhode Island (15%; Table 38). The states of Maine, Delaware, and Maryland, accounted for less than 1% each of the 1990 to 1999 mean. The state of New Hampshire had no summer flounder landings from 1990 to 1999.

Most commercial landings are made from otter trawl vessels (93%) and sea scallop dredges (2%), as based on 1990 to 1999 NMFS Weighout Data (Table 39). From 1990 to 1999 combined, otter trawls caught 117 million pounds of summer flounder, while sea scallop dredges caught 2.5 million pounds. Hand lines, pound nets, and unknown combined gears were the only other gear that averaged more than 1 million pounds for the time period. Small catches of summer flounder were also made with haul seines, floating traps, gillnets, pots/traps, and midwater/pair trawls (Table 39).

From 1990 to 1999, the majority of the summer flounder were landed annually by commercial fishermen using otter trawls in all states except Delaware (Table 40). Three gear types accounted for 97% of the Delaware landings, pots/traps, gillnets, and hand lines.

Due to a change in reporting requirements, the reporting of commercial landings by distance from shore is inconsistent from 1994-1998. Therefore, only 1999 landings are presented by distance from shore in this document. Earlier landings by distance from shore are presented in Amendment 10. In 1999, 73.8% of the commercial landings of summer flounder came from the EEZ (Table 12). Delaware had the lowest landings (12.5%) in the EEZ, while Virginia had the highest landings (92.3%) in the EEZ. The remainder of the states caught the majority of their landings in the EEZ (Table 12).

Approximately 37% of the commercial summer flounder landings from 1990 to 1999 were caught in January and February (Table 41). Less than 10% of the landings for this time period were caught in each month from March through December. The lowest landings occurred April through August.

3.3.1.2 Recreational fishery

Summer flounder is one of the mainstays of the sport fishery along the Atlantic coast. The use of live bait is common, but summer flounder are also taken on jigs, small spoons, and spinners. Although not as strong a fighter per pound as some other sport fishes, the summer flounder provides lively action, especially on light tackle (MAFMC 1993).

MRFSS data are used to describe recreational fisheries. These surveys have been conducted by NMFS on an annual basis since 1979. Random interviews are conducted with anglers at or near fishing sites over the course of each year. Information collected includes mode of fishing, area of fishing, species targeted, and species and quantity of catch. Data are presented as total catch (types A, B_1, and B_2) and total landings (types A and B_1).

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

From 1980 to 1989 summer flounder landings ranged from a high of 38.2 million pounds in 1980 to a low of 3.2 million pounds in 1989. Recreational landings of summer flounder in 1999, at about 8.4 million pounds, were 36% below the historical 1980-1999 average of 17.4 million pounds and only slightly below the 1990-1999 average of 8.6 million pounds (Table 42). In 1999 the recreational sector accounted for 44% of the total landings. Historically recreational summer flounder landings accounted for 61% of the average total landings from 1980-1999, and 59% of the average total landings from 1990 to 1999 (Table 42).

Recreational catch and landings have fluctuated since recreational harvest limits were implemented under Amendment 2 regulations in 1993 (Table 43). Landings increased to 8.8 million pounds in 1993 from the 1992 level of 7.15 million pounds (Table 43). From 1994 to 1999, recreational landings ranged from 5.4 million pounds (1995) to 12.5 million pounds (1998). Recreational landings in 1999 were estimated to be 8.4 million pounds. In 1980 summer flounder recreational catch was at its highest with 28.4 million fish. It declined to a low of 2.7 million fish in 1989 and has been increasing since. In 1999 summer flounder recreational catch totaled 21.4 million fish.

Summer flounder recreational data indicate that in only two of the last eight years (1994 and 1995) have recreational landings been less than the recreational harvest limits (Table 44). In 1998 and 1999, recreational landings of summer flounder were 12.5 million lb and 8.4 million lb, respectively. The summer flounder recreational landings in 1998 and 1999 were 5.07 million lb and 0.96 million lb over the recreational harvest limit for those years, respectively.

The method of estimating trips for specific species is potentially biased since MRFSS interviewers ask anglers, upon completion of their trip, which species they targeted. This approach may cause anglers to report the species they caught, regardless of the species they originally sought. Over the past 10 years, recreational trips directing for summer flounder in the Mid-Atlantic, New England, and South Atlantic Regions, have fluctuated between a low of 3.6 million trips in 1990 to a high of 5.8 million trips in 1994, the second year with a recreational harvest limit (Table 44). In 1999, there was an estimated 4.2 million trips directing for summer flounder.

From 1990 to 1999, New Jersey landed the largest percentage of catch by number (42.9%), followed by New York (18.8%), Virginia (14.8%), and North Carolina (5.8%). The remaining states all caught less than 5% each (Table 45).

MRFSS estimates from 1990 to 1999 indicate that more than 90% of the recreational summer flounder landings occurred in state waters (inland waters and ocean water <= 3 miles combined) in the North Atlantic and Mid-Atlantic subregions and in North Carolina (Table 46).

From 1990 to 1999, recreational fishermen in private/rental boats, accounted for 92.2%, 84.0%, and 75.9% of the landings in the New England Region, Mid-Atlantic Region, and North Carolina, respectively. The party/charter boat industry accounted for the second highest percent (11.6%) of recreational summer flounder landings in the Mid-Atlantic Region, as compared to only 2.4% and 0.4% of the landings in the New England Region and North Carolina (Table 47). Fishermen fishing from shore were the second highest in both the New England Region (54.9%) and North Carolina (23.7%; Table 47).

VTR data for party/charter boats is only available from 1996 and later, when the requirement for a federal permit holder to submit a vessel logbook was implemented. VTR data indicate that summer flounder contributed almost 13% of the total catch (by number) made by party/charter vessels for the 1996-1999 period (Table 48). The contribution of summer flounder to the total catch of party/charter vessels fluctuated throughout the year, ranging from less than 1% in January, February, March, April, and December to 24% in July. The largest proportion of summer flounder was caught from May through September (Table 48). Analysis of the VTR party/charter data by state indicates that the proportion of summer flounder in the total catch ranged from less than 1% in Maine, New Hampshire, Massachusetts, and Maryland to 34% in New York (Table 48).

3.3.1.3 Foreign fishing activities

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

Two sources of foreign catch data are available for determining bycatch of summer flounder: foreign fleet observers' reports and captains' logbooks from permitted foreign fishing categories. Incidental catch in foreign directed fisheries was estimated at over 100,000 pounds in the early 1980's, but was reduced to negligible amounts in the late 1980's (MAFMC 1993). The reduction of summer flounder bycatch is most likely due to the phase out of the foreign directed *Loligo* squid fishery. Summer flounder caught in joint venture fisheries cannot be retained by foreign vessels, so they must be returned to US catcher boats or discarded.

3.3.2 Scup

3.3.2.1 Commercial fishery

Scup have supported important commercial fisheries since colonial times (Neville and Talbot 1964). Prior to the 1930's, most scup were harvested by fixed gears such as pound nets and floating traps. Since then otter trawls have increased in importance and are now the predominant gear used to catch scup commercially. A more detailed description of the historic fisheries for scup can be found in Neville and Talbot (1964) and Morse (1978).

Commercial landings have steadily increased since the early 1900's to a peak of approximately 50 million pounds in 1960 and began to decline in the mid 1960's. In the last 18 years (1981 to 1998) there has been a downward trend in scup commercial landings. Commercial scup landings, which had declined 60 percent from 21.73 million lb (9.85 million kg) in 1981 to 8.18 million lb (3.71 million kg) in 1989, increased to 15.14 million lb (6.86 million kg) in 1991 and then dropped to the lowest value in the time series, 3.32 million lb (1.51 million kg), in 1999.

An average of 35.8% of the scup commercial landings came from one state, Rhode Island, from 1990 to 1999 (Table 49). Scup landings from Rhode Island have fluctuated over the ten-year time period with a high of approximately 6.4 million pounds in 1991 and a low of only 795 thousand pounds in 1998. Rhode Island landings increased in 1999 to 1.3 million pounds. New Jersey had the second highest scup landings (31% of the average from 1990 to 1999) with an average of 2.6 million pounds from 1990 to 1999. In fact, over the last five years New Jersey's scup landings were higher than in Rhode Island's. In general, three states, Rhode Island, New Jersey, and New York, have accounted for more than 80% of the coastwide scup landings on average from 1990 to 1999 (Table 49).

Although scup were harvested in both state and federal waters by a variety of commercial gears, two gears accounted for the majority of the commercial landings from 1990 to 1999. Coastwide, from 1990 to 1999, 75% of total commercial scup landings, were accounted for by otter trawls (Table 50). The other predominant gear was shallow floating traps, which accounted for about 10% of the landings over this time period. Other gear that caught more than 1% of the landings included midwater paired trawls, fish pots/traps, hand lines, and unknown combined gear.

Otter trawls were the predominant gear to land scup in most states from 1990 to 1999 (Table 51). However, hand lines accounted for 46% of the landings in Massachusetts, over the ten year period. Fish pots/traps accounted for 98% of the Delaware scup landings.

Due to a change in reporting requirements, the reporting of commercial landings by distance from shore is inconsistent from 1994-1998. Therefore, only 1999 landings are presented by distance from shore in this document. Earlier scup landings by distance from shore are presented in Amendment 8. In 1999, 55% of the commercial landings of scup were caught in the EEZ (Table 13). Of the states with reported landings, Massachusetts and Connecticut had the lowest landings (1.2% and 10.3%, respectively) from the EEZ. Virginia had the highest landings (100%) from the EEZ. The remainder of the states with reported landings caught the majority of their landings in the EEZ (Table 13).

Landings by month indicated that more than 80% of the commercial scup landings are caught November through May, with more than 50% caught from February through May (Table 52). Landings by month show no clear regional pattern (Table 52). The state of Rhode Island had the highest scup landings for the coast, followed by New Jersey, New York, and Massachusetts (Table 52). A little less than 50% of Rhode Islands landings were caught in April and May with another 30% caught from October through December (Table 52). Almost 90% of New Jersey's landings were caught January through April. New York's landings were fairly uniform throughout the year with the most landings caught in November, December, and April. Almost 90% of the landings in Massachusetts were caught May through October.

3.3.2.2 Recreational fishery

From 1981 to 1999, recreational scup landings ranged from a high of 11.6 million pounds in 1986 to a low of 875 thousand pounds in 1998 (Table 53). The recreational landings were in 1999 were 57% below the 1981 to 1999 historical average of 4.4 million scup. In 1999, the recreational sector accounted for 36% of the total landings, which is higher than the historical average of 27%, from 1981 to 1999 (Table 53). The average landings from 1990 to 1999 also account for 27% of the total scup landings.

Over the past 10 years, recreational trips directing for scup in the Mid-Atlantic, New England, and South Atlantic Regions, have decreased overall from a high of 864 thousand trips in 1990, before a recreational harvest limit was implemented, to a low of 105 thousand trips in 1998, the second year with a recreational harvest limit. There was an estimated 134 thousand directed trips for scup in 1999 (Table 54).

From 1990 to 1999, recreational landings of scup primarily occurred from Massachusetts through New York. Anglers in New York landed the highest proportion scup landed along the Atlantic coast, accounting for 33.8% of the total scup landed by recreational fishermen for this time period (Table 55). Few if any scup were caught by anglers fishing in states north of Massachusetts or south of Delaware (Table 55).

Recreational fishermen landed (in number) more scup caught in state waters than in the EEZ from 1990 to 1999 (Table 56). Over these 10 years, more than 80% of the scup were landed in state waters in the North and Mid-Atlantic subregions and North Carolina.

Recreational fishermen using private/rental boats accounted for most of the scup catch and landings (in numbers) from 1990 to 1999, in the North Atlantic (71.6%), Mid-Atlantic Regions (72.0%), and North Carolina (55.2%; Table 57). However, fishermen fishing from shore in North Carolina had the second highest catch and landings, accounting for 37.6% of the recreational landings. Conversely, in the Mid-Atlantic and North Atlantic Regions, anglers fishing from party/charter boats had the second highest catch and landings, 19.3% and 20.1%, respectively.

VTR data for party/charter boats is only available from 1996 and later, when the requirement for a federal permit holder to submit a vessel logbook was implemented. These data indicate that scup contributed 7.8% of the total catch (by number) made by party/charter vessels for the 1996-1999 period (Table 58). The contribution of scup to the total catch of party/charter vessels fluctuated throughout the year, ranging from less than 1% in January, February, March, and April, to 25% in October, with the largest proportion of scup caught from September to November (Table 58). Analysis of the recreational landings by state indicates that the proportion of scup in the total catch ranged from less than 1% to 16%.

3.3.3 Black Sea Bass

3.3.3.1 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 21.8 million pounds in 1952, declined to 1.4 million pounds in 1971 (Table 59), and in recent years have fluctuated between approximately 2 and 4 million pounds (Table 59). Commercial black sea bass landings have varied without trend since 1981, ranging from a low of 2.06 million lb in 1994 to a high of 4.33 million lb in 1984 (Table 59). The 1999 landings of 2.98 million lb were substantially below the peak landings estimated for 1952 (Table 59).

The distribution of commercial landings by state has fluctuated since 1950 (Table 59). However, Virginia has generally had the highest black sea bass landings with 42% of the total landings from Maine through North Carolina from 1950 through 1999, followed by New Jersey. Landings from North Carolina increased in relative importance to the coast in the early 1960's as compared to the early part of the time series. Likewise, New York landings have decreased in relative importance to the coast since the early part of the time series. Commercial landings by state have varied over recent years (Table 59). New Jersey had the highest average landings (33.5% of the average) from 1990 to 1999, with Virginia second (22.6%; Table 59). Virginia had the highest landings in 1998 and 1999. In addition, although Massachusetts has a 12" TL size limit for black sea bass, landings in that state almost doubled from 1998 to 1999 to around 574 thousand pounds making that state second in 1999.

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 about 85% of the landings from 1990 to 1999 (Table 60). Other important gear include hand lines (9%) and inshore and offshore lobster pots (nearly 2% combined).

Otter trawls, which harvested 40% of the black sea bass coastwide, accounted for the majority of the black sea bass landings in most states with the exception of Massachusetts, New Jersey, Delaware, and Maryland, from 1990 to 1999 (Table 61). Fish pots/traps accounted for a significant proportion of the landings from the remaining states. In addition, hand lines harvested a significant proportion of black sea bass in Massachusetts, Connecticut , New York, Virginia, and North Carolina (Table 61).

Due to a change in reporting requirements, the reporting of commercial landings by distance from shore is inconsistent from 1994-1998. Therefore, only 1999 landings are presented by distance from shore in this document. Earlier black sea bass landings by distance from shore are presented in Amendment 9. In 1999, 74.6% of the commercial landings of black sea bass were caught in the EEZ (Table 14). Of the states with reported landings Massachusetts had the lowest landings (0.5%) from the EEZ. Virginia had the highest landings (99.7%) from the EEZ. The remainder of the states with reported landings caught the majority of their landings in the EEZ (Table 14).

Landings by month indicate that most black sea bass were harvested from January through June with peak landings in March and May, for the period 1990 to 1999 (Table 62). By state landings generally peaked in the winter months for all states except Massachusetts, New York, and Maryland. These states generally showed peaks in the summer months from April through August (Table 62).

3.3.3.2 Recreational fishery description

From 1981 to 1999 recreational landing have fluctuated between a high of 12.4 million pounds in 1986 to a low of 1.2 million pounds in 1998. During this time period the recreational sector accounted for 79% of the total black sea bass landings in 1982 to only 25% of the total black sea bass landings in 1984. Recreational fishermen landed 1.7 million pounds of black sea bass in 1999, accounting for 36% of the total black sea bass landings (Table 63). However, recreational landings were about 50% below the average value of 3.9 million pounds, from 1990 to 1999.

From 1990 to 1999, recreational trips directing for black sea bass in the Mid-Atlantic, New England, and South Atlantic Regions, ranged from a 219 thousand trips in 1992, to 315 thousand trips in 1995 (Table 64). Data of recreational fishing trips directed for black sea bass is not reported in the MRFSS statistics after 1997.

Over the past ten years (1990 to 1999) New Jersey accounted for the majority of recreational black sea bass landings (53.1% of the ten year total), followed by Virginia (20.3%), and North Carolina (5%; Table 65). The remainder of the states each accounted for less than 5.0% of the total recreational black sea bass landings from 1990 to 1999.

The majority of the black sea bass recreational landings came from the EEZ, from 1990 to 1999, in the Mid-Atlantic Region and North Carolina, with an average of 71.0% and 63.8%, respectively, of the landings from the EEZ (Table 66). During this time period, an average of 77.1% of the landings came from state waters in the North Atlantic Region.

In the North Atlantic Region and North Carolina, recreational landings of black sea bass were predominantly made by fishermen from private/rental boats (62.9% and 69.8% of the 1990 to 1999 average, respectively; Table 67). In the Mid-Atlantic Region recreational landings of black sea bass were predominantly made by fishermen on party/charter boats (66.5% of the 1990 to 1999 average).

VTR data for party/charter boats is only available from 1996 and later, when the requirement for a federal permit holder to submit a vessel logbook was implemented. VTR data indicate that black sea bass contributed almost 20% of the total catch (by number) made by party/charter vessels for the 1996-1999 period (Table 68). The contribution of black sea bass to the total catch of party/charter vessels fluctuated throughout the year, ranging from less than 10% in January, February, March, April, and August to almost 50% in November, with the largest proportion of black sea bass caught from May through December (Table 68). Analysis of the recreational landings by state indicates that the proportion of black sea bass to the total catch ranged from less than 1% to over 47%.

3.3.4 Economic Characteristics of the Fishery

Summer flounder constitutes a major component of Mid-Atlantic recreational catches and comprises a significant proportion of commercial landings from North Carolina through Maine. Scup and black sea bass are important components of the commercial and recreational fisheries from North Carolina through Massachusetts. The economic characteristics of the commercial and recreational fisheries for summer flounder, scup, and black sea bass 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 summer flounder, scup, or black sea bass in the dockside market. Likewise, retail value is a measure of final consumer willingness to pay for these species 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, these species are valuable to both recreational anglers and seafood consumers who do not or cannot fish for themselves. Also, individuals and firms engaged in the commercial harvesting, processing and marketing of summer flounder, scup, and/or black sea bass make expenditures and generate employment in the course of business activities, as do participants in the recreational fishery. These species have economic value in both recreational and commercial uses and these species related activities have economic impact in each use.

When considering the relative benefits of summer flounder, scup, and/or 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.

3.3.4.1 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 these fisheries.

3.3.4.1.1 Harvesting sector

3.3.4.1.1.1 Ex-vessel value and price

Commercial landings of summer flounder have decreased approximately 75% from 37.8 million pounds in 1984 to 9.3 million pounds in 1990. Commercial landings in 1992 were 16.6 million pounds, and then decrease to 8.8 million pounds in 1997. In 1998 and 1999, commercial landings were above the 1997 landings. In 1999, commercial landings were 10.7 million pounds or 4% below the 1998 level and 15% below the 1990-1999 mean. The commercial share averaged about 60% of the combined total landings of summer flounder from 1990-1999 (Table 42). Preliminary landings data indicates that 11.2 million pounds of summer flounder were landed in 2000.

The ex-vessel value of summer flounder landings has increased from about $19 million in 1991 to a peak $28 million in 1995 (Table 69). Ex-vessel value dropped to $21.1 and $16.5 million in 1996 and 1997, respectively. The sharp decrease in summer flounder value in 1996 and 1997 from the 1995 level was the result of a sharp decline in landings of approximately 7 and 12 million pound, respectively. Between 1998 and 2000, summer flounder ex-vessel value has ranged from $18.4 to $19.8 million. Inflation adjusted prices (2000 dollars) have ranged from $1.57 to $1.96 per pound for the 1991 to 2000 period (Table 69).

The value of summer flounder landings relative to the value of total landings in 1999 and 2000 are presented in Table 70. In 2000, the contribution of summer flounder landings to the value of total landings varied for each state from 1% or less (Maine, New Hampshire, Massachusetts, Delaware, and Maryland) to about 12% in North Carolina. The overall contribution of summer flounder landings to the total ex-vessel value from Maine to North Carolina was about 1.6%. While some states experienced small percentage changes in the contribution of summer flounder value to the value of total landings from 1999 to 2000, the aggregate contribution associated with this species from Maine to North Carolina was virtually unchanged.

At $1.96/lb, the average price (all sizes) of summer flounder reached a record high in inflation adjusted (2000) dollars in 1995 (Table 69). Adjusted prices for summer flounder have ranged from $1.57 to $1.96 per pound for the 1991 to 2000 period. In 2000, highest prices were received in the northern States with Maine, Connecticut and New York as the leaders at $3.12, $2.63, and $2.47 per pound, respectively. Coastwide, the average price of summer flounder was $1.65 per pound in 2000 (Table 71).

Monthly landing and price data for flounder indicates that a supply - price relationship is observable on a monthly basis. Months with highest average ex-vessel prices tend to coincide with months of lowest landings, normally in June, July, and August (Table 72). Prices received for summer flounder originating in state waters for the 1999-2000 period were generally higher than for EEZ waters (Table 73) and tracked the seasonal supply relationship for 1991-2000 (Table 72). The 2000 coastwide average ex-vessel price per pound for jumbo was $2.07, $1.67 for large, $1.39 for medium, $1.40 for small, and $2.08 for unclassified landings (Table 74). The average price per pound for peewees was $3.86 in 2000, however, only a few hundred pounds of summer flounder belonging to this category were landed and this does not represent a typical price pattern. As a general rule, price premiums for larger flounder reflect higher yielding fillet weight.

Commercial landings of scup have decreased approximately 62% from 21.7 million pounds in 1981 to 8.2 million pounds in 1989. Commercial landings then ranged between 9.5 and 15.1 million pounds for the 1990 to 1994 period. In 1995, scup commercial landings decreased to 6.8 million pounds and have steadily declined to 3.33 million pounds in 1999. The 1999 landings were 20% below the 1998 landings and 60% below the 1990-1999 mean. The commercial share averaged 73% of the combined total landings of scup from 1990-99 (Table 53). Preliminary landings data indicates that less than 2.7 million pounds of scup were landed in 2000.

The ex-vessel value of scup landings has decrease from a peak of approximately $7.9 million in 1991 to $6.5 million in 1994. From 1995 to 1998, the commercial value of scup landings have fluctuated between $6.1 and $7.1 million. However, it decreased to $4.2 and $3.3 million in 1999 and 2000, respectively (Table 75). Inflation adjusted prices (2000 dollars) have ranged from $0.59 to $1.55 per pound for the 1991 to 2000 period (Table 75).

The value of scup landings relative to the value of total landings in 1999 and 2000 are presented in Table 76. In 2000, the contribution of scup landings to the value of total landings varied for each state from 1% or less for most states to less than 2% in Rhode Island and New York. The overall contribution of scup landings to the total ex-vessel value from Maine to North Carolina was less than 0.5% in 1999 and 2000.

At $1.45/lb, the average price (all sizes) of scup reached a record high in nominal and at $1.55/lb in inflation adjusted (2000) dollars in 1998 (Table 75). Adjusted prices for scup have more than double for the last 10 years. In 2000, highest prices were received in the northern States with New York and Massachusetts as the leaders at $1.43 and $1.26 per pound, respectively. Coastwide, the average price of scup was $1.25 per pound in 2000 (Table 77).

Monthly landing and price data for scup indicates that a supply - price relationship is observable on a monthly basis. Months with highest average ex-vessel prices tend to coincide with months of lowest landings, normally between June and September (Table 78). Prices received for scup originating in state waters for the 1999 to 2000 period were generally higher than for EEZ waters (Table 79) and tracked the seasonal supply relationship for 1991-2000 (Tables 78). The 2000 coastwide average ex-vessel price per pound for jumbo was $1.58, $1.35 for large, $1.07 for large/mix, $1.10 for medium, $1.07 for small, $0.45 for pins, and $1.37 for unclassified landings (Table 80). Price differential in 2000 indicate that the ex-vessel price per pound for large scup was 21% greater than for small and 67% greater than for pins.

Commercial landings of black sea bass have decreased approximately 31% from 4.3 million pounds in 1984 to less than 3.0 million pounds in 1999. Commercial landings in 1999 were 16% above the 1998 landings and 5% above the 1990-1999 mean. The commercial share averaged 45% of the combined total landings of black sea bass from 1990-1999 (Table 63). Preliminary landings data indicates that less than 2.7 million pounds of black sea bass were landed in 2000.

The ex-vessel value of black sea bass landings increased from approximately $2.3 million in 1994 to over $5.0 million in 1999. In 2000, the commercial value of black sea bass was estimated at $4.7 million or 6% below the 1999 value. Inflation adjusted prices (2000 dollars) have ranged from $1.14 to $1.81 per pound for the 1991 to 2000 period. These prices have increased from $1.14/lb in 1993 to $1.79/lb in 2000 (Table 81).

The value of black sea bass landings relative to the value of total landings in 1999 and 2000 are presented in Table 82. In 2000, the contribution of black sea bass landings to the value of total landings varied for each state from 1% or less for most states to slightly over 1% in Delaware, Virginia, and North Carolina. The overall contribution of summer flounder landings to the total ex-vessel value from Maine to North Carolina was less than 0.5% in 2000. While some states experienced small percentage changes in the contribution of black sea bass value to the value of total landings from 1999 to 2000, Delaware experienced about a 3% reduction. However, the aggregate contribution associated with this species from Maine to North Carolina was virtually unchanged from 1999 to 2000.

At $1.81/lb, the average price (all sizes) of black sea bass reached a record high in inflation adjusted (2000) dollars in 1998 (Table 81). Adjusted prices for black sea bass have ranged from $1.19 to $1.81 per pound for the 1991 to 2000 period. In 2000, highest prices were received in North Carolina ($2.08/lb), Virginia ($2.06/lb), and New York ($1.90/lb). Coastwide, the average price of scup was $1.79 per pound in 2000 (Table 83).

Monthly landing and price data for black sea bass indicates that a supply - price relationship is observable on a monthly basis. Months with highest average ex-vessel prices tend to coincide with months of lowest landings, normally between June and September (Table 84). Prices received for black sea bass originating in EEZ waters were generally higher than for state waters for 1999-2000 (Table 85). The 2000 coastwide average ex-vessel price per pound for jumbo was $2.62, $2.04 for large, $1.47 medium, $1.05 for small, $10.3 for extra small, and $1.56 for unclassified landings (Table 86). Price differential in 2000 indicate that the ex-vessel price per pound for large black sea bass was approximately 95% greater than for small and extra small (pins).

3.3.4.1.1.2 Fishing vessel activity

Analysis of permit data indicates that in 2000 there were 1,969 vessels with one or more of the following three commercial or recreational federal northeast permits: summer flounder, black sea bass, and scup. A total of 1,033, 977, and 831 federal commercial permits for summer flounder, scup, and black sea bass, respectively, were issued to northeast region fishing vessels. For party/charter operators a total of 613, 498, and 528 federal permits were issued for summer flounder, scup, and black sea bass, respectively (section 3.5).

These three fisheries (summer flounder, scup, and black sea bass) have vessels permitted as commercial, recreational, or both. Of the 1,969 vessels with at least one federal permit there were 1,303 that held only commercial permits for summer flounder, scup, or black sea bass while there were 546 vessels that held only a recreational permit. The remaining vessels (120) held some combination of recreational and commercial permits. Whether engaged in a commercial or recreational fishing activity vessels may hold any one of seven combinations of summer flounder, scup, and black sea bass permits. The total number of vessels holding any one of these possible combinations of permits by species and commercial or recreational status are reported in Table 87.

In addition to summer flounder, scup, and black sea bass there are a number of alternative commercial or recreational fisheries for which any given vessel might possess a federal permit. The total number of vessels holding any one or more of these other permits is reported in Table 88. Additional descriptive information for these permit holders is presented in section 3.5.

Preliminary NMFS weighout system records indicate that the number of vessels landing any summer founder decrease from 840 in 1999 to 798 in 2000. In addition, the number of trips landing any summer flounder decreased from 29,468 to 25,956 for the same time period.

Preliminary NMFS weighout system records indicate that from 1999 to 2000, the number of vessels and trips landing any summer flounder decreased from 840 to 798 and from 29,468 to 25,956, respectively. The number of vessels landing any scup decreased from 432 in 1999 to 428 in 2000, and the number of trip increased from 8,360 to 11,455 in the same time period. Both the number of vessels and trips landing any black sea bass from 1999 to 2000 decreased from 799 to 726 and from 13,526 to 9,606, respectively. This information indicates that there has been some changes in the number of vessels and trips landing these species from 1999 to 2000. However, as indicated before this data is preliminary and changes may be smaller than those presented above. Note that the states of Connecticut and Delaware report canvass (summary) data to NMFS, so landings by individual vessels cannot be included. Thus vessels that land exclusively in those states cannot be analyzed. Vessels that land in these, plus other states, are analyzed as that activity is reported under other states is not reported as summaries.

The number of vessels federally permitted to participate in these fisheries is smaller than those currently participating in the fishery. Many vessel owners likely check off summer flounder, scup, and/or black sea bass category to maintain flexibility of fishing operations pending the availability of other species, or to maintain eligibility give concerns about potential limited entry programs.

Table 89 presents the top commercial landing ports for summer flounder, scup, and black sea bass for 1999. Activity at the port level indicate that 54% of the total fluke commercial landings occurred in seven ports: Point Judith, Rhode Island; Cape May and Point Pleasant, New Jersey; Newport News and Hampton, Virginia; and Wanchese and Beaufort, North Carolina. The contribution of summer flounder to ports with 10% or more summer flounder dependence (value) is presented in Table 90. Of the seven ports accounting for the bulk of the summer flounder landings in 1999, only Beaufort (18.95%), Wanchese (13.26%), and Hampton (10.87%) had 10% or more revenue dependence on summer flounder (Table 90).

Activity at the port level indicate that 54% of the total scup commercial landings occurred in five ports: New Bedford, Massachusetts; Point Judith, Newport, and Little Compton, Rhode Island; and Cape May, New Jersey. The contribution of scup to ports with 10% or more scup dependence (value) is presented in Table 90. Of the five ports accounting for the bulk of the scup landings in 1999, only Little Compton (18.16%) had 10% or more revenue dependence on scup (Table 90).

Activity at the port level indicate that 57% of the total black sea bass commercial landings occurred in seven ports: Chatham and "Other Massachusetts", Massachusetts; Point Judith, Rhode Island; Cape May, New Jersey; Ocean City, Maryland; and Virginia Beach and Hampton, Virginia. The contribution of black sea bass to ports with 10% or more black sea bass dependence (value) is presented in Table 90. Of the seven ports accounting for the bulk of the black sea bass landings in 1999, only Virginia Beach (14.60%) and Ocean City (9.76%) had 10% or more revenue dependence on black sea bass (Table 90).

A detailed description of ports and communities with significant contribution of summer flounder, scup, and/or black sea bass to the total value landed for all species in that port is presented in section 3.4. While the contribution of summer flounder, scup, and black sea bass are important to specific ports, the overall contribution of these species to the total ex-vessel landed value from Maine to North Carolina was, on average, 1.63%, 0.34%, and 0.45%, for the 1999-2000 period, respectively.

3.3.4.1.1.3 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, etc. 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, etc.

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 landings, summer flounder, scup, and/or 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. In some cases none of the trip expenses are paid by the crew but incurred by the boat. When this system is employed, the gross revenue is divided equally between the crew and the boat. This system is termed "Clear 50." On the other hand, trip expenses such as fuel, ice, and in some cases food are subtracted from the gross revenue with the remainder divided 50-50 between the crew and the boat. This system is termed "Broken 50." When one or the other of the parties is responsible for additional costs, the share split normally reflects this.

In the Northeast, diesel fuel has increased from approximately $0.96 per gallon in 1997 to $1.27 per gallon in 2000 (USDA 2001). However, fuel costs will vary throughout the year and among ports. 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. Given the uncertainties of world oil markets, it is likely that fuel prices will fluctuate unpredictably from year to year.

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

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

The bulk of the summer flounder commercial landings (93%) are made by fish otter trawl gear. In addition, 2% of the summer flounder landings are landed by scallop dredges (Table 39). Vessels which use otter trawls other than finfish otter trawls are expected to be similar in their characteristics to finfish otter trawl vessels. Scallop dredgers are predominately the same type of vessel (often the same vessels) as those which use finfish or other otter trawls. Therefore, these vessels' fixed costs, with the exception of gear costs, would be the same as finfish otter trawlers while their variable costs will vary somewhat depending on weather, bottom topography and drag, etc. Over 75% of the scup commercial landings are made by fish otter trawl gear, followed by shallow floating traps (10%), hand lines (7%), and pots/traps for fish (4%) (Table 50). Over 95% of the landed black sea bass are harvested by three gear types: pots/traps for fish (46%), fish otter trawl gear (40%), and hand lines (9%) (Table 60).

The results of a survey of small Northeast fishing vessels (<65 feet in length) whose primary gear was otter trawl and reported landings in New England in 1996 was presented by Lallemand *et. al.* (1998). Even though the vessels in the survey had wide ranges in effort and in operating expenses, the vessel physical characteristics were very similar. The value most frequently reported for length (40 ft), gross ton (16 GRT), horsepower (300 hp), number of engines (1), crew size (2), and captain's age (38 years of age) are close to the respective reported means or averages. The age of the typical vessels was 17-years-old. The typical vessel value reported was $150,000 (mean of $142,726), however, a wide variation ($30,000 to $425,000) in vessel value was reported. Small otter trawlers indicated than when using secondary harvesting gear (other than otter trawl gear) they most likely catch squids late in the winter and early spring, lobsters early in summer and fall, and tuna in the summer.

Trip expenses were divided into eight categories (fuel, oil, ice, food and water, lumpers fees, supplies, consignment fees, and other expenses). The average total operating cost per trip for small trawlers in 1996 was $267. Fuel was the most significant expense, contributing with an average of $132/trip ($97/day), a median of $100/trip (or $100/day), and a standard deviation of $94/trip (or $26/day) (Tables 91 and 92). Trip expenses per year are presented in Table 93. Number of fishing trips by month, days absent by month, and steaming time by month are presented in Tables 94, 95, and 96, respectively.

The small trawler survey reported a total mean of $7,141/year for repair and maintenance. This represents the cost of routine repair and maintenance. Repair and maintenance cost for fishing and other gears was the largest component with 28% of the total, followed by maintenance (21%), engine (14%), other repair (12%), electronics (11%), tow wires (11%), and generator (3%).

Unusual expenses and unexpected repair costs ranging from $2,000 to $20,000 (mean $9,840) were reported. These costs are not likely to be made annually and probably represent major investments which will be amortized. Loan payments for small trawlers, have a mean of $873 and in most cases, are modest when compared to operating expenses and overhead costs. The mean average duration of the loan is 7 years at an 8.6% interest rate.

The remuneration system of smaller trawlers in the survey indicated that 56% of the resonants implemented a Clear Lay system in 1996, 41% used a Broken System, and 3% used a daily rate system. As such, it is reasonable to conclude that on small trawlers, the gross revenues are shared equally between the crew and the vessel using a 50-50 ratio. In addition, the captains bonus averaged between 6% and 9% and it was deducted from either the gross or vessel revenues.

The small trawler survey indicated that large variations among vessels' overhead costs exist. Overhead costs were divided into the following categories: haul-out charges; fishing permit(s); other permit(s); mooring and dockage fees; insurance; association(s) fees; professional fees; office expenses; vehicle; taxes (property, fuel, etc.); and other charges. The largest mean values were associated with other charges ($9,300), insurance ($3,925), and haul-out charges ($2,904). These items accounted for the bulk of the total mean overhead cost of $14,650 (standard error of $1,456).

Gross revenue for small otter trawl vessels in the survey ranged from $60,000 to $475,000, and the mean revenue was $174,863 (standard error $28,233). Most of the larger gross revenues (>$200,000) were reported by vessels that were greater than 50 feet and fished distances greater than 80 miles from the principal port of landings.

The results of a survey of large Northeast fishing vessels (>65 feet in length) whose primary gear was otter trawl and reported landings in New England in 1997 was presented by Lallemand *et. al.* (1999). Even though the vessels in the survey had wide ranges in effort and in operating expenses, the vessel physical characteristics were very similar. The value most frequently reported for length (65 ft), gross ton (125 GRT), horsepower (675 hp), number of engines (1), crew size (4), and captain's age (55 years of age) are close to the respective reported means or averages. The age of the typical vessels was 20 years old. The typical vessel value reported was $800,000, however, a wide variation ($80,000 to $1,250,000) in vessel value was reported. Large otter trawlers indicated that when using secondary harvesting gear (other than otter trawl gear) they most likely catch invertebrates (squids and shrimp) late in the winter and early spring, pelagics in the fall and early winter, and other fish (i.e., summer flounder, monkfish, whiting) in the summer. In addition, flat fish and other than groundfish are still mainly caught using otter trawl bottom fishing gear.

Trip expenses were divided into eight categories (fuel, oil, ice, food and water, lumpers fees, supplies, consignment fees, and other expenses). The average total operating cost per trip for large trawlers in 1997 was $2,608. Fuel was the most significant expense, contributing with an average of $1,369/trip ($332/day), a median of $1,440/trip (or $341/day), and a standard deviation of $314/trip (or $38/day) (Tables 97 and 98). Trip expenses per year are presented in Table 99. Number of fishing trips by month, days absent by month, and steaming time by month are presented in Tables 100, 101, and 102, respectively.

The large trawler survey reported a total mean of $40,805/year for repair and maintenance. These represents the cost of routine repair and maintenance. Repair and maintenance cost for fishing and other gears was the largest component with 27% of the total, followed by other repair (22%), maintenance (20%), engine (13%), tow wires (8%), electronics (7%), and generator (4%). Unusual expenses and unexpected repair costs ranging from $1,800 to $50,000 (mean $16,404) were reported. These costs are not likely to be made annually and probably represent major investments which will be amortized. Loan payments for small trawlers, have a mean of $4,155. The mean average duration of the loan is 9 years at a 7.3% interest rate.

The remuneration system of large trawlers in the survey indicated that 6% of the resonants implemented a Clear Lay system in 1997, 94% used a Broken System, and 0% used a daily rate system. As such, it is reasonable to conclude that on large trawlers, after trip expenses are subtracted from gross revenues, the remainder is shared equally between the crew and the vessel using a 50-50 ratio. In addition, the captains bonus averaged between 4% and 9% and it was deducted from either the gross or vessel revenues.

The large trawler survey indicated that the variations among vessels overhead costs is smaller than that from smaller trawlers. Overhead costs for large trawlers were divided into the following categories: haul-out charges; fishing permit(s); other permit(s); mooring and dockage fees; insurance; association(s) fees; professional fees; office expenses; vehicle; taxes (property, fuel, etc.); and other charges. The largest mean values were associated with insurance ($30,337), other charges ($8,200), and haul-out charges ($14,283). These items accounted for the bulk of the total mean overhead cost of $55,141 (standard error of $3,412). Gross revenue for large otter trawl vessels in the survey ranged from $65,468 to $1,542,417, and the mean revenue was $564,915 (standard error $74,492).

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 summer flounder, scup, or 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 black sea bass, 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%), and in past years made much of their income from striped bass (Norton *et al.* 1983).

The cost of using hook and line gear to fish for groundfish in the Northeastern U.S. was presented by Georgianna and Cass (1998). A population of 234 vessels interviewed in 1997 (averaging 26 trips per year), indicated that the fleet spent $2,479,613 in operating costs in 1996. However, this figure underestimates total operating cost outlays by the fleet because hook boats fish for other species (than groundfish) or use other gear for a considerable amount of fishing time. Overhead cost was estimated to be $2,981,137, $1,905,019 for mortgage, $1,154,557 for depreciation, and $3,266,349 for repairs and maintenance in 1996. The report indicates that most of these expenses were incurred in or near the vessel's home port.

Table 103 presents an estimated average annual operating costs for pot/trap vessels in 2000. These estimates are based on operating expenditures for the lobster fishery less bait and labor expenditures. While these costs are not specifically associated with pot/trap fishing for scup or black sea bass, they represent realistic approximations to the cost structure of those fisheries. The overall average annual operating costs for pot/trap vessels was $22,472 in 2000. The largest average operating cost was associated with fuel and lubricants with 29% of the total, followed by general maintenance (normal use) 19%, boat repair and maintenance (by owner) 15%, vehicles 15%, supplies (store) 14%, food 6%, boat repair and maintenance (by yard) 3%.

3.3.4.1.2 Processing, marketing, and consumption

Almost all summer flounder are sold in fresh form. The catch is generally iced at the dock and then shipped to market. The major central wholesale market for fresh fish in the Mid-Atlantic region is the Fulton Fish Market.

The number of processing plants handling summer flounder from Maine through North Carolina has varied from 10 in 1990 to 4 in 1999. The value of the summer flounder processed by these plants has varied from $2.1 million in 1990 to over $2.5 million in 1999. In addition, 91 plants reported handling unclassified flounders in 1990 (valued at $42.3 million) and 35 plants in 1999 (valued at $30.8 million) from Maine through North Carolina. The bulk of the plants handling unclassified flounders in 1999 were located in Massachusetts (20) followed by North Carolina (5), and Maine (4). Maryland, New Jersey, Pennsylvania, Rhode Island, and Virginia had a combined total of 6 plants handling unclassified summer flounder in 1999 (NMFS Unpublished processing survey data).

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

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

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

Recent and specific information on the distribution of processed summer flounder products to restaurants, specialty shops, institutional food service, and supermarkets is lacking. However, four surveys were conducted between 1970 and 1981 which determined per capita consumption of various species of fish or species groups. The surveys did not collect usable data on home consumption of fish caught by recreational fishermen so results must be interpreted for seafood obtained through commercial channels only. Findings of the four surveys were collated and summarized by Hu (1985) in order to investigate how socio-demographic and economic factors related to seafood consumption over time.

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

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

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

NMFS unpublished processing survey data indicates that in 1999, one plant reported handling scup and two plants handled black sea bass. Information regarding production for these plants is confidential. However, the overall contribution of black sea bass to the total poundage processed and total value of the products processed of these plants was minimal, i.e., less than 0.5%. The overall contribution of scup to the total poundage processed and total value of the products processed for the one plant reporting scup processing in 1999 was also minimal, i.e., 0.6% and 0.3%, respectively. Most scup and black sea bass are sold fresh (Bergman and 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. Scup and black sea bass might be frozen for future marketing when demand is low or when the market is glutted. When frozen, processing is minimal, mainly consisting of handling and freezing. Boxes containing scup and black sea bass for shipment typically weigh 100 pounds. However, higher value scup and black sea bass may be boxed in 50 and 60 pound cartons, respectively (McCauley pers. comm.).

Scup and black sea bass are generally transported to market by truck. The Fulton Fish Market in New York City is the primary wholesale outlet for scup (Finlayson and McCay 1994). Marketing channels for scup appear to be well established. 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).

Scup is generally a low priced fish. The greatest proportion of small scup go to dealers in Philadelphia, Washington, Baltimore and points south (Finlayson and McCay 1994). Some of the large scup marketed from Point Judith, Rhode Island are shipped to the Boston area (McCauley pers. comm.).

Finlayson and McCay (1994) reported that "black sea bass dealers in the Fulton Fish 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).

3.3.4.1.3 Economic impact of the commercial fishery

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

Cumulative direct impacts of the Mid-Atlantic summer flounder fishery (Table 104) amounted to 2,290 person-years of employment, $21.6 million in income, and $50.2 million in output (sales). Over 60% of the employment was generated in the food service sector. Harvesting and processing made up most of the remainder, each accounting for just under 15%. Income per person-year was highest in the harvesting and distribution sectors and lowest for processing and food service, probably related to the labor intensive nature of the two latter sectors. Value of output was high for harvesting, processing and food service, indicating the large markup in these sectors. In 2000, summer flounder contributed 1.6% of the total value of all finfish and shellfish landed from Maine to North Carolina (Table 70).

The economic impact of the commercial scup and black sea bass fisheries as it relates to employment and wages is difficult to determine given the nature of these fisheries. Since scup and black sea bass represent 0.3% and 0.4% of the total value for all finfish and shellfish from North Carolina to Maine, respectively, it can be assumed that only a small portion of the region's fishing vessel employment, wages and sales is dependent on scup and black sea bass (Tables 76 and 82).

3.3.4.2 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.

Since 1979, the NMFS has conducted an annual MRFSS along the Atlantic coast. The survey is designed to provide estimates of the total bimonthly fishing effort (number of days fished), participation, and finfish catch by marine recreational anglers. The MRFSS consists of two independent yet complementary surveys: an intercept survey of marine anglers at fishing access sites and a random digit dial (RDD) telephone survey of coastal county households. Data from the intercept survey are primarily used to estimate mean catch-per-trip by species. Participation and effort are estimated using data acquired through the RDD survey of coastal households. 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. It is worth noting that the recreational landings estimates are not comparable to commercial landings estimates because they include fish that are discarded dead.

3.3.4.2.1 Recreational fishing activity

3.3.4.2.1.1 Summer flounder

Recreational fishermen caught over 24 million summer flounder in 2000, the highest annual level of the past decade (Table 105). Landings in 2000 were also substantially higher than the ten year average in terms of numbers (7.5 million fish) and weight (15.8 million pounds). However, recreational fishermen released a slightly lower proportion of summer flounder alive (31%) than the 10 year average of 32%.

In 2000, over 90% of the summer flounder landed by weight in the North and Mid-Atlantic were caught in state waters (Table 106). Landings by North and Mid-Atlantic fishermen fishing in state waters have consistently exceeded EEZ landings throughout the past decade, accounting for over 93% of total landings, on average, during the past 10 years.

The participation of summer flounder anglers by region and mode indicates that from 1991 to 2000, 8% of the summer flounder (by number) were caught from party or charter vessels (Table 107). Anglers' expenditures aboard party and charter boats benefits the party and charter industry as well as other businesses in the coastal communities.

In addition to party and charter vessels, 10% of the summer flounder were caught from shore, and 82% from private/rental boats (Table 107). Furthermore, private and rental boat fishermen also accounted for over 80% of the summer flounder landings (by number) and over 80% of the summer flounder released alive, on average, during the past decade. 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; and are used to fish for many different species. Expenditure and cost data must be prorated for summer flounder trips to account for multipurpose use.

Anglers fishing in New Jersey were responsible for over 45% of the average annual total summer flounder landings from Maine to North Carolina during the past decade (Table 108). Recreational landings in New Jersey, New York, and Virginia accounted for 76% of the total annual landings (by number) during this time period.

Analysis of permit data indicates that in 2000, there were 1,969 vessels with one or more of the following three commercial or recreational federal northeast permits: summer flounder, black sea bass, and scup. A total of 1,033, 977, and 831 federal commercial permits for summer flounder, scup, and black sea bass, respectively, were issued to northeast region fishing vessels. For party/charter operators a total of 613, 498, and 528 federal permits were issued for summer flounder, scup, and black sea bass, respectively (section 3.5).

These three fisheries (summer flounder, scup, and black sea bass) have vessels permitted as commercial, recreational, or both. Of the 1,969 vessels with at least one federal permit there were 1,303 that held only commercial permits for summer flounder, scup, or black sea bass while there were 546 vessels that held only a recreational permit. The remaining vessels (120) held some combination of recreational and commercial permits. Whether engaged in a commercial or recreational fishing activity, vessels may hold any one of seven combinations of summer flounder, scup, and black sea bass permits. The total number of vessels holding any one of these possible combinations of permits by species and commercial or recreational status are reported in Table 87.

NMFS estimated that in 2000, a total of 33.228 million day trips were taken by marine recreational anglers along the Atlantic coast from Maine to North Carolina (Personal communication from NMFS, Fisheries Statistics and Economics Division). An estimated 16.7% of these anglers indicated that they preferred or sought summer flounder as the primary target species. That is, an estimated 5.56 million angler trips (all modes) were nominally directed at summer flounder from Maine to North Carolina in 2000.

3.3.4.2.1.2 Scup

Recreational fishermen caught over 10 million scup in 2000, the highest annual level since 1991 (Table 109). Landings in 2000 were also substantially higher than the ten year average in terms of numbers (6.9 million fish) and weight (5.1 million pounds). However, recreational fishermen also released a slightly higher proportion of scup alive (36%) than the 10 year average of 32%.

In 2000, 88% of the scup landed by weight in the North Atlantic were caught in state waters (Table 110). In the Mid-Atlantic, virtually all of the landings were caught in state waters (99%). Landings by North and Mid-Atlantic fishermen fishing in state waters have consistently exceeded EEZ landings throughout the past decade, accounting for over 87% of total landings, on average, during the past 10 years.

The participation of scup anglers by region and mode indicates that from 1991 to 2000, 18% of the scup (by number) were caught from party or charter vessels (Table 111). Anglers' expenditures aboard party and charter boats benefits the party and charter industry as well as other businesses in the coastal communities.

In addition to party and charter vessels, 10% of the scup (by number) were caught from shore, and 72% from private/rental boats (Table 111). Furthermore, private and rental boat fishermen also accounted for over 70% of the scup landings (by number) and over 75% of the scup released alive, on average, during the past decade. 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; and are used to fish for many different species. Expenditure and cost data must be prorated for scup trips to account for multipurpose use.

Anglers fishing in New York and Massachusetts were responsible for 55% of the average annual total scup landings from Maine to North Carolina during the past decade (Table 112). Recreational landings in four states, New York, Massachusetts, Rhode Island, and Connecticut, accounted for 86% of the total annual landings (by number) during this time period.

NMFS estimated that in 2000, a total of 33.228 million day trips were taken by marine recreational anglers along the Atlantic coast from Maine to North Carolina (Personal communication from NMFS, Fisheries Statistics and Economics Division). An estimated 1.3% of these anglers indicated that they preferred or sought scup as the primary target species. That is, an estimated 431,964 angler trips (all modes) were nominally directed at scup from Maine to North Carolina in 2000.

3.3.4.2.1.3 Black sea bass

Recreational fishermen caught over 17 million black sea bass in 2000, the highest annual level of the past decade (Table 113). However, landings in 2000 in terms of numbers (4.4 million fish) and weight (4.0 million pounds) were only slightly higher than the ten year averages (4.2 million fish and 3.7 million pounds, respectively). In 2000, recreational fishermen also released a higher proportion of black sea bass alive (74%) than the 10 year average of 59%.

Recreational fishermen in the Mid-Atlantic (including North Carolina) landed substantially more black sea bass from the EEZ in 2000 than their North Atlantic counterparts (Table 114). Landings by Mid-Atlantic fishermen fishing in the EEZ have consistently exceeded state-level landings throughout the past decade, accounting for 77% of total landings, on average, during the past 10 years. In contrast, state-level landings were predominant in the North Atlantic for most years during the past decade. Nearly 80%, on average, of the black sea bass landed by North Atlantic fishermen during the past 10 years was caught in state waters.

The participation of black sea bass anglers by region and mode indicates that from 1991 to 2000, 64% of black sea bass (by number) were landed from party or charter vessels (Table 115). Anglers expenditures aboard party and charter boats benefits the party and charter industry as well as other businesses in the coastal communities.

In addition to party and charter vessels, 3% of black sea bass (by number) were landed from shore, and 33% from private/rental boats (Table 115). Furthermore, private and rental boat fishermen accounted for most of the black sea bass catch from 1991-2000 (50%), but party and charter boats landed more black sea bass (by number and weight) during this time period than shore and private/rental boat fishermen combined. 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; 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.

Anglers fishing in New Jersey were responsible for over 50% of the average annual total black sea bass landings from Maine to North Carolina during the past decade (Table 116). Recreational landings in New Jersey, Maryland, and Virginia accounted for 86% of the total annual landings during this time period.

NMFS estimated that in 2000, a total of 33.228 million day trips were taken by marine recreational anglers along the Atlantic coast from Maine to North Carolina (Personal communication from the NMFS, Fisheries Statistics and Economics Division). An estimated 0.72% of these anglers indicated that they preferred or sought black sea bass as the primary target species. That is, an estimated 238,976 angler trips (all modes) were nominally directed at black sea bass from Maine to North Carolina in 2000.

3.3.4.2.2 Economic impact of the recreational fishery

3.3.4.2.2.1 Summer flounder

Anglers' expenditures generate and sustain employment and personal income in the production and marketing of fishing-related goods and services. In 1998, saltwater anglers from Maine to Virginia spent an estimated $1.136 billion on trip-related goods and services (Steinback and Gentner 2001). Trip-related good and services included expenditures on private transportation, public transportation, food, lodging, boat fuel, party/charter fees, access/boat launching fees, equipment rental, bait, and ice. Unfortunately, estimates of trip expenditures specifically associated with summer flounder were not provided in the study. However, if average trip expenditures are assumed to be constant across all fishing trips, an estimate of the expenditures associated with summer flounder can be determined by multiplying the proportion of total trips that targeted summer flounder (16.7%) by the total estimated trip expenditures from the Steinback and Gentner study ($1.136 billion). According to this procedure, anglers fishing for summer flounder from Maine to Virginia spent an estimated $200.412 million on trip-related goods and services in 2000.[1] Apart from trip-related expenditures, anglers also purchase fishing equipment and other durable items that are used for many trips (i.e, rods, reels, clothing, boats, etc.). Although some of these items may be purchased with the intent of targeting/catching specific species, the fact that these items can be used for multiple trips creates difficulty when attempting to associate durable expenditures with particular species. Therefore, only trip-related expenditures were used in this assessment.

The summer flounder expenditure estimate can be used to reveal how anglers' expenditures affect economic activity such as sales, income, and employment from Maine to Virginia. During the course of a fishing trip, summer flounder anglers purchase a variety of goods and services, spending money on transportation, food, boat fuel, lodging, etc. The sales, employment, and income generated from these transactions are known as the direct effects of anglers' purchases. Indirect and induced effects also occur because businesses providing these goods and services also must purchase goods and services and hire employees, which in turn, generate more sales, income, and employment. These ripple effects (i.e., multiplier effects) continue until the amount

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[1]The 1998 estimate of expenditures ($189.712 million) was adjusted to its 2000 equivalent ($200.412 million) by using the Bureau of Labor Statistics Consumer Price Index.

remaining in a local economy in negligible. A variety of analytical approaches are available for determining these impacts, such as input-output modeling. Unfortunately, a model of this kind was not available. Nonetheless, the total sales impacts can be approximated by assuming a multiplier of 1.5 to 2.0 for the Northeast Region. Given the large geographical area of the Northeast Region, it is likely that the sales multiplier falls within those values. As such, the total estimated sales generated from anglers that targeted summer flounder in 2000 was likely to be between $300.618 million ($200.412 million * 1.5) and $400.824 million ($200.412 million * 2.0) from Maine to Virginia. A similar procedure could be used to calculate the total personal income and employment generated from summer flounder anglers' expenditures, but since these multiplier values have been quite variable in past studies, no estimates were provided here.

3.3.4.2.2.2 Scup

Anglers' expenditures generate and sustain employment and personal income in the production and marketing of fishing-related goods and services. In 1998, saltwater anglers from Maine to Virginia spent an estimated $1.136 billion on trip-related goods and services (Steinback and Gentner 2001). Trip-related good and services included expenditures on private transportation, public transportation, food, lodging, boat fuel, party/charter fees, access/boat launching fees, equipment rental, bait, and ice. Unfortunately, estimates of trip expenditures specifically associated with scup were not provided in the study. However, if average trip expenditures are assumed to be constant across all fishing trips, an estimate of the expenditures associated with scup can be determined by multiplying the proportion of total trips that targeted scup (1.3%) by the total estimated trip expenditures from the Steinback and Gentner study ($1.136 billion). According to this procedure, anglers fishing for scup from Maine to Virginia spent an estimated $15.598 million on trip-related goods and services in 2000.[2] Apart from trip-related expenditures, anglers also purchase fishing equipment and other durable items that are used for many trips (i.e, rods, reels, clothing, boats, etc.). Although some of these items may be purchased with the intent of targeting/catching specific species, the fact that these items can be used for multiple trips creates difficulty when attempting to associate durable expenditures with particular species. Therefore, only trip-related expenditures were used in this assessment.

The scup expenditure estimate can be used to reveal how anglers' expenditures affect economic activity such as sales, income, and employment from Maine to Virginia. During the course of a fishing trip, scup anglers purchase a variety of goods and services, spending money on transportation, food, boat fuel, lodging, etc. The sales, employment, and income generated from these transactions are known as the direct effects of anglers' purchases. Indirect and induced effects also occur because businesses providing these goods and services also must purchase goods and services and hire employees, which in turn, generate more sales, income, and employment. These ripple effects (i.e., multiplier effects) continue until the amount remaining in a local economy in negligible. A variety of analytical approaches are available for determining these impacts, such as input-output modeling. Unfortunately, a model of this kind was not available. Nonetheless, the total sales impacts can be approximated by assuming a multiplier of 1.5 to 2.0 for the Northeast Region. Given the large geographical area of the Northeast Region, it

[2]The 1998 estimate of expenditures ($14.768 million) was adjusted to its 2000 equivalent ($15.598 million) by using the Bureau of Labor Statistics Consumer Price Index.

is likely that the sales multiplier falls within those values. As such, the total estimated sales generated from anglers that targeted scup in 2000 was likely to be between $23.397 million ($15.598 million * 1.5) and $31.196 million ($15.598 million * 2.0) from Maine to Virginia. A similar procedure could be used to calculate the total personal income and employment generated from scup anglers' expenditures, but since these multiplier values have been quite variable in past studies, no estimates were provided.

3.3.4.2.2.3 Black sea bass

Anglers' expenditures generate and sustain employment and personal income in the production and marketing of fishing-related goods and services. In 1998, saltwater anglers from Maine to Virginia spent an estimated $1.136 billion on trip-related goods and services (Steinback and Gentner 2001). Trip-related goods and services included expenditures on private transportation, public transportation, food, lodging, boat fuel, party/charter fees, access/boat launching fees, equipment rental, bait, and ice. Unfortunately, estimates of trip expenditures specifically associated with black sea bass were not provided in the study. However, if average trip expenditures are assumed to be constant across all fishing trips, an estimate of the expenditures associated with black sea bass can be determined by multiplying the proportion of total trips that targeted black sea bass (0.72%) by the total estimated trip expenditures from the Steinback and Gentner study ($1.136 billion). According to this procedure, anglers fishing for black sea bass from Maine to Virginia spent an estimated $883,354 on trip-related goods and services in 2000.[3] Apart from trip-related expenditures, anglers also purchase fishing equipment and other durable items that are used for many trips (i.e., rods, reels, clothing, boats, etc.). Although some of these items may be purchased with the intent of targeting/catching specific species, the fact that these items can be used for multiple trips creates difficulty when attempting to associate durable expenditures with particular species. Therefore, only trip-related expenditures were used in this assessment.

The black sea bass expenditure estimate can be used to reveal how anglers' expenditures affect economic activity such as sales, income, and employment from Maine to Virginia. During the course of a fishing trip, black sea bass anglers purchase a variety of goods and services, spending money on transportation, food, boat fuel, lodging, etc. The sales, employment, and income generated from these transactions are known as the direct effects of anglers' purchases. Indirect and induced effects also occur because businesses providing these goods and services also must purchase goods and services and hire employees, which in turn, generate more sales, income, and employment. These ripple effects (i.e., multiplier effects) continue until the amount remaining in a local economy in negligible. A variety of analytical approaches are available for determining these impacts, such as input-output modeling. Unfortunately, a model of this kind was not available. Nonetheless, the total sales impacts can be approximated by assuming a multiplier of 1.5 to 2.0 for the Northeast Region. Given the large geographical area of the Northeast Region, it is likely that the sales multiplier falls within those values. As such, the total estimated sales generated from anglers that targeted black sea bass in 2000 was likely to be between $1.325 million ($883,354*1.5) and $1.767 million ($883,354*2.0). A similar procedure could be used to

[3]The 1998 estimate of expenditures ($817,920) was adjusted to its 2000 equivalent ($883,354) by using the Bureau of Labor Statistics Consumer Price Index.

calculate the total personal income and employment generated from black sea bass anglers' expenditures, but since these multiplier values have been quite variable in past studies no estimates were provided here.

3.3.4.2.3 Value of the fishery to anglers

3.3.4.2.3.1 Summer flounder

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 fishing (purchase of gear, bait, boats, fuel, etc.), but do not pay for the fish they catch or for the enjoyment of many other attributes of the fishing experience (socializing with friends, contact with nature, etc.). Despite the obvious value of these attributes of the experience to anglers, no direct expenditures are made for them, hence the term "non-monetary" benefits.

Behavioral models that examine travel expenditures, catch rates, accessability of fishing sites, and a variety of other factors affecting angler enjoyment can be used to estimate the "non-monetary" benefits associated with recreational fishing trips. Unfortunately, a model of this kind does not exist for summer flounder. Data constraints often preclude researchers from designing species-specific behavioral models. However, a recent study by Hicks, *et. al.* (1999) estimated the value of access across states in the Northeast region (that is, what people are willing to pay for the opportunity to go marine recreational fishing in a particular state in the Northeast) and the marginal value of catching fish (that is, what people are willing to pay to catch an additional fish). Table 117 shows, on average, the amount anglers in the Northeast states (except for North Carolina which was not included in the study) are willing to pay for a one-day fishing trip. The magnitude of the values in Table 117 reflect both the relative fishing quality of a state and the ability of anglers to choose substitute sites. The willingness to pay is generally larger for larger states, since anglers residing in those states may need to travel significant distances to visit alternative sites. Several factors need to be considered when examining the values in Table 117. First, note that Virginia has relatively high willingness to pay estimates given its relative size and fishing quality characteristics. In this study, Virginia defines the southern geographic boundary for a person's choice set, a definition that is arbitrary in nature. For example, an angler in southern Virginia is likely to have a choice set that contains sites in North Carolina. The regional focus of the study ignores these potential substitutes and therefore the valuation estimates may be biased upward (Hicks, *et. al.* 1999). Second, the values cannot be added across states since they are contingent upon all of the other states being available to the angler. If it was desirable to know the willingness to pay for a fishing trip within Maryland and Virginia, for example, the welfare measure would need to be recalculated while simultaneously closing the states of Maryland and Virginia.

Assuming the average willingness to pay values shown in Table 117 are representative of trips that targeted summer flounder, these values can be multiplied by the number of trips that targeted summer flounder by state (from the MRFSS data) to derive welfare values for summer flounder. Table 118 shows the aggregate estimated willingness to pay by state for anglers that targeted summer flounder in 2000 (i.e., the value of the opportunity to go recreational fishing for summer flounder). New York, New Jersey, and Virginia were the states with the highest estimated willingness to pay for summer flounder day trips. Once again, note that the values cannot be added across states since values are calculated contingent upon all of the other states being available to the angler.

In the Hicks *et. al.* (1999) study the researchers also estimated welfare measures for a one fish change in catch rates for 4 different species groups by state. One of the species groups was "flat fish," of which summer flounder is a component. Table 119 shows their estimate of the welfare change associated with a one fish increase in the catch rate of all flat fish by state. For example, in Massachusetts, it was estimated that all anglers would be willing to pay $5.03 (the 1994 value adjusted to its 2000 equivalent) extra per trip for a one fish increase in the expected catch rate of all flat fish. The drawback to this type of aggregation scheme is that the estimates relate to the marginal value of the entire set of species within the flat fish category, rather than for a particular species within the grouping. As such, it is not possible to estimate the marginal willingness to pay for a one fish increase in the expected catch rate of summer flounder from the information provided in Table 119.

However, it is possible to calculate the aggregate willingness to pay for a 1 fish increase in the catch rate of flat fish across all anglers. Assuming that anglers will not adjust their trip taking behavior when flat fish catch rates at all sites increase by one fish, the estimated total aggregate willingness to pay for a one fish increase in the catch rate of flat fish in 2000 was $154.843 million (total trips (33.228 million) x average per trip value ($4.66)). This is an estimate of the total estimated welfare gain (or loss) to fishermen of a one fish change in the average per trip catch rate of all flat fish. Although it is unclear how much of this welfare measure would be attributable to summer flounder, the results show that flat fish in general, in the Northeast, are an extremely valuable resource.

Although not addressed here, recreational fishing participants and nonparticipants may also hold additional intrinsic value out of a desire to be altruistic to friends and relatives who fish or to bequeath a fishery resource to future generations. A properly constructed valuation assessment would include both use and intrinsic values in the estimation of total net economic value. Currently, however, there have been no attempts to determine the altruistic value (i.e, non-use value) of summer flounder in the Northeast.

3.3.4.2.3.2 Scup

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 fishing (purchase of gear, bait, boats, fuel, etc.), but do not pay for the fish they catch or for the enjoyment of many other attributes of the fishing experience (socializing with friends, contact with nature, etc.). Despite the obvious value of these attributes of the experience to anglers, no direct expenditures are made for them, hence the term "non-monetary" benefits.

Behavioral models that examine travel expenditures, catch rates, accessability of fishing sites, and a variety of other factors affecting angler enjoyment can be used to estimate the "non-monetary" benefits associated with recreational fishing trips. Unfortunately, a model of this kind does not exist for scup. Data constraints often preclude researchers from designing species-specific behavioral models. However, a recent study by Hicks, *et. al.* (1999) estimated the value of access across states in the Northeast region (that is, what people are willing to pay for the opportunity to go marine recreational fishing in a particular state in the Northeast) and the marginal value of catching fish (that is, what people are willing to pay to catch an additional fish). Table 117 shows, on average, the amount anglers in the Northeast states (except for North Carolina which was not included in the study) are willing to pay for a one-day fishing trip. The magnitude of the values in Table 117 reflect both the relative fishing quality of a state and the ability of anglers to choose substitute sites. The willingness to pay is generally larger for larger states, since anglers residing in those states may need to travel significant distances to visit alternative sites. Several factors need to be considered when examining the values in Table 117. First, note that Virginia has relatively high willingness to pay estimates given its relative size and fishing quality characteristics. In this study, Virginia defines the southern geographic boundary for a person's choice set, a definition that is arbitrary in nature. For example, an angler in southern Virginia is likely to have a choice set that contains sites in North Carolina. The regional focus of the study ignores these potential substitutes and therefore the valuation estimates may be biased upward (Hicks, *et. al.* 1999). Second, the values cannot be added across states since they are contingent upon all of the other states being available to the angler. If it was desirable to know the willingness to pay for a fishing trip within Maryland and Virginia, for example, the welfare measure would need to be recalculated while simultaneously closing the states of Maryland and Virginia.

Assuming the average willingness to pay values shown in Table 117 are representative of trips that targeted scup, these values can be multiplied by the number of trips that targeted scup by state (from the MRFSS data) to derive welfare values for scup. Table 120 shows the aggregate estimated willingness to pay by state for anglers that targeted scup in 2000 (i.e., the value of the opportunity to go recreational fishing for scup). Willingness to pay values were estimated only for five of the states in the North and Mid-Atlantic (Massachusetts, Rhode Island, Connecticut, New York, and New Jersey) because no anglers indicated they were targeting scup in the remaining states. The value of access to anglers fishing in New York was considerably higher than in all of the other states. Once again, note that the values cannot be added across states since values are calculated contingent upon all of the other states being available to the angler.

In the Hicks *et. al.* (1999) study the researchers also estimated welfare measures for a one fish change in catch rates for 4 different species groups by state. One of the species groups was "bottom fish," of which scup is a component. Table 121 shows their estimate of the welfare change associated with a one fish increase in the catch rate of all bottom fish by state. For example, in New York, it was estimated that all anglers would be willing to pay $1.89 (the 1994 value adjusted to its 2000 equivalent) extra per trip for a one fish increase in the expected catch rate of all bottom fish. The drawback to this type of aggregation scheme is that the estimates relate to the marginal value of the entire set of species within the bottom fish category, rather than for a particular species within the grouping. As such, it is not possible to estimate the marginal willingness to pay for a one fish increase in the expected catch rate of scup from the information provided in Table 121.

However, it is possible to calculate the aggregate willingness to pay for a 1 fish increase in the catch rate of bottom fish across all anglers. Assuming that anglers will not adjust their trip taking behavior when bottom fish catch rates at all sites increase by one fish, the estimated total aggregate willingness to pay for a one fish increase in the catch rate of bottom fish in 2000 was $76.092 million (total trips (33.228 million) x average per trip value ($2.29)). This is an estimate of the total estimated welfare gain (or loss) to fishermen of a one fish change in the average per trip catch rate of all bottom fish. Although it is unclear how much of this welfare measure would be attributable to scup, the results show that bottom fish in general, in the Northeast, are an extremely valuable resource.

Although not addressed here, recreational fishing participants and nonparticipants may also hold additional intrinsic value out of a desire to be altruistic to friends and relatives who fish or to bequeath a fishery resource to future generations. A properly constructed valuation assessment would include both use and intrinsic values in the estimation of total net economic value. Currently, however, there have been no attempts to determine the altruistic value (i.e, non-use value) of scup in the Northeast.

3.3.4.2.3.3 Black sea bass

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 fishing (purchase of gear, bait, boats, fuel, etc.), but do not pay for the fish they catch or for the enjoyment of many other attributes of the fishing experience (socializing with friends, contact with nature, etc.). Despite the obvious value of these attributes of the experience to anglers, no direct expenditures are made for them, hence the term "non-monetary" benefits.

Behavioral models that examine travel expenditures, catch rates, accessibility of fishing sites, and a variety of other factors affecting angler enjoyment can be used to estimate the "non-monetary" benefits associated with recreational fishing trips. Unfortunately, a model of this kind does not exist for black sea bass. Data constraints often preclude researchers from designing species-specific behavioral models. However, a recent study by Hicks, *et. al.* (1999) estimated the value of access across states in the Northeast region (that is, what people are willing to pay for the opportunity to go marine recreational fishing in a particular state in the Northeast) and the marginal value of catching fish (that is, what people are willing to pay to catch an additional fish). Table 117 shows, on average, the amount anglers in the Northeast states (except for North Carolina which was not included in the study) are willing to pay for a one-day fishing trip. The magnitude of the values in Table 117 reflect both the relative fishing quality of a state and the ability of anglers to choose substitute sites. The willingness to pay is generally larger for larger states, since anglers residing in those states may need to travel significant distances to visit alternative sites. Several factors need to be considered when examining the values in Table 117. First, note that Virginia has relatively high willingness to pay estimates given its relative size and fishing quality characteristics. In this study, Virginia defines the southern geographic boundary for a person's choice set, a definition that is arbitrary in nature. For example, an angler in southern Virginia is likely to have a choice set that contains sites in North Carolina. The regional focus of the study ignores these potential substitutes and therefore the valuation estimates may be biased upward (Hicks, *et. al.* 1999). Second, the values cannot be added across states since they are contingent upon all of the other states being available to the angler. If it was desirable to know the willingness to pay for a fishing trip within Maryland and Virginia, for example, the welfare measure would need to be recalculated while simultaneously closing the states of Maryland and Virginia.

Assuming the average willingness to pay values shown in Table 117 are representative of trips that targeted black sea bass, these values can be multiplied by the number of trips that targeted black sea bass by state (from the MRFSS data) to derive welfare values for black sea bass. Table 122 shows the aggregate estimated willingness to pay by state for anglers that targeted black sea bass in 2000 (i.e., the value of the opportunity to go recreational fishing for black sea bass). New Jersey, Virginia, and New York were the states with the highest estimated willingness to pay for black sea bass day trips. Once again, note that the values cannot be added across states since values are calculated contingent upon all of the other states being available to the angler.

In the Hicks *et. al.* (1999) study, the researchers also estimated welfare measures for a one fish change in catch rates for 4 different species groups by state. One of the species groups was "bottom fish," of which black sea bass is a component. Table 121 shows their estimate of the welfare change associated with a one fish increase in the catch rate of all bottom fish by state. For example, in New Jersey, it was estimated that all anglers would be willing to pay $2.01 (the 1994 value adjusted to its 2000 equivalent) extra per trip for a one fish increase in the expected catch rate of all bottom fish. The drawback to this type of aggregation scheme is that the estimates relate to the marginal value of the entire set of species within the bottom fish category, rather than for a particular species within the grouping. As such, it is not possible to estimate the marginal willingness to pay for a one fish increase in the expected catch rate of black sea bass from the information provided in Table 121.

However, it is possible to calculate the aggregate willingness to pay for a 1 fish increase in the catch rate of bottom fish across all anglers. Assuming that anglers will not adjust their trip taking behavior when bottom fish catch rates at all sites increase by one fish, the estimated total aggregate willingness to pay for a one fish increase in the catch rate of bottom fish in 2000 was $76.092 million (total trips (33.228 million) x average per trip value ($2.29)). This is an estimate of the total estimated welfare gain (or loss) to fishermen of a one fish change in the average per trip catch rate of all bottom fish. Although it is unclear how much of this welfare measure would be attributable to black sea bass, the results show that bottom fish in general, in the Northeast, are a very valuable resource.

Although not addressed here, recreational fishing participants and nonparticipants may also hold additional intrinsic value out of a desire to be altruistic to friends and relatives who fish or to bequeath a fishery resource to future generations. A properly constructed valuation assessment would include both use and intrinsic values in the estimation of total net economic value. Currently, however, there have been no attempts to determine the altruistic value (i.e., non-use value) of black sea bass in the Northeast.

3.3.4.2.4 1990 Survey of party and charter boats

The charter and party boat industry is important in several states in the management unit of this FMP. On average for the 1991-2000 period, 10% of the summer flounder, 20% of the scup, and 64% of the black sea bass, in numbers, landed by anglers from Maine to North Carolina were caught from party or charter boats (Tables 107, 111, and 115).

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 123). Massachusetts, New York, New Jersey, 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 the 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 included 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 124). It was followed by bluefish (4.6), then summer flounder (3.6), Atlantic mackerel (3.5), and striped bass (3.5). Black sea bass and scup ranked a mean interest of 3.2 and 2.2, respectively. 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), sharks (other than dogfish) (1.9), and scup (2.0).

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. Scup and black sea bass showed one of the smallest differences between interest and success value for party boat fishermen (0.3) and (0.2), respectively.

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 124). 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 and scup for charter boat owners was 2.1 and 1.4, respectively.

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 125). 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.

3.3.4.3 International trade

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

Flat fish imports (excluding halibut) for all product forms decreased from 68.2 million pounds in 1995 to 35.0 million if 2000. However, the value of those imports increased from $139.0 in 1995 to $147.4 in 2000 (NMFS trade data).

Imports of summer flounder have slightly increased for the 1995 to 2000 period. The quantity of summer flounder (all product forms) that entered the US increased from 9.4 million pounds ($42.4 million) in 1995 to 9.7 million pounds ($44.3 million) in 2000. By product type, "frozen fillets" contributed to the bulk of the imports in 2000 with over 52% of the total poundage and 63% of the total value, followed by "whole fresh" (29%, 12%), "fresh fillets" (11%, 17%), "frozen fillet blocks >4.5 kg" (6%, 7%), and "whole frozen" (2%, 1%). Canada and Argentina contributed with the bulk of the summer flounder shipped into the US in 2000. Canada contributed with 50% of the total volume and 37% of the total value of all summer flounder that entered the US last year, and Argentina contributed with 27% of the total volume and 36% of the total value.

The value of imported flatfish products can vary widely depending on the species, whether fresh or frozen, overall quality, and the level of value added through filleting, etc. Belgium and the Netherlands in particular specialize in high value species and products. The average value of

Belgium's and Netherlands' flatfish exports to the US was $10.65/lb and 6.83/lb in 2000, versus Pakistan $1.01/lb, and $4.21 per lb. for all countries combined. The value of summer flounder that enters the US also varies by product form. The average value of summer flounder (all product forms) that entered the country in 2000 was $4.56/lb. In 2000, the most valuable summer flounder product form was "fresh fillets" at $7.23/lb, followed by "frozen fillets" ($5.56/lb), "frozen fillet blocks >4.5 kg" ($5.11/lb), "whole frozen" ($2.02/lb), and "whole fresh" $1.88/lb.

Total US commercial production flounders was estimated at 331 million pounds in 1999, with an average ex-vessel value of $0.27/lb (Fisheries of the USA, 2000). Slightly more than 3.2% (10.6 million pounds) of this domestic harvest was made up of summer flounder, with an average price of $1.83/lb: more than six times the nation's average. When compared with just the more valuable Atlantic coast flounders (winter, summer, and yellow tail flounders), summer flounder comprised 35% of the 1999 landings and 44% of the value.

Japan continues to be the most important export market for summer flounder. Exports of summer flounder are difficult to determine as summer flounder gets lumped under a variety of export codes and it is impossible to identify in the U.S. export data (Ross pers. comm.). However, export of US summer flounder to Japan has been reported to vary from approximately 800 to 1,800 mt in 1993-1997 (Asakawa pers. comm.). Fresh whole U.S. fluke or summer flounder (*Paralichthys dentatus*) is generally exported to Japan for raw (sashimi) consumption. Fresh U.S. summer flounder is used as a substitute for Japanese "hirame" (bastard halibut -- *Paralichthys olivaceus*), and normally imported whole fresh and sold through seafood auction markets to restaurants. They are usually consumed raw for sashimi or sushi toppings in Japan. While U.S. summer flounder is well established in some major action markets, daily prices may fluctuate depending on the total quantity of domestic and imported hirame (including U.S. summer flounder) delivered to auction on a given day. Depending on quality, auction prices for fresh U.S. summer flounder may vary from around 1,000 to 3,000 yen/kilo ($3.13 to 9.40/lb at 145 yen/$ 1.00) depending on size, quality and market conditions (Asakawa pers. comm.). Frozen summer flounder may not be considered to be of the same quality, and is unlikely to become substitute for unfrozen summer flounder. Nevertheless, properly handled frozen summer flounder may receive wholesale prices of 400-900 yen/kilo ($1.73-3.90/lb) or higher (Asakawa pers. comm.). The recent economic crisis in Japan could potentially hamper exports of seafood commodities to that country. Furthermore, future devaluation of the yen would result in reduced revenues for exporters of summer flounder to Japan.

Scup occur primarily on the continental shelf of the northwest Atlantic, and there are no imports of this species into the US. International trade of scup appears to be very limited. In 1991 there were no scup exports and in 1992 about 93,000 pounds valued at $67,200 were exported to China (Ross pers. comm.). These figures minimum export values. Given the export classification codes employed by the NMFS, it is possible that some scup were exported under the "unclassified" species category.

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 (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.

3.4 PORT AND COMMUNITY DESCRIPTION

3.4.1 Defining What Constitutes a Community

National Standard 8 states that conservation and management measures take into consideration the importance of the fishery resources to fishing communities while being consistent with the conservation requirements of the MSFCMA. According to National Standard 8, a fishing community must be a geographic entity. This geographic entity could be a port/town, a county, or some small geographic division. In this amendment, the basic unit of analysis is the port/town.

The main purpose of this amendment is to remedy the problems associated with the current management system for the commercial black sea bass fishery (see section 1.0, Purpose and Need for Action, of the EIS for a full description of history of FMP development, management objectives and strategy, and problems for resolution). In addition, this amendment will address fishing gear impacts to Essential Fish Habitat (EFH) for the summer flounder, scup, and black sea bass fisheries (see section 1.0 for purpose and need for action of the EIS and provide an update on the port/community description for these three species).

3.4.2 Dependence of Individual Communities on Summer Founder, Scup, and Black Sea Bass

According to National Marine Fisheries Service (NMFS) weighout landings data, in 1999, summer flounder was landed in 130 ports, scup in 63 ports, and black sea bass in 99 ports from Maine throughout North Carolina. In addition, 57 ports reported landings of all three species. All of these ports were located in 10 states and 64 counties and are listed in Table 126.

In order to assess the importance of each species to each port, the proportion or contribution of the species to the total value landed (or revenue) from all landings (fishing revenue dependence) were estimated. The ports reporting summer flounder landings (130 ports) in 1999 showed that summer flounder contributed less than 5% of the total port landings value for all species for 65% of the ports (84 ports), with 5-10% of the total port landings value for 14% of the ports (18 ports), and with greater than 10% of the total port landings value for 22% of the ports (28 ports). The ports reporting scup landings (63 ports) in 1999 showed that scup contributed less than 5% of the total port landings value for all species for 81% of the ports (51 ports), with 5-10% of the total port landings value for 6% of the ports (4 ports), and with greater than 10% of the total port landings value for 13% of the ports (8 ports). The ports reporting black sea bass landings (99 ports) in 1999 showed that black sea bass contributed less than 5% of the total port landings value for all species for 85% of the ports (84 ports), with 5-10% of the total port landings value for 6% of the ports (6 ports), and with greater than 10% of the total port landings value for 9% of the ports (9 ports). In addition, for ports showing any landings combinations of summer flounder, scup, and/or black sea bass (140 ports) in 1999, summer flounder, scup, and/or black sea bass contributed with less than 5% of the total port landings value for all species for 53% of the ports (75 ports), with 5-10% of the total port landings value for 12% of the ports (17 ports), and with greater than 10% of the total port landings value for 34% of the ports (48 ports).

As such, when the individual contribution of summer flounder, scup, or black sea bass to the total value landed for all species is considered, a small proportion of the ports (ranging from 6 to 22%) where these species were landed in 1999 derived more than 10% of the total port landings from any of the three species. However, when the contribution of two or more species is considered, the percentage of ports showing more than 10% of the total port landings increased to 34%. Since in some cases, the total port landings ranged from a few hundred to a few thousand dollars, the following criteria was employed to identify the ports and counties to be described in the community profiles: 1) the contribution of either summer flounder, scup, or black sea bass was 10% or more of the total value landed for all species in a specific port; 2) the contribution of either summer flounder, scup, or black sea bass to the ports identified under criteria 1 was $1,000 or greater; 3) the contribution of either summer flounder, scup, and/or black sea bass was 10% or more of the total value landed in a specific port; and 4) that the total landed value for all species combined for those ports qualifying under the above criteria (3) was $100,000 or greater.

Employing the criteria outlined above, 34 ports were identified for further evaluation. These ports and the contribution of summer flounder, scup, and black sea bass to the total value of all port landings are presented in Table 90. In addition, two other ports, Tiverton (Newport County, Rhode Island) and Cape May (Cape May County, New Jersey), were included in the discussion because the overall contribution of summer flounder, scup, and black sea bass was 10% of the total value of all species landed in those ports. In addition, detailed economic information of the counties containing one or more ports that showed 10% or more commercial revenue dependence on summer flounder, scup, and/or black sea bass in 1999 is presented in section 5.3.7.1 of the Regulatory Flexibility Analysis (RFA).

Barnstable County, Massachusetts

Barnstable is one of 14 counties in Massachusetts and is part of the Barnstable-Yarmouth Metropolitan Area. In 1999, the total population for the county of 212,519 individuals ranked 9th in the state.

PER CAPITA PERSONAL INCOME

In 1999, Barnstable had a per capita personal income (PCPI) of $34,470. This PCPI ranked 6th in the state, and was 97% of the state average ($35,527) and 121% of the national average ($28,546). The 1999 PCPI reflected a 5.7% increase from 1998. The 1998-1999 state change was 6.3% while the national change was 4.5%.

TOTAL PERSONAL INCOME

In 1999, Barnstable had a total personal income (TPI) of $7,325,565* (*all income estimates with the exception of PCPI are in thousands of dollars). This TPI ranked 9th in the state and accounted for 3.3% of the state total. The 1999 TPI reflected a 7.7% increase from 1998. The 1998-1999 state change was 6.9% and the national change was 5.4%.

COMPONENTS OF TOTAL PERSONAL INCOME

The TPI includes the earnings (wages, salaries, other labor income, and proprietors' income); dividends, interest, and rent; and transfer payments received by the residents of Barnstable. In 1999, earnings were 55.4% of TPI; dividends, interest, and rent were 28.8%; and transfer payments were 15.9%. From 1998 to 1999, earnings increased 10.7%; dividends, interest, and rent increased 4.9%; and transfer payments increased 3.1%.

EARNINGS BY INDUSTRY

Earnings by persons employed in Barnstable increased from $3,223,196* in 1998 to $3,666,220* in 1999, an increase of 13.7%. The largest industries in 1999 were services (31.1% of earnings), retail trade (16.9%), and state and local government (12.9%). In 1999, the industries that accounted for at least 5% of earnings showed the slowest growing from 1998 to 1999 was state and local government (increased 5.4%) while the fastest growing was durable goods manufacturing (7.5% of earnings in 1999 which increased 157.1%) (Regional Economic Information Systems, Bureau of Economic Analysis, Bearfacts *–http://www.bea.doc.gov/bea/regional/bearfacts/bf1/25/b125001.htm*)

In 1990, Barnstable County had 186,605 residents allocated among 52,450 families and 77,675 households. According to 1990 Census data in Barnstable County, there were 84 white non-Hispanic male captains or other officers of fishing vessels and 616 fishers (571 non-Hispanic white males and 45 non-Hispanic white females).

In 1990, 43% of the 135,192 housing units in the county were empty while 28% of the occupied units were rental units and 81% of the vacant units were for seasonal, recreational, or occasional use.

In 1990, 66% of all residents were born in the state of Massachusetts while another 19% were born in the Northeast United States. Furthermore, 52% of persons age 5 and over were living in the same house in 1990 that they had occupied in 1985. An additional 25% were living in a different house in 1985 but still within Dukes County and 11% were living in a different house but still in Massachusetts.

The racial composition of Dukes County in 1990 was 96% white, 2% black, and 2% other groups (the largest number was American Indian). Furthermore, 1% of all persons were of Hispanic origin. When reporting first ancestry, Irish was the largest group (21%) followed by English (18%), then German (17%). The vast majority of persons age 5 years and over speak only English (91%) and only 1% of households are classified as linguistically isolated.

In 1990, 30% of county residents age 25 and over were high school graduates and 19% held a bachelor's degree. According to the Bureau of Labor Statistics, the civilian labor force in 1996 was 102,662 with a 5.8% unemployment rate. According to the 1999 CBP, there were 8,253 establishments employing 69,028 individuals with an annual payroll of $2002 million. When fishing dependent industries are included, the level of dependence increases; however, it is difficult to calculate due to data reporting restrictions in the County Business Pattern data. Overall, 92% of the establishments in Barnstable County employ 1-19 employees.

In 1989, the median *household* income was $31,766 with median family income of $38,117 and the median non-family *household* income of $18,404. The *per capita* income in 1989 was $16,402. In 1997, the median *household* income was estimated to be $40,791 while 8.9% of the county's population was estimated to be living in poverty.

Port of Falmouth

Falmouth is located 72 miles southeast of Boston and 239 miles from New York City in Southeastern Massachusetts situated on the shoulder or southwest end of Cape Cod. It is bordered by Bourne and Sandwich on the north, Mashpee on the east, Buzzards Bay on the west, and Gosnold, Vineyard Sound, and Nantucket Sound on the south (Massachusetts Department of Housing and Community Development – *http://www.state.ma.us/dhcd/iprofile/096.HTM*).

In 1990, Falmouth (County Subdivision) had 27,960 residents allocated among 7,822 families and 11,364 households. According to 1990 Census data in Falmouth, there were 267 persons employed in occupations of agricultural services, forestry and fishing (2% of all employed persons 16 or over) and 361 employed in agriculture, forestry and fisheries industries.

In 1990, 38% of the 18,168 housing units in the area were empty while 29% of the occupied units were rental units.

In 1990, 68% of all residents were born in the state of Massachusetts and the next largest group (15%) were born in the Northeast United States. In the classification of persons age 5 and over, 53% were living in the same house in 1990 that they had occupied in 1985. An additional 26% were living in a different house in 1985 but still within Barnstable County, and 11% were living in a different house but still in Massachusetts. In addition, 89% of all workers 16 and over worked in their county of residence.

The racial composition of Falmouth in 1990 was 95% white, 2% black, 1% American Indian, and less than 1% of any other group. Furthermore, 1% of all persons were of Hispanic origin. When reporting first ancestry, Irish was the largest group (20%) followed by English (15%), then Portuguese (10%). The majority of persons age 5 years and over speak only English (89%) and less than 1% of households are classified as linguistically isolated.

In 1990, 29% of residents age 25 and over were high school graduates and 18% held a bachelor's degree. In 1989, the median *household* income was $33,944 (7% above of the Barnstable County average) with the median family income of $40,655 (7% above the county average) and the median non-family *household* income of $19,022 (3% above the county average). The *per capita* income in 1989 was $17,131 (4% of the county average). Approximately 9% of persons for whom poverty status was determined (98% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was retail trade followed by other professional and related services and health services.

Falmouth is a large town and probably has one of the longest coastlines in the state. Consequently, there is a lot of land development with high value, high demand, and the choice views that create real property wealth. At the same time, Falmouth has a lot of agencies that are very attentive to the environmental demands of that coastline, whether it be the Planning Board, the Zoning Board of Appeals, the Conservation Commission, the Department of Natural Resources, Shellfish Warden, Harbormaster and the Board of Selectmen. Large geographical tracts of land have been set aside for public conservation. These tracts of land are not necessarily exclusively waterfront but some of the woodland and back land areas that are the natural habitat for wildlife and are locations that also serve to enhance the attractiveness of the community. Falmouth, like every community tries to retain attractiveness in the face of growth pressure (Massachusetts Department of Housing and Community Development - *http://www.state.ma.us/dhcd/iprofile/096.HTM*).

Dukes County, Massachusetts

Dukes is one of the 14 counties in Massachusetts but is not part of a Metropolitan Area. In 1997, the total population for the county of 13,588 individuals ranked 13th in the state.

PER CAPITA PERSONAL INCOME

In 1997, Dukes had a PCPI of $29,945. This PCPI ranked 7th in the state and was 96% of the state average ($31,239) and 118% of the national average ($25,288). The 1997 PCPI reflected an increase of 3.6% from 1996. The 1996-97 state change was 5.6% and the national change was 4.7%.

TOTAL PERSONAL INCOME

In 1997, Dukes had a TPI of $406,886* (*all income estimates with the exception of PCPI are in thousands of dollars). This TPI ranked 13th in the state and accounted for 0.2% of the state total. The 1997 TPI reflected an increase of 6.3% from 1996. The 1996-97 state change was 6.1% and the national change was 5.7%.

COMPONENTS OF TOTAL PERSONAL INCOME

The TPI includes the earnings (wages, salaries, other labor income, and proprietors' income); dividends, interest, and rent; and transfer payments received by the residents of Dukes. In 1997, earnings were 54.9% of TPI; dividends, interest, and rent were 31.8%; and transfer payments were 13.3%. From 1996 to 1997, earnings increased 7.4%; dividends, interest, and rent increased 4.5%; and transfer payments increased 5.8%.

EARNINGS BY INDUSTRY

Earnings by persons employed in Dukes increased from $221,669* in 1996 to $238,278* in 1997, an increase of 7.5%. The largest industries in 1997 were services (28.3% of earnings); retail trade (22.8%); and construction (14.8%). In 1999, the industries that accounted for at least 5% of earnings showed the slowest growing from 1996 to 1997 was construction (increased 5.1%) while the fastest growing was state and local government (13.8% of earnings in 1997 which increased 12.3%) (Regional Economic Information Systems, Bureau of Economic Analysis, Bearfacts - *http://www.bea.doc.gov/bea/regional/bearfacts/bf9697/25/ 25007.htm*).

In 1990, Dukes County had 11,639 residents allocated among 2,977 families and 5,076 households. For 1997, the population was estimated to be 13,578 individuals and for 2000 to be 14,987 individuals. According to 1990 Census data in Dukes County, there were 6 white non-Hispanic male captains or other officers of fishing vessels and 66 fishermen (50 non-Hispanic white male, 3 American Indian or Alaskan Native male, and 13 non-Hispanic white female).

In 1990, 57% of the 11,604 housing units in the county were empty while 28% of the occupied units were rental units and 82% of the vacant units were for seasonal, recreational, or occasional use.

In 1990, 60% of all residents were born in the state of Massachusetts while another 24% were born in the Northeast United States. Furthermore, 51% of persons age 5 and over were living in the same house in 1990 that they had occupied in 1985. An additional 26% were living in a different house in 1985 but still within Dukes County and 9% were living in a different house but still in Massachusetts.

In 1990, the racial composition of Dukes County was 92% white, 4% black, and 3% other groups (the largest numbers were American Indian and Korean). Furthermore, 1% of all persons were of Hispanic origin. When reporting first ancestry, English was the largest group (21%) followed by Irish (13%), then Portuguese (11%). The vast majority of persons age 5 years and over speak only English (96%) and only 1% of households are classified as linguistically isolated.

In 1990, 29% of county residents age 25 and over were high school graduates and 22% held a bachelor's degree. According to the Bureau of Labor Statistics, the civilian labor force in 1996 was 8,908 with a 5.1% unemployment rate. According to the 1999 CBP, there were 986 establishments employing 4,938 individuals with an annual payroll of $160 million. When fishing dependent industries are included, the level of dependence increases; however, it is difficult to calculate due to data reporting restrictions in the County Business Pattern data. Overall, 96% of the establishments in Dukes County employ 1-19 employees.

In 1989, the median *household* income was $31,994 with median family income of $41,369 and the median non-family *household* income of $21,035. The *per capita* income in 1989 was $18,280. In 1997, the median *household* income was estimated to be $40,852 while 6.7% of the county's population was estimated to be living in poverty.

Ports of "Other Dukes"

Ports of "Other Dukes" refers to ports in the Martha's Vineyard area. Martha's Vineyard is an island 20 miles long and about 10 miles wide situated five miles south of the southwest tip of Cape Cod. The major fishing ports in the area are located in the towns of Oak Bluffs, Vineyard Haven and, to a lesser extent, Edgartown. Both Oak Bluffs and Edgartown are classified as "Resort Retirement Artistic Communities" according to the Commonwealth of Massachusetts Department of Revenue - Division of Local Services - (*http://www.state.ma.us/scripts/dls/data bank/indivl.cgi?report3*).

Oak Bluffs

The town of Oak Bluffs is located on the northern shore of Martha's Vineyard, an island 20 miles long and 10 miles wide situated five miles south of the southwest tip of Cape Cod. Oak Bluffs is bordered by Nantucket Sound on the north and east, Edgartown on the south, and Tisbury on the west and northwest (Massachusetts Department of Housing and Community Development - *http:// www.state.ma.us/dhcd/iprofile/221.htm*).

In 1990, Oak Bluffs (County Subdivision) had 2,805 residents allocated among 718 families and 1,265 households. According to 1990 Census data in Oak Bluffs, there were 44 persons employed in occupations of agricultural services, forestry and fishing (3% of all employed persons 16 or over) and 67 employed in agriculture, forestry and fisheries industries.

In 1990, 61% of the 3,171 housing units in the area were empty while 23% of the occupied units were rental units.

In 1990, 59% of all residents were born in the state of Massachusetts and the next largest group (24%) were born in the Northeast United States. In the classification of persons age 5 and over, 46% were living in the same house in 1990 that they had occupied in 1985. An additional 31% were living in a different house in 1985 but still within Dukes County and 9% were living in a different house but still in Massachusetts. In addition, 95% of all workers 16 and over worked in their county of residence.

The racial composition of Oak Bluffs in 1990 was 90% white, 7% black, 3% American Indian, and less than 1% of any other group. Furthermore, 1% of all persons were of Hispanic origin. When reporting first ancestry, English was the largest group (20%) followed by Portuguese (15%), then Irish (11%). The majority of persons age 5 years and over speak only English (93%) and only 2% of households are classified as linguistically isolated.

In 1990, 33% of residents age 25 and over were high school graduates and 18% held a bachelor's degree. In 1989, the median *household* income was $31,117 (97% of the Dukes County average) with the median family income of $38,462 (93% of the county average) and the median non-family *household* income of $21,625 (3% above the county average). The *per capita* income in 1989 was $16,695 (91% of the county average). Approximately 7% of persons for whom poverty status was determined (98% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was retail trade followed by construction and health services.

The town of Oak Bluffs is a resort town on the northeast shore of Martha's Vineyard. There was a large pre-Colonial Indian population that took advantage of the fishing and shellfishing in Oak Bluffs. The explorer Gosnold was among the first European adventurers. Beginning as early as 1602, fishermen and traders set up temporary or seasonal camps on Cuttyhunk. The first grant of 500 acres of land made to a European was in 1642 to John Dagget. It wasn't until 1667 that the first permanent European settlement took place. Subsistence farming, fishing and shellfishing supported these early settlers.

In 1835, Jeremiah Pease chose an oak grove on the edge of Squash Meadow for a camp meeting of island Methodists. The summer meeting became popular and attendance grew like wildfire.

Groups of church members first came to stay in tents for two or three days, then families started bringing their own tents to the weekend retreats. In 1835, nine tents were sufficient to shelter the attendees. In 1858, over 12,000 people attended the Sunday Services. The camp meetings were ecumenical in spirit and attracted members of most Protestant sects as well as Roman Catholics. By the late 1850's, annual visitors were replacing tents with elaborately decorated carpenter Gothic cottages and the first major hotel in Oak Bluffs opened in the 1860's. The expanding number of permanent residents, including a significant immigrant population of Portuguese, continued a substantial fishing industry, built cottages and serviced summer visitors in the thriving tourist business. Through the 19th century, Oak Bluffs saw the side-by-side development of a secular seaside resort featuring a trotting track, roller rink and dance hall, and the continuation of a religious summer revival.

In modern times, Oak Bluffs has come to terms with all of the strands in its past and among the most sought after houses are the small, colorful carpenter Gothic cottages built by revivalists. (Massachusetts Department of Housing and Community Development - *http://www.state.ma.us/dhcd/iprofile/221.htm*).

<u>Port of Vineyard Haven</u>

In 1990, Vineyard Haven had 1,778 residents allocated among 472 families and 804 households. According to 1990 Census data in Vineyard Haven, there were 43 persons employed in occupations of agricultural services, forestry and fishing (5% of all employed persons 16 or over) and 36 employed in agriculture, forestry and fisheries industries.

In 1990, 36% of the 1,338 housing units in the area were empty while 36% of the occupied units were rental units.

In 1990, 58% of all residents were born in the state of Massachusetts and the next largest group (23%) were born in the Northeast United States. In the classification of persons age 5 and over, 52% were living in the same house in 1990 that they had occupied in 1985. An additional 23% were living in a different house in 1985 but still within Dukes County and 15% were living in a different house but still in Massachusetts. In addition, 100% of all workers 16 and over worked in their county of residence.

In 1990, the racial composition of Vineyard Haven was 89% white, 4% black, 3% American Indian, and 4% of any other group. Furthermore, less than 1% of all persons were of Hispanic origin. When reporting first ancestry, English was the largest group (22%) followed by Irish (13%), then Portuguese (11%). The majority of persons age 5 years and over speak only English (96%) and none of the households are classified as linguistically isolated.

In 1990, 29% of residents age 25 and over were high school graduates and 17% held a bachelor's degree. In 1989, the median *household* income was $25,965 (81% of the Dukes County average) with the median family income of $35,887 (87% of the county average) and the median non-family *household* income of $16,100 (77% of the county average). The *per capita* income in 1989 was $16,769 (92% of the county average). Approximately 10% of persons for whom poverty status was determined (100% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was retail trade followed by health services and construction.

Port of Edgartown

In 1990, Edgartown (County Subdivision) had 3,062 residents allocated among 710 families and 1,376 households. According to 1990 Census data in Edgartown, there were 49 persons employed in occupations of agricultural services, forestry and fishing (3% of all employed persons 16 or over) and though there were 72 employed in agriculture, forestry and fisheries industries.

In 1990, 57% of the 3,041 housing units in the area were empty while 28% of the occupied units were rental units.

In 1990, 66% of all residents were born in the state of Massachusetts and the next largest group (22%) were born in the Northeast United States. In the classification of persons age 5 and over, 50% were living in the same house in 1990 that they had occupied in 1985. An additional 26% were living in a different house in 1985 but still within Dukes County and 10% were living in a different house but still in Massachusetts. In addition, 98% of all workers 16 and over worked in their county of residence.

In 1990, the racial composition of Edgartown was 93% white and 7% black. When reporting first ancestry, English was the largest group (18%) followed by Irish (11%), then Portuguese (9%). The majority of persons age 5 years and over speak only English (98%) and none of the households are classified as linguistically isolated.

In 1990, 31% of residents age 25 and over were high school graduates and 23% held a bachelor's degree. In 1989, the median *household* income was $36,285 (13% above the Dukes County average) with the median family income of $43,803 (6% above the county average) and the median non-family *household* income of $25,076 (19% above the county average). The *per capita* income in 1989 was $22,242 (22% above the county average). Approximately 5% of persons for whom poverty status was determined (96% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was retail trade followed by other professional and related services, finance, insurance and real estate, and construction.

The community of Edgartown is bordered by Oak Bluffs and Nantucket Sound on the north, Katama Bay on the East, the Atlantic Ocean on the south, and West Tisbury on the west. Edgartown is separated from Chappaquiddick Island by Katama Bay (Massachusetts Department of Housing and Community Development - *http://www.state.ma.us/dhcd/iprofile/089.htm*).

Edgartown is classified as a "Resort Retirement Artistic Community" according to the Commonwealth of Massachusetts Department of Revenue, Division of Local Services (*http://www.state.ma.us/scripts/dls/databank/indivi1.cgi?report3*). Edgartown is seen by some to be one of New England's most elegant communities. Edgartown was Martha's Vineyard's first colonial settlement and has been the county seat since 1642. The stately Greek Revival Houses built by the whaling captains have been carefully maintained and make the town a seaport village preserved from the early 19th century.

The view from Main Street include the harbor and waterfront. Although the tall square-riggers that sailed the world's oceans have passed from the scene, the heritage of these vessels and their captains remains. For the past hundred years, Edgartown has been one of the world's greatest yachting centers. The town is also known for its architecture with many buildings that pre-date the whaling era and still serve as family homes. Among the oldest buildings are the Vincent House, built in 1672, the Thomas Cooke House which is now a museum, and the offices of the Vineyard Gazette. The venerable Old Whaling Church is now a performing arts center.

Public beaches offer surfing, swimming, bathing, and bluefish and bass fishing. On Felix Neck, about three miles outside the center of town, 200 acres which is owned by the Massachusetts Audubon Society provide marked trails and a program of wildlife management and conservation education. Special activities for all age groups are offered throughout the year (Massachusetts Department of Housing and Community Development - *http://www.state.ma.us/dhcd/iprofile/089.htm*).

Nantucket County, Massachusetts

Nantucket is one of the 14 counties in Massachusetts and is not part of a Metropolitan Area. In 1997, the total population for the county of 7,489 individuals ranked 14th in the state.

PER CAPITA PERSONAL INCOME

In 1997, Nantucket had a PCPI of $41,240. This PCPI ranked first in the state and was 132% of the state average ($31,239), and 163% of the national average ($25,288). The 1997 PCPI reflected an increase of 5.5% from 1996. The 1996-97 state change was 5.6% and the national change was 4.7%.

TOTAL PERSONAL INCOME

In 1997, Nantucket had a TPI of $308,843* (*all income estimates with the exception of PCPI are in thousands of dollars). This TPI ranked 14th in the state and accounted for 0.2% of the state total. The 1997 TPI reflected an increase of 8.2% from 1996. The 1996-97 state change was 6.1% and the national change was 5.7%.

COMPONENTS OF TOTAL PERSONAL INCOME

The TPI includes the earnings (wages, salaries, other labor income, and proprietors' income); dividends, interest, and rent; and transfer payments received by the residents of Nantucket. In 1997, earnings were 63.6% of TPI; dividends, interest, and rent were 26.9%; and transfer payments were 9.6%. From 1996 to 1997, earnings increased 10.4%; dividends, interest, and rent increased 4.3%; and transfer payments increased 5.9%.

EARNINGS BY INDUSTRY

Earnings by persons employed in Nantucket increased from $194,741* in 1996 to $215,079* in 1997, an increase of 10.4%. The largest industries in 1997 were services (25.7% of earnings); retail trade (24.8%); and construction (15.5%). Of the industries that accounted for at least 5 percent of earnings in 1997, the slowest growing from 1996 to 1997 was construction, which increased 5.4%; the fastest growing was transportation and public utilities (5.6% of earnings in 1997), which increased 16.2% (Regional Economic Information Systems, Bureau of Economic Analysis, Bearfacts - *http://www.bea.doc.gov/bea/regional/ bearfacts/bf9697/25/25019.htm*).

In 1990, Nantucket County had 6,012 residents allocated among 1,453 families and 2,631 households. By 1997, the population was estimated to be 7,508 and by 2000 to be 9,250. According to 1990 Census data in Nantucket County, there were 11 fishermen (all male non-Hispanic white).

In 1990, 63% of the 7,021 housing units in the county were empty while 37% of the occupied units were rental units and 81% of the vacant units were for seasonal, recreational or occasional use.

In 1990, 51% of all residents were born in the state of Massachusetts and an additional 29% were born in the Northeast United States. Furthermore, 45% of persons age 5 and over were living in the same house in 1990 that they had occupied in 1985. An additional 31% were living in a different house in 1985 but still within Nantucket County and 7% were living in a different house but still in Massachusetts.

In 1990, the racial composition of Nantucket County was 97% white, 2% black, and 1% other groups (the largest numbers were American Indian and Japanese). Furthermore, 1% of all persons were of Hispanic origin. When reporting first ancestry, English was the largest group (29%) followed by Irish (15%), then German (7%). The vast majority of persons age 5 years and over speak only English (91%) and only 1% of households are classified as linguistically isolated.

In 1990, 27% of county residents age 25 and over were high school graduates and 24% held a bachelor's degree. According to the Bureau of Labor Statistics, the civilian labor force in 1996 was 5,863 with a 2.2% unemployment rate. According to the 1999 CBP there were 746 establishments employing 4,017 individuals with an annual payroll of $141 million. When fishing dependent industries are included, the level of dependence increases; however, it is difficult to calculate due to the data reporting restrictions in the County Business Pattern data. Overall, 94% of the establishments in Nantucket County employ 1-19 employees.

In 1989, the median *household* income was $40,331 with median family income of $49,209 and the median non-family *household* income of $26,059. The *per capita* income in 1989 was $20,591. In 1997, the median *household* income was estimated to be $48,151 while 4.2% of the county's population was estimated to be living in poverty.

Ports of "Other Nantucket"

The ports of "Other Nantucket" refer to the ports of Nantucket and Madaket. However, the bulk of commercial landings is landed in Nantucket. In 1998, 47,000 pounds valued at $136,000 were landed in the ports of "Other Nantucket." Four species (lobster, summer flounder, knobbed whelk, and cod) accounted for over 86% of the total value landed in these ports. In the past few years, between 12 and 16 vessels have landed in the ports of "Other Nantucket." In 1998, less than 3 vessels landed in these ports. The contribution of scup was low to the total ex-vessel value and pounds of all landings for all species was low.

Nantucket is the largest island in the group that forms the county and runs about 15 miles from east to west and 10 miles from north to south (Massachusetts Department of Housing and Community Development - *http://www.state.ma.us/dhcd/iprofile/201.htm*). The 50 square mile island situated 30 miles out to sea south of Cape Cod, has incredible natural beauty and unspoiled charm. The charm of Nantucket is embodied in its well-preserved architecture and its protected moors, plains and beaches. For more than 150 years Nantucket served as the center of the world's whaling industry. In recognition of this heritage, the U.S. Department of the Interior designated the town a National Historic Landmark in 1966.

The Nantucket economy is based on tourism and second-home development. The island, connected to Hyannis by two ferry services and several airlines, has a summer population that peaks at approximately 40,000 in August. Residents and visitors alike enjoy Nantucket's many bike paths and beaches, as well as seasonal events including Daffodil Weekend, Harborfest, and the Cranberry Festival.

Nantucket's special environment is well-cared for by the efforts of several environmental and planning organizations, including the Nantucket Planning and Economic Development Commission, Nantucket Conservation Foundation (owner of 8200 acres of island open space) and the Nantucket Land Council. The Nantucket Land Bank, founded in 1984 as the nation's first local land trust, utilizes funding from a local real estate transaction fee. The Land Bank has purchased over 1,000 acres of open space to date (Massachusetts Department of Housing and Community Development - *http://www.state.ma.us/iprofile/201.htm*).

Not-Specified County, Massachusetts

Port of "Other Massachusetts"

The National Marine Fisheries Service (NMFS) port/county denomination corresponds or refers to landings occurring in any port throughout the state but not assigned to a specific port. This may include landings made in ports were marine and estuarine fishes are landed. As such, individual characterization by port/county is difficult. NMFS weighout data shows that 26 different species valued at $2.58 million were landed under this port category in 1999. Five species accounted for over 98% of the total ex-vessel value of all species landed under this port category. These species were striped bass (46.42%), unknown crab (25.57%), cod (11.13%), scup (7.60%), and black sea bass (7.37%).

Newport County, Rhode Island

The information presented in this section was partially modified from the port and community description provided in the Tilefish FMP (MAFMC 2000).

Newport is one of the 5 counties in Rhode Island and is not part of a Metropolitan Area. In 1997, the total population for the county of 82,962 individuals ranked 4th in the state.

PER CAPITA PERSONAL INCOME

In 1997, Newport had a PCPI of $27,558. This PCPI ranked 2nd in the state, and was 107% of the state average ($25,667) and 109% of the national average ($25,288). The 1997 PCPI reflected an increase of 6.0% from 1996. The 1996-97 state change was 5.4% while the national change was 4.7%.

TOTAL PERSONAL INCOME

In 1997, Newport had a TPI of $2,286,246* (* all income estimates with the exception of PCPI are in thousands of dollars). This TPI ranked 4th in the state and accounted for 9% of the state total. The 1997 TPI reflected an increase of 6.2% from 1996. The 1996-97 state change was 5.3% and the national change was 5.7%.

COMPONENTS OF TOTAL PERSONAL INCOME

The TPI includes the earnings (wages, salaries, other labor income, and proprietors' income); dividends, interest, and rent; and transfer payments received by the residents of Newport. In 1997, earnings were 60.8% of TPI; dividends, interest, and rent were 20.9%; and transfer payments were 18.2%. From 1996 to 1997, earnings increased 7.3%; dividends, interest, and rent increased 2.8%; and transfer payments increased 6.6%.

EARNINGS BY INDUSTRY

Earnings by persons employed in Newport increased from $1,343,651* in 1996 to $1,445,178* in 1997, an increase of 7.6%. The largest industries in 1997 were services (32.4% of earnings), federal civilian government (17.0%), and military (11.6%). The industries that accounted for at least 5% of earnings in 1997, the slowest growing from 1996 to 1997, was state and local government (8.2% of earnings in 1997 which increased 0.8%) while the fastest growing was services (which increased 13.1%). (Regional Economic Information System, Bureau of Economic Analysis - *http://www.bea.doc.gov/bea/regional/bearfacts/bf9697/44/ 44005.htm*).

In 1990, Newport County had 87,194 residents allocated among 22,684 families (average size 3.07) and 32,731 households. By 1997, the population was estimated to be 82,598 and by 2000 to be 85,433. According to 1990 Census data in Newport County, there were 27 captains or other officers of fishing vessels (19 white non-Hispanic males and 8 American Indian or Alaskan native male) and 333 fishermen (all male, 302 non-Hispanic white, 5 Hispanic white, 8 non-Hispanic black and 18 "other races").

In 1990, 13% of the 37,475 housing units in the county were empty while 41% of the occupied units were rental units and 46% of the vacant units were for seasonal, recreational or occasional use.

In 1990, 38% of all residents were born in the state of Rhode Island while another 38% were born in the Northeast United States. Furthermore 51% of persons age 5 and over were living in the same house in 1990 that they had occupied in 1985. An additional 21% were living in a different house in 1985 but still within Newport County and 3% were living in a different house but still in Rhode Island.

In 1990, the racial composition of Newport County was 94% white, 4% black, and 2% other groups (largest number were Filipino and then American Indian). Furthermore, 2% of all persons were of Hispanic origin. When reporting first ancestry, Irish was the largest group (19%) followed by English (14%), then Portuguese (13%). The vast majority of persons age 5 years and over speak only English (92%) and only 1% of households are classified as linguistically isolated.

In 1990, 18% of county residents age 25 and over were high school graduates and 19% were college graduates. According to the Bureau of Labor Statistics, the civilian labor force in 1996 was 39,286 with a 5.0% unemployment rate. According to the 1999 CBP, there were 2,706 establishments employing 28,076 individuals with an annual payroll of $745 million. When fishing dependent industries are included, the level of dependence increases; however, it is difficult to calculate due to data reporting restrictions in the County Business Pattern data. Overall, 89% of the establishments in Barnstable County employ 1-19 employees.

In 1989, the median *household* income was $35,829 with the median family income of $41,424 and the median non-family income of $20,929. The *per capita* income in 1989 was $16,819. In 1997, the median *household* income was estimated to be $43,684 while 7.9% of the county's population was estimated to be living in poverty.

Port of Little Compton

In 1990, Little Compton (county subdivision) had 3,339 residents allocated among 1,013 families and 1,310 households. According to 1990 Census data in Little Compton, there were 155 persons employed in occupations of agricultural services, forestry and fishing (9% of all employed persons 16 or over) though there were 149 employed in agriculture, forestry and fisheries industries.

In 1990, 30% of the 1,850 housing units in Little Compton were empty while 20% of the occupied units were rental units.

In 1990, 58% of all residents were born in the Northeast United States and the next largest group was born in the state of Rhode Island (31%) followed by those born in a foreign country (3%). In the classification of persons age 5 and over, 64% were living in the same house in 1990 that they had occupied in 1985. An additional 17% were living in a different house in 1985 but still within Newport County and 4% were living in a different house but still in Rhode Island. In addition, 51% of all workers 16 and over worked in their county of residence.

The racial composition of Little Compton in 1990 was over 99% white and less than 1% was Japanese. Furthermore, less than 1% of all persons were of Hispanic origin. When reporting first ancestry, English was the largest group (31%) followed by Portuguese (17%), then Irish (12%).

The majority of persons age 5 years and over speak only English (90%) and 1% of households are classified as linguistically isolated.

In 1990, 27% of the residents of Little Compton age 25 and over were high school graduates and 24% held a bachelor's degree. In 1989, the median *household* income was $41,187 (15% above the Newport County average) with the median family income of $44,292 (7% above the county average) and the median non-family *household* income of $22,257 (6% above the county average). The *per capita* income in 1989 was $20,273 (21% above the county average). Approximately 4% of persons for whom poverty status was determined (100% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was retail trade followed by durable goods manufacturing and construction.

Little Compton was incorporated as a part of Plymouth Colony in 1682 after having been settled by Captain Benjamin Church, the noted Indian fighter, and others seven years previously. In 1746 under Royal Decree, Little Compton was transferred to Rhode Island together with the towns of Cumberland, Barrington, Bristol and Tiverton.

The town was originally the home of the "Sagonate" or "Sakonnet" Indians, a particularly independent group of native Americans that fought with the settlers against the notorious King Philip, Sachem of the Wampanoags. King Philip waged a bloody war against the white settlers and tried to induce other neighboring tribes to join his crusade.

The southern end of the town bordering the Atlantic is still known as "Sakonnet". This was the area that Captain Church cleared for settlement.

After the Indian hostilities ceased, the small settlement of Little Compton enjoyed comparative peace and prosperity until the threat of the British occupation of Newport arose during the Revolution. Parties from the British garrison invaded Little Compton several times and were met with stiff resistance from the settlers.

Today, the port of Little Compton is a rural-farming community. Fishing is still a major industry in the town as one can observe with the daily departure of the fishing fleet from the Sakonnet Wharf. The town has also developed into an ideal vacation spot with the traditional atmosphere of colonial New England (Rhode Island Economic Development Corporation - *http://www.riedc.com/mcds/Little%20Compton.html).*

Port of Newport

The information presented in this section was partially modified from the port and community description provided in the Tilefish FMP (MAFMC 2000).

In 1990, Newport city had 28,227 residents allocated among 6,422 families and 2,692 households. According to 1990 Census data in Newport, there were 316 persons employed in occupations of agricultural services, forestry and fishing (2% of all employed persons 16 or over) and 291 employed in agriculture, forestry, and fishing industries.

In 1990, 15% of the 13,094 housing units in the town were empty while 58% of the occupied units were rental units and 34% of the vacant units were for seasonal, recreational or occasional use only (13% were "usual home elsewhere").

In 1990, 44% of all residents were born in the state of Rhode Island and 28% were born in the Northeast United States. In the classification of persons age 5 and over, 42% were living in the same house in 1990 that they had occupied in 1985. An additional 24% were living in a different house in 1985 but still within Newport County and less than 1% were living in a different house but still in Rhode Island. In addition, 88% of all workers 16 and over worked in their county of residence and 67% worked in their town of residence.

In 1990, the racial composition of Newport was 89% white, 8% black, and 3% other groups (American Indian and Filipino). Only 3% of all persons were of Hispanic origin. When reporting first ancestry, Irish was the largest group (25%) followed by English (12%) and German (9%). The majority of persons age 5 years and over speak only English (92%) and less than 3% of households are classified as linguistically isolated.

In 1990, 28% of the town's residents age 25 and over were only high school graduates and 20% held a only bachelor's degree while an additional 18% had some college. In 1989, the median *household* income was $30,534 (85% of the Newport County average) with a median family income of $37,427 (90% of the county average) and a median non-family income of $20,629 (99% of the county average). The *per capita* income in 1989 was $16,358 (97% of the county average). Approximately 11% of persons for whom poverty status was determined (90% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was retail trade followed by other professional and related services, and educational services.

The town of Newport was settled in 1639 and was incorporated as a city in 1784. Rhode Island was founded on the basis of complete religious and political freedom. In Newport, Quakers and Jews found a comfortable haven shortly after it was founded. By the early 1700's, commerce, combined with a successful farming and fishing industry, brought great wealth to the community. Newport ships developed what became the first resort in British North America during the 1720's when sea captains brought passengers from the Carolinas and Caribbean who wished to get away from the heat, fever, and humidity of their plantations.

Newport was one of the five most important settlements in the 13 colonies sharing that distinction with Boston, New York, Philadelphia and Charlestown. Newport was the "Birthplace of the Navy" combining both private and naval shipping which added to the cosmopolitan atmosphere of the community. The finest furniture and silver craftsmen worked here before the Revolution. Summer visitors enjoyed an advanced cultural society that has continued to this day.

Newport combines three communities in one; the "settled community", the "Navy" (which bases its Naval Education and Training Center here), and the "summer colony." The communities all work in harmony to produce and sponsor events of international importance such as opera and music festivals; the opening of the opulent Vanderbilt, Astor, and Belmont mansions to visitors; and outstanding exhibits and performances of the visual and performing arts.

The city claims more standing buildings built before 1830 than any American community. Most of these buildings are open to visitors, such as the Old Colony House (the nation's second oldest capitol building); the Redwood Library (the oldest library building in continuous use); the Touro Synagogue (America's oldest Jewish house of worship); the armory of the Artillery Company of Newport (the oldest, active military organization in the country); and several examples of Colonial residential architecture such as the Hunter House, which experts agree rates with the nation's top ten.

Contemporary Newport has a variety of museum attractions, including the International Tennis Hall of Fame, the Newport Auto Museum, and replicas of two ships recalling the port's part in the Revolutionary War. There are windjammer cruises out of the port, excursion boats, harbor and city bus tours, a New York style disco, scuba diving, surfing, spearfishing, summer theater, golf, pari-mutual jai alai, tennis and fishing along with numerous yacht races for international, national, regional, or Olympic championships. Its numerous restaurants serve up the best in Rhode Island seafood, and several are known for their continental cuisine (*http://www.riedc.com/mcds/Newport.html#introduction*).

Newport is an historical port dedicated to tourism and recreational boating but with a long and persistent commercial fishing presence. Before the development of the docking facilities at Point Judith, Newport was the center for fishing and shipping in the state. In 1971, 57% of all Rhode Island commercial fisheries landings were in Newport, but Point Judith surpassed Newport in importance by 1973 and now is the dominant commercial port in the state.

Tourism in Newport started as far back as the 1700's. Visitors included southern plantation owners who stayed in Newport to escape the heat of the summer. By the 1830's, tourist hotels began to dominate the shore side landscape. The famous "cottages" of Newport where built by industrialists seeking to top each other in displays of ostentatiousness. The present tourist economy is centered on year round activities with the highlights being summer and sailing events. The Americas Cup races are regularly held in the area, attesting to the importance of the pleasure boating industry.

Besides tourism, the East Bay Navy base has a major economic impact in the area. The base employees thousands of local civilians in service roles. The service industry also caters to a large retirement community. Many naval personnel who are familiar with the area from periods at the local War College or at the command schools choose to retire in Newport. They bring money into the community as retirement pensions and contribute to the support of many service-oriented businesses.

Fishing has always been an integral part of the local economy, although not of the stature of tourism and other components. There is little community "dependency" on fishing in Newport, for the existing 'community' could do quite well if commercial fishing disappeared altogether. The fishing "community" is rather a regional contributor to the commerce of the groundfish fishery. It provides support to approximately 200 families with a sustainable livelihood while they contribute a high-quality food product to the commerce of the region and nation.

During the 1700's to early 1800's, fishing was an important part of the local economy. Historical records mention fish drying stations and fisheries. Fisheries began to declined by the 1700's with the rapid development of Newport as a slave trading and shipping center.

Whaling was practiced for several decades in the 1770's but was never as important as it was in ports such as New Bedford and Nantucket. By 1785, the whaling fleet consisted of 50 vessels. By the late 1850's, however, most of the craft had either moved to New Bedford or entered other pursuits (Field 1902).

The period from 1800 to 1930 saw the development of the indigenous (bay and inshore) fleet. Fishing effort was concentrated on groundfish stocks that could be reached in a day, fished, and then landed on the dock. Most fish, with the exception of menhaden, were taken in staked and floating fish traps and weirs. This was also the period when industrial fishing was a major component of the economy. For example, in 1889 in Newport and other Rhode Island ports, fish reduction plants for menhaden and fish drying operations for cod and other groundfish processed 127 million pounds of fish (89% of which were menhaden) (Olsen and Stevenson 1975). This fishery collapsed in the 1930s, and the fishery transitioned towards groundfish trawling. During the 1920s, marine diesel engines effectively extended the range and fishing time of commercial groundfishing vessels using otter trawls.

Newport has one of the best natural harbors on the northeast. It provides excellent protection from rough weather and is deep enough to provide berthing for U.S. naval vessels. Fishermen only use one wharf in the area. It is leased by the state to the Newport Shipyard Company. In 1981, major fish buyers included Anthony's Seafood, Aquidnick Lobster Company, and Parascandolo and Sons. Anthony's is no longer in business, and Parascandolo markets all groundfish landings that come into Newport. Fish are not sold or processed locally.

Newport's fishing fleet has dramatically declined over the last twenty years. The decline has been spurred by increasing property values restricting fishing industry infrastructure and competition with recreational vessels constricting wharf space. No new boats or new shore side fishing businesses have come into the fishery in the last twenty years. The local waters of Narragansett Bay are overfished, and nearshore grounds off the coast and nearby Block Island have experienced significant declines in groundfish. Factors forcing a decline in groundfishing are not recent, but has been ongoing for some time. Bort (1981) wrote: "The general direction of the community's development does not bode well for the future of fishing. Neither tourists nor pleasure boaters are typically enthusiastic about sharing a harbor with commercial fishermen. The stereotypic grizzled old man handlining from a dory is romanticized. The modern steel trawler is viewed as a source of odor and noise and as competition for space. The fishing industry is far down on the list of economic inputs to Newport, and probably also on the community's list of priorities".

Bort (1981) was correct in this prediction. There is still a degree of prejudice by the Newport community against commercial fishermen (key respondent, Office of the Harbor Master) and the fleet has declined dramatically. In 1977, 164 boats made landings in Newport. While 49 were from Newport, 45 from New Bedford, and the remainder from as far north as Gloucester and as far south as Virginia (Murphy pers. comm.). In 1978, only 91 of these vessels had returned to Newport.

The greatest decline has been in the indigenous, or bay and inshore fleet. After WWII, the indigenous Newport fleet consisted of 20 vessels. In 1981, this number was down to only eight, and in 1996, only four. Declines in nearshore stocks, pollution impacts, competition with stationary gear, and area closures have made inshore groundfishing more difficult. Overall, the Newport fleet is more dependent proportionately on groundfish than the more diversified fleet fishing out of Point Judith. All of the vessels are essentially groundfish fishing, with some having the capacity and permits to fish squid (*Loligo*) as needed in order to maximize the benefit of days at sea limits. Despite these difficulties, local fishermen and fish marketers feel that the remaining fleet represents a stabilized situation.

It does not appear that the social, economic, and cultural capital which comprise the fishery are being reproduced. Multispecies Groundfish permit holders in Newport will eventually have to make the decision to retire their permits or pass them on to others as vessels age and new recruits do not take up the occupation (a decline in the social yield). The questions that remain for Newport are: (1) will the community support the presence of a new generation of fishermen; (2) will a support infrastructure survive to allow them to fish; and (3) will anyone be interested in joining a profession that is both dangerous and increasingly economically risky? (Dyer and Griffiths, 1996).

Port of Tiverton

Tiverton is a quiet waterfront community situated on the easterly side of the Sakonnet River just minutes away from the cities of Portsmouth, Newport, Providence, Fall River, and New Bedford. (*http://members.home.net/tiverton3/main.html*).

In 1990, Tiverton (County Subdivision) had 14,312 residents allocated among 4,181 families and 5,308 households. According to 1990 Census data in Tiverton, there were 221 persons employed in occupations of agricultural services, forestry and fishing (3% of all employed persons 16 or over) and 209 employed in agriculture, forestry and fisheries industries.

In 1990, 6% of the5,675 housing units in the area were empty while 18% of the occupied units were rental units.

In 1990, 71% of all residents were born in the Northeast United States and the next largest group (18%) were born in the state of Rhode Island. In the classification of persons age 5 and over, 70% were living in the same house in 1990 that they had occupied in 1985. An additional 13% were living in a different house in 1985 but still within Newport County, and 2% were living in a different house but still in Rhode Island. In addition, 43% of all workers 16 and over worked in their county of residence.

The racial composition of Tiverton in 1990 was over 99% white with less than 1% Filipino and American Indian. Furthermore, 2% of all persons were of Hispanic origin. When reporting first ancestry, Portuguese was the largest group (30%) followed by English (14%), then Irish (11%). The majority of persons age 5 years and over speak only English (88%) and less than 2% of households are classified as linguistically isolated.

In 1990, 31% of residents age 25 and over were high school graduates and 13% held a bachelor's degree. In 1989, the median *household* income was $36,170 (1% above the Newport County average) with the median family income of $41,127 (1% below the county average) and the median non-family *household* income of $13,271 (3% above the county average). The *per capita* income in 1989 was $16,023 (1% below the county average). Approximately 6% of persons for whom poverty status was determined (99% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was retail trade followed by manufacturing of durable goods, health services, and construction.

Tiverton was originally incorporated in 1694 as part of the Massachusetts Bay Colony. A long boundary dispute between Rhode Island and Massachusetts was settled in 1746. Tiverton, by Royal Decree, together with the towns of Cumberland, Barrington, Bristol and Little Compton was annexed to Rhode Island. The town was incorporated in 1747.

During the Revolution when the British held Aquidneck Island, Tiverton was an asylum for Americans fleeing from British occupation. The town became a mustering point for Colonial forces who gathered together to drive the British off the island.

In its early day, Tiverton was chiefly a farming community with some fishing and boat construction. Until 1900, the manufacture of menhaden oil, a fish derivative, was one of the primary industrial pursuits. Cotton and woolen mills were established as early as 1827. Today, trade establishments are the major employers in the town. In recent years, Tiverton has grown as a summer resort and residential area. Development has been concentrated in the area known as North Tiverton (Rhode Island Economic Development Corporation - *http://www.riedc.com/mcds/Tiverton.html*).

Washington County, Rhode Island

The information presented in this section was partially modified from the port and community description provided in the Tilefish FMP (MAFMC 2000).

Washington is one of the 5 counties in Rhode Island and is part of the Providence-Warwick-Pawtucket Metropolitan Area. In 1997, the total population for the county of 119,243 individuals ranked 3rd in the state.

PER CAPITA PERSONAL INCOME

In 1997, Washington had a PCPI of $27,198. This PCPI ranked 3rd in the state, and was 106% of the state average ($25,667) and 108% of the national average ($25,288). The 1997 PCPI reflected a 5.7% increase from 1996. The 1996-97 state change was 5.4% and the national change was 4.7%.

TOTAL PERSONAL INCOME

In 1997, Washington had a TPI of $3,243,118* (* all income estimates with the exception of PCPI are in thousands of dollars). This TPI ranked 3rd in the state and accounted for 12.8% of the state total. The 1997 TPI reflected a 6.9% increase from 1996. The 1996-97 state change was 5.3% and the national change was 5.7%.

COMPONENTS OF TOTAL PERSONAL INCOME

The TPI includes the earnings (wages, salaries, other labor income, and proprietors' income); dividends, interest, and rent; and transfer payments received by the residents of Washington. In 1997, earnings were 66.6% of TPI; dividends, interest, and rent were 18.2%; and transfer payments were 15.2%. From 1996 to 1997, earnings increased 8.1%; dividends, interest, and rent increased 2.8%; and transfer payments increased 7.1%.

EARNINGS BY INDUSTRY

Earnings by persons employed in Washington increased from $1,369,415* in 1996 to $1,439,275* in 1997, an increase of 5.1%. The largest industries in 1997 were services (25.1% of earnings), state and local government (19.6%); and retail trade (12.6%). In 1997, industries that accounted for at least 5% of earnings showed the slowest growing from 1996 to 1997 was state and local government (increased 0.4%) while the fastest growing was nondurable goods manufacturing (8.2% of earnings in 1997 which increased 9.0%; Regional Economic Information System, Bureau of Economic Analysis - *http://www.bea.doc.gov/bea/regional/ bearfacts/bf9697/44/44009.htm*).

In 1990, Washington County had 110,006 residents allocated among 28,309 families and 39,272 households. For 1997, the population was estimated to be 119,690 and for 2000 to be 123,546. According to 1990 Census data in Washington County, there were 131 captains or other officers of fishing vessels (122 white non-Hispanic males and 9 males of "other races") and 612 fishermen (559 non-Hispanic white male, 7 male of "other races", and 46 white non-Hispanic female).

In 1990, 21% of the 49,856 housing units in the county were empty while 31% of the occupied units were rental units and 65% of the vacant units were for seasonal, recreational, or occasional use and 6% were "usual home elsewhere."

In 1990, 61% of all residents were born in the state of Rhode Island while 25% were born in the Northeast United States. Furthermore, 50% of persons age 5 and over were living in the same house in 1990 that they had occupied in 1985. An additional 18% were living in a different house in 1985 but still within Washington County and 10% were living in a different house but still in Rhode Island. In addition, 56% of all workers age 16 and over work in their county of residence.

In 1990, the racial composition of Washington County was 97% white, 1% black, and 1% American Indian, Eskimo, or Aleut. Furthermore, under 1% of all persons were of Hispanic origin. When reporting first ancestry, English was the largest group (9%) followed by Irish (8%), then French (5%). The vast majority of persons age 5 years and over speak only English (93%) and only 1% of households are classified as linguistically isolated.

In 1990, 29% of county residents age 25 and over were high school graduates and 17% held a bachelor's degree. According to the Bureau of Labor Statistics, the civilian labor force in 1996 was 59,863 with a 3.8% unemployment rate. According to the 1999 CBP, there were 3,463 establishments employing 34,553 individuals with an annual payroll of $925 million. When fishing dependent industries are included, the level of dependence increase; however, it is difficult to calculate due to data reporting restrictions in the County Business Pattern data. Overall, 91% of the establishments in Washington County employ 1-19 employees.

In 1989, the median *household* income was $36,948 with the median family income of $42,343 and the median non-family income of $20,234. The *per capita* income in 1989 was $16,182. In 1997, the median *household* income was estimated to be $47,467 while 6.5% of the county's population was estimated to be living in poverty.

Port of New Shoreham

The town of New Shoreham was incorporated in 1672 as the only town on Block Island. New Shoreham is the smallest town in the smallest state in the United States and can only be accessed by boat or plane. Block Island has a single source aquifer (*http://www.ultranet.com/block-island*).

In 1990, New Shoreham (county subdivision) had 821 residents allocated among 209 families and 358 households. According to 1990 Census data in New Shoreham, there were 30 persons employed in occupations of farming, forestry and fishing (less than 7% of all employed persons 16 or over) and 34 employed in agriculture, forestry and fisheries industries.

In 1990, 71% of the1,276 housing units in New Shoreham were empty while 38% of the occupied units were rental units.

In 1990, 38% of all residents were born in the state of Rhode Island while 40% were born in the Northeast United States. In the classification of persons age 5 and over, 45% were living in the same house in 1990 that they had occupied in 1985. An additional 21% were living in a different house in 1985 but still within Washington County, and 8% were living in a different house but still in Rhode Island. In addition, 43% of all workers 16 and over worked in their place of residence while 97% worked in their county of residence.

The racial composition of New Shoreham in 1990 was 97% white, less than 3% black, and less than 1% of any other group. Furthermore, about 1% of all persons were of Hispanic origin. When reporting first ancestry, English was the largest group (21%) followed by Irish (16%), then German (14%). The majority of persons age 5 years and over speak only English (96%) and none of the households are classified as linguistically isolated.

In 1990, 26% of New Shoreham residents age 25 and over were high school graduates and 27% held a bachelor's degree. In 1989, the median *household* income was $31,471 (85% of the Washington County average) with the median family income of $43,068 (2% above the county average) and the median non-family *household* income of $16,875 (83% of the county average). The *per capita* income in 1989 was $20,676 (28% above the county average). Approximately 8% of persons for whom poverty status was determined (over 100% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was construction followed by retail trade and personal services.

Block Island was formed about 12,000 years ago when the glacier from the last Ice Age finally subsided leaving the sandy moraine which now makes up Long Island, Block Island, Martha's Vineyard, and Nantucket. In prehistoric times, a Native Indian tribe called the Manisses lived here as hunters and gathers. Shell heaps and fire pits dating back hundreds of years before the time of Christ have been found here.

The European settlers who arrived in 1661 found a gently rolling forested landscape dotted with hundreds of fresh water ponds. They established a farming and fishing community which slowly grew from a population of 25 to about 1,350 at the time of the American Civil War. It was at this time that island resident Nicholas Ball foresaw that a safe harbor would attract the steamboat traffic which plied Block Island Sound on the busy New York to Providence and New Bedford routes. He convinced the federal government to build a breakwater at "Old Harbor" thus giving the Island its first real harbor. Within 20 years, a number of large Victorian Hotels were built for the visiting steamship passengers and the island's reputation as a magnificent vacation resort was established.

With the demise of the steamship to the automotive age, so came the decline of Block Island as a Victorian resort community. By the middle of the 20th century, the island had reverted back primarily to farming and fishing. The year-round population fell to below 500 and the magnificent Victorian hotels sat mostly vacant.

In the 1960s, the island began to be rediscovered. Visitors who were enchanted by the unspoiled landscape and beautiful beaches started to buy property and soon their summer cottages began to dot the countryside. One by one, the rustic hotels were restored and the village as it is today began to take form. In the real estate boom of the 1980's, a number of large development projects were proposed. These projects, which were not typical of the cottage style construction found elsewhere on the island, were vigorously opposed by grass roots environmental and conservation groups and by a town government which was unwilling to let Block Island go the way of dozens of other coastal communities which were ruined by over development.

Today Block Island sits at the crossroads. An island whose appeal, which comes from its unspoiled nature, is now threatened by the very popularity which it attracts. Some feel that the island can be spared the overdevelopment which ravaged many other coastal communities by planning and incorporating growth-pacing mechanisms to protect its unspoiled character. Others who are less far sighted and perhaps more economically motivated disagree (*http://www.ultranet.com/block-island*).

Formed by glaciers 12,000 years ago, Block Island is made up of a diverse array of habitats such as morainal grasslands, beaches, sand dunes, maritime scrubland, salt and brackish ponds, and various freshwater wetland ecosystems. These habitats support a rich diversity of wildlife, including over forty species classified as rare or endangered. As such, Block Island is one of the most ecologically significant areas in the northeast. Thousands of migratory shorebirds, waterfowl, raptors and songbirds also depend on the Island as a critical stopover point on their journey north and south along the Atlantic Flyway.

The dominant vegetation type on the island has been described as maritime scrubland, made up of tall shrubs such as shad, arrowwood and bayberry, and dense understory vegetation. This community is associated with areas that are exposed to offshore winds and salt spray. Most of the fruit-bearing shrubs found in the scrubland provide an important food source for migrating songbirds, and provide excellent nesting cover for the state-wide rare Northern Harrier, or Marsh Hawk. Shrubs also provide habitat for the common Ring Necked Pheasant and American Woodcock. The highest concentrations of endangered species occur in the open grassland habitat, most notably at the Lewis-Dickens Farm in the southwest part of the island. Grassland has been almost continuously maintained since the advent of agriculture on Block Island. Species of note include the regionally rare Grasshopper Sparrow, Upland Sandpiper and the federally endangered American Burying Beetle. The American Burying Beetle is now found only in two places, with Block Island holding the more viable population. The state-endangered Northern Harrier relies on these grasslands for food.

Block Island beaches are home to many species of plants and animals which are ecologically significant and fragile. Beaches are interesting as ecosystems because they are in a state of constant flux. Some changes act on a scale of days, like waves, tides, and wind. Others, like storms and human use, operate on longer time scales. Plants and animals must be able to survive very dry conditions, flooding, shifting sands, and other varied elements of life in the intertidal zone, the beach, and the dunes. However, these species depend on relatively calm, stable conditions during summer. Fragile plants that are not able to resist trampling by foot or vehicle tend to grow on beaches. These fragile plants are responsible for the stabilization of dunes and root systems hold them in place. Erosion of dunes leads to erosion of the beach and of the island. Due to overuse, most rare species occur on the less heavily used beaches. Both Piping Plovers and Least Terns used to nest on the east beaches on Block Island, but have been extirpated in the last twenty years (*http://www.ultranet.com/block-island*).

Port of Point Judith

The information presented in this section was partially modified from the port and community description provided in the Tilefish FMP (MAFMC 2000).

While Point Judith is not an incorporated place and as such is not available in the general census files, both Point Judith and nearby Narragansett are included in the county subdivision of South Kingstown. Census data for that entity are therefore included here.

In 1990, South Kingstown had 24,631 residents allocated among 5,243 families and 7,456 households. According to 1990 Census data in South Kingstown, there were 423 persons employed in occupations of agricultural services, forestry and fishing (4% of all employed persons 16 or over), and 448 employed in agriculture, forestry and fishing industries.

In 1990, 24% of the 9,806 housing units in the town were empty while 28% of the occupied units were rental units. Of the vacant units, 84% were classified as for seasonal, recreational or occasional use only and 11% were "usual home elsewhere".

In 1990, 56% of all residents were born in the state of Rhode Island and the next largest group (28%) were born in the Northeast United States. In the classification of persons age 5 and over, 46% were living in the same house in 1990 that they had occupied in 1985. An additional 17% were living in a different house in 1985 but still within Washington County, and 13% were living in a different house but still in Rhode Island. In addition, 65% of all workers 16 and over worked in their county of residence.

The racial composition of South Kingstown in 1990 was 93% white, 2% black, and 2% American Indian, Eskimo or Aleut and 3% Asian or Pacific Islander. Furthermore, 1% of all persons were of Hispanic origin. When reporting first ancestry, Irish and English were the largest groups (16% each) followed by Italian (13%). The majority of persons age 5 years and over speak only English (72%), and less than 1% of households are classified as linguistically isolated.

In 1990, 24% of the town's residents age 25 and over were high school graduates and 14% held a bachelor's degree. In 1989, the median *household* income was $36,481 (99% of the Washington County average) with the median family income of $41,895 (99% of the county average) and the median non-family income of $21,523 (6% above the county average). The *per capita* income in 1989 was $14,325 (89% of the county average). Approximately 7% of persons for whom poverty status was determined (78% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was retail trade followed by educational services and manufacturing of durable goods.

Commercial fishing in Point Judith is an historically recent activity. The port lacks the complex fishing traditions and infrastructure of the larger ports such as Gloucester and New Bedford. A fleet consisting of offshore and inshore vessels follow a cyclic, shifting pattern of resource use that sets Point Judith apart from the northern New England ports. Point Judith boats are diverse in their annual round and approach to the fisheries as opposed to New Bedford boats which only go after groundfish. Fishermen are employed full-time as they switch fisheries and boats during the year. The port most similar to Point Judith is Chatham, although Chatham has no large offshore vessels in its fleet.

Beginning in the 17th century and through most of the 18th, the region of southern Rhode Island surrounding Point Judith was a farming community. Pictures from the turn of the century show plowed fields and farm settlements where there are now secondary growth forest and housing developments. The textile industry started in 1802, became prominent in the late 19th century, and then collapsed. The 20th century has seen the decline of agriculture and mill manufacturing, and their replacement with the tertiary services sector, including retail trade, health care, education, and tourism. Commercial fishing is a secondary industry that came to prominence in the 1930's. Unlike other primary sector industries such as agriculture which have declined, fishing advanced in importance in the community.

Seining was carried out by 'fishing gangs', characterized by fish houses along the beach with bunks in which they slept until it was time to fish. Gangs were equipped with two boats and a seine, and this fishing practice continued until about 1940. Trap fishing and lobstering were also important early fishing methods in the area.

After WWII, the fishing fleet expanded and a cooperative was formed (The Point Judith Fishermen's Cooperative Association, locally known as "the Coop"). This included most all inshore groundfishermen in the port. As of 1978, Point Judith's landings made up 61% of Rhode Island's total catch. In 1992, the total value of fish landed in Point Judith was $36.2 million.

With enactment of the 200 mile limit in 1976, fishing strategies began to diversify as lobster, shellfish, and swordfishing became important. These new fisheries did not require the same precision, or knowledge of the grounds as groundfishing. It encouraged a whole new generation of fishermen who worked outside the established cooperation. Many of these newcomers had never fished before, but were making a lot of money. New entrants were also encouraged by inexpensive boat loans made available through the U.S. Department of Commerce. The expansion of the industry in the late 1970 pressured the cooperation to put a moratorium on memberships. This was extended until 1986-87 when the cooperation increased its processing capacity by moving into a new larger building. Yet during the cooperation moratorium, other companies filled the niche created by the expanding industry, and by the time the cooperation could accommodate the influx, there was little incentive for fishermen to join. The expansion of the cooperation increased operating costs, and along with pressures from local and external (main market) competitors, contributed to its collapse in 1994.

The social cohesiveness of the Point Judith community was based on sharing the common occupation and traditions of the fishing lifestyle. Twenty years ago, there was a different atmosphere to the community. Bait processing and related jobs brought locals with no prior experience into contact with established fishermen to share in the development of the industry. An event that represented this shared lifestyle was the blessing of the fleet. The blessing was marked with food, games, parades, and other festivities. Commercial fishing boats would be cleaned and decorated for the celebration to symbolically demonstrate their central value in the social and economic life pattern of the community (Dyer and Griffith 1996).

Tourism, however, has continued to gain in importance in Point Judith in recent years. A similar process typifies nearby Newport, where fishing has been overshadowed and incrementally reduced by more than a hundred years of touristic development (Bort 1980). For example, with the increasing costs of boat insurance, insurance companies refused to cover anyone hurt during the Blessing of the Fleet celebration. Such insurance blackmail effectively ended the blessing, and the town officials never fought to keep this significant marker of the local fishing culture alive (personal communication, key respondent). This change represented a shift in social and economic alliances away from fishing towards tourism.

Areas where fishermen used to park before setting out to sea are now lots for tourists. Most of the social gathering spots for fishermen have been converted into tourist attractions such as ice cream shops and restaurants. Weakening of the communal identity of fishermen has had a negative social impact. A symptom of this is the changing role of the Point Judith Mission. The Mission initially helped fishermen's families in crisis with food and small loans. Over the years, the emphasis moved towards helping fishermen with drug and alcohol addiction problems. Today, some key respondents feel the Mission has lost its community orientation as a support resource for fishing families.

Fishermen comprise a social and occupational network where people know each other. The small town atmosphere is punctuated by functions such as the Fishermen's Scholarship fund.

Port facilities, although small scale compared to New Bedford or Gloucester, are adequate for the size of the local fleet. There are approximately 230 vessels of all types berthed in Point Judith (McGovern pers. comm.). The area is not much bigger than 3 city blocks, but all the activity in the area is associated with some aspect of the fishing industry. Vessels are located at a number of docks which extend perpendicular to the main street. Another set of docks extend off a large industrial area. Across from the harbor are a number of empty docks for seasonal recreational boaters.

There are numerous support industries along the water. The large industrial area at the north end of the street is where most fish processing is done. It has six processing plants including the former Point Judith Cooperation (now owned by an independent operator) and the Town Dock. Facilities include dockside fuel pumps, a single restaurant/store, bait shops, commercial marine suppliers, recreational suppliers, and vessel repair shops. Along the adjoining streets are several other restaurants devoted to seafood. The Block Island Ferry also leaves from this port and promotes a large seasonal population of people passing through town.

The main docking facility is the Town Dock. It employs 50 people and hires between 20-50 part-timers as needed. Temporary employees work at the dock on a seasonal basis depending on the species. Permanent employees all live in the area, while part-timers live as far away as Providence.

Town Dock handles 12 permanent vessels in the 60-70 foot range. They handle some vessels from other ports, but primarily deal with the 12 Point Judith vessels. Dock space does not appear to be a problem in Point Judith, as long as boats are out at sea. During storms the boats have to 'raft-out' which means they tie up to one another along the docks. Boats are charged a docking fee which is handled by the state. There are more docks than processing places in town with a dozen different places to tie up.

At one time, the dock served as a cutting dock for yellowtail, summer flounder, and cod. About seven years ago it shifted its focus because of a decrease in landings for these species. Now, they process little groundfish and deal primarily with squid, herring, and mackerel. Other important species include butterfish, scup, and summer flounder. Fish product from Point Judith is considered to be of very high quality. It commands high prices in Fulton's and the Boston Fish Market.

Squid, herring, mackerel, and whiting are predominantly offshore midwater species caught by large (70 foot) vessels. Groundfish such as cod, flounder, and haddock are primarily targeted by inshore medium length vessels and not offshore vessels.

An ecological advantage for Point Judith fishermen is that they are close to many of their primary stocks, including relatively new target species such as squid. Another advantage is that Point Judith fishermen have access to mid-Atlantic stocks such as butterfish, which are approaching the northern most point for many species, as well as access to northern traditional groundfish areas and stocks. An important key to adaptability of Point Judith fishermen is stock and gear switching. This adaptability is attuned to the mixing of Mid-Atlantic and New England marine ecozones.

In a telephone survey, the total number of suppliers of fisheries equipment was noted as 11 with 32 wholesale fish and seafood buyers, 4 seafood brokers, and 2 packers.

The Point Judith fisheries have been dominated by otter-trawl dragging and lobster pot fishing, which together regularly make up 90-95% of the catch.

The fleet in Point Judith is very unlike those in Gloucester and New Bedford, and most similar to the Chatham fishing fleet. It differs from Chatham in having an offshore fleet (17 compared to none in Chatham). The industry and the local fishermen's families, with the possible exception of lobster fishermen and shellfishermen victimized by the Cape North oil spill, are under less stress than those in ports such as Gloucester and New Bedford. Adaptability is a trademark of the Point Judith fleet, and local respondents say they have enjoyed six successful consecutive fishing seasons.

Like Chatham, Point Judith fishermen have the capacity and willingness to innovate and spread their efforts across different gear types and fishery stocks (key respondent, local fishing community leader). For example, recent increases in local landings result from targeting herring, which involves a gear conversion costing $125,000. Such success and economic flexibility is mirrored in a fleet that is fairly modern and in good repair.

In 1996, there were 134 commercial vessels in port ranging from 45-90 feet, with most being ground trawlers. Of these, 55 are between 45 and 75 feet, and 17 over 75 feet. The smaller vessels have 1-2 person crews, with larger vessels manned by 4-5 crew. Most larger vessels fish for squid, herring and whiting. Some smaller inshore boats are still targeting groundfish.

As in Gloucester, there is an external market for seafood products, including processing of non-local seafood products. For example, the Mitsubishi corporation has an arrangement with Sea Fresh Corporation. Mitsubishi Fresh, Inc., contracts 16 Taiwanese longliners to fish for big eye and yellowfin tuna off of Brazil and Trinidad. These vessels stay out for six months at a time, unloading their catch onto carrier vessels in exchange for fuel and food, and then return to Trinidad where the main plant is located. Fish are handled and shipped from Trinidad to Miami and New York for distribution in the United States markets. Most of the harvest is sold domestically. All sales and business are conducted out of Narragansett. The involvement of foreign investors in local seafood processing is a pattern that is being repeated in many ports.

The original inhabitants of the region where Algonquin Indians, who hunted, trapped, and cultivated until being replaced by European colonists. Indian displacement began with the Pettaquamscutt Purchase in 1658, followed by other transactions in 1660 and 1662. White settlers practiced agriculture using slaves and indentured servants for the next 200 years. The industrial sector boomed in the early 1800s with the growth of textile mills, while the agricultural sector experienced declines with gentrification of the area and shifts in labor to mill jobs. Details of demographic transition and economic history from these early years up to 1970 can be found in Poggie and Gersuny (1978). The primary trend has been towards an increase in the services sector away from primary and secondary sectors. In 1970, only 1.1% of workers were engaged in agriculture (93 people), 903 in manufacturing (including 244 in textiles), 24.2% in material goods-producing occupations, with the majority (74.7%) involved in various professional, white collar, and service pursuits.

As of 1996, the labor force remains skewed towards the service industry, with fishermen's numbers remaining fairly constant. There are few new fishermen coming into the industry from local communities, but sons of fishermen are inheriting operating vessels and permits (key respondent, Point Judith as cited by Clay pers. comm.). Tourism has also become a competing industry. Although fishermen are holding their own, access to prime docking space and 'social space' is being lost to tourism development.

Most fishermen from this port live in a 20 mile radius. There is little residential housing in the immediate vicinity. Thus, there is no communal enclave of fishermen's residences, and fishing families are scattered throughout the small local communities of Southern Rhode Island, including Snug Harbor, Wakefield, and Narragansett. Although Point Judith does have a tradition in the fisheries, most of the people here have little family connection to the fishing industry. The typical Point Judith fisher is around 40 years old, has college or masters degrees, and came into the fisheries during the 60's primarily for the lifestyle and financial independence afforded by the occupation.

The majority of fishermen are first generation and lack historical ties to the industry. There is also little ethnic diversity in a population characterized as highly adaptive. The more ethnically rooted a fishing community is, the more difficult it is for them to change. There is a good side to lack of tradition.

The overwhelming majority of fishermen are white males. Older fishermen refer to themselves as "Swamp Yankees." On the other hand, a majority of fish processing workers are ethnic minorities. The former Coop contracts a company to bus in Asians and Puerto Ricans from Providence to work in the fish houses.

Several local organizations represent fishermen and their issues. Until 1994, the Point Judith Fisherman's Cooperation was a viable organization which provided marketing support to members. The marketing-purchasing organization of the Cooperation made it "one of the most effective fishing cooperatives in the United States." Overcapitalization has been cited as the major factor in the failure of the cooperative, but other conditions such as poor prices and market conditions could have contributed to its demise (key respondent, Point Judith as cited by Clay pers. comm.). The Cooperation has been purchased, and is now run as an independent fish marketing organization.

An important fishing organization based out of Point Judith is the East Coast Fisheries Federation (ECFF). It is mainly a large boat organization extending from New Bedford to New Jersey. ECFF is partially supported by funding from local processors, and functions to keep fishermen abreast of important management issues. Funds are taken from fuel costs, with 3 cents from every gallon going to the organization, which ensures its existence even if there is a lack of interest.

The primary issues in this port are distilled from interviews with key informants as the most often mentioned critical issues. They reflect the focus and concern of Point Judith fishermen in maintaining flexibility and adaptability being able to change fisheries, versatility, but dampened by the hassle of numerous new permits for the different fisheries and not knowing the control dates until after the fact; being on the margins of management decision making; restrictions on the mesh size you can have onboard your vessel with what fish, and the need for these fisheries to be able to switch mesh sizes mid-tow; gear conflict offshore between draggers and offshore lobster pots as well as inshore between draggers and gillnetters; fear of ITQs; positive attitudes towards the buyout program; inability to improve your business by increasing your vessel size and/or horsepower (certain fisheries, such as groundfish and scallops, have vessel upgrade limits on length, tonnage, and horsepower as a form of effort control); distrust of the political process of developing FMPs; discouragement at the time lapse between the gathering of scientific data and the proper use of that data; insulted by the way they are perceived and publicly portrayed by fishery scientists (no perceived respect for their knowledge or experience as fishermen by those managing the resource); pollution impacts on nearshore waters; interference in commercial fishing by the developing tourist (recreational boating) sector; loss of dock space for nearshore draggers; poor prices because of the influx of foreign fisheries products driving down ex-vessel value of domestic fresh-caught fish; and no control over the marketing end of the industry.

The development of tourism in South Kingston and a focus on offshore trawling has also created problems for the few inshore draggers who wish to continue groundfishing. Dock space is expensive and supporting commercial infrastructure cannot be expanded upon, since it is in competition with a growing recreational boat sector. The trend has been towards consolidation of infrastructure and loss of 'social' space as the surrounding area becomes gentrified.

The kinds of impacts being felt by families of large draggers in places such as New Bedford and Gloucester is not apparent in Point Judith. Fishermen are still under stress because of the constantly changing regulatory climate, but appear to be coping by maintaining flexible fishing strategies. The oil spill has also stressed local fishing families, particularly those that rely on shellfishing and lobstering for all or part of their fishing income (Dyer and Burroughs 1996).

As in all of the primary ports surveyed, there is no evidence that the industry is replicating itself or expanding through the introduction of new vessels and support businesses. However, Point Judith fishermen are, overall, being able to sustain their level of social yield in the fishery by maintaining a great degree of adaptability to changing regulatory and economic conditions.

The social reproduction of the fishery follows a father-son progression, and fishermen are related to each other patrilineally. This is predicted by the Natural Resource Community model, in which relationships to utilization of local resources, whether they be extracted through commercial fishing, farming, or for subsistence purposes, tie individuals to a location through the social and cultural value of a renewable natural resource extraction lifestyle.

Thus, patrilineal kinship ties have defined the social and occupational networks of local fishermen for generations. A recent dockside intercept survey of seven boat captains found them working with a son and/or one other male relative as part of the crew.

One significant change is that women are involved more as crew or dockside support than they have been in the past, with at least one woman boat owner in the port. Another difference with the present fishing populations from the early 1970s is that there has been an influx of first time fishermen from the University of Rhode Island and nearby communities that have no family history in the industry, and started fishing because it was an available option. Present recruitment, however, is at a standstill as limits on permits, well established occupational networks, and high start-up costs inhibit new entrants to the fishery. Other issues include gear conflicts, area restrictions, and competition for resources with the recreational sector.

Fishermen of Point Judith are maintaining their economic viability by taking advantage of a good mix of mid and north Atlantic fish stocks, and by maintaining diversity in seasonal fishing patterns, gear types, and permits held. The result is a relatively economically healthy fishing fleet with few new recruits and no new vessels coming into the system. Ties to international markets have kept the inshore processing sector viable even with the declines in groundfish landings. Offshore midwater draggers have also made up for local declines in groundfish landing by targeting high biomass midwater species such as whiting, herring, and squid. The immediate future of the fishery in Point Judith looks good, but the lack of recruitment and loss of social and cultural capital through gentrification prevents the industry from expanding, and could accelerate its decline if gentrification intensifies. There is evidence that this is occurring, since the south Kingston area is experiencing a population growth due to high quality of living and benefits of a good school system which is driving rapid land development. As values of local dock space and land increase, further declines in fishing infrastructure may follow (Dyer and Griffiths 1996).

Port of Westerly

In 1990, Westerly had 16,612 residents allocated among 4,635 families and 6,592 households. According to 1990 Census data in Westerly, there were 29 persons employed in occupations of agricultural services, forestry and fishing (less than 1% of all employed persons 16 or over), and 42 employed in agriculture, forestry and fisheries industries.

In 1990, 7% of the 7,068 housing units in Westerly were empty while 42% of the occupied units were rental units.

In 1990, 60% of all residents were born in the state of Rhode Island and the next largest group (26%) were born in the Northeast United States. In the classification of persons age 5 and over, 55% were living in the same house in 1990 that they had occupied in 1985. An additional 25% were living in a different house in 1985 but still within Washington County and 1% were living in a different house but still in Rhode Island. In addition, 43% of all workers 16 and over worked in their place of residence while 53% worked in their county of residence.

The racial composition of Westerly in 1990 was 98% white, less than 1% Chinese, and less than 2% of any other group. Furthermore, about 1% of all persons were of Hispanic origin. When reporting first ancestry, Italian was the largest group (36%) followed by Irish and English (11%). The majority of persons age 5 years and over speak only English (84%) and only 3% of households are classified as linguistically isolated.

In 1990, 32% of Westerly residents age 25 and over were high school graduates and 11% held a bachelor's degree. In 1989, the median *household* income was $33,469 (91% of the Washington County average) with the median family income of $40,814 (96% of the county average) and the median non-family *household* income of $14,732 (73% of the county average). The *per capita* income in 1989 was $15,370 (95% of the county average). Approximately 7% of persons for whom poverty status was determined (over 98% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was retail trade followed by durable goods manufacturing and nondurable goods manufacturing.

Middlesex County, Connecticut

Middlesex is one of the 8 counties in Connecticut and is part of the Hartford Metropolitan Area. In 1997, the total population for the county of 148,802 individuals ranked 6th in the state.

PER CAPITA PERSONAL INCOME

In 1997, Middlesex had a PCPI of $31,393. This PCPI ranked 3rd in the state, and was 88% of the state average ($35,863) and 124% of the national average ($25,288). The 1997 PCPI reflected a 4.0% increase from 1996. The 1996-97 state change was 5.5% while the national change was 4.7%.

TOTAL PERSONAL INCOME

In 1997, Middlesex had a TPI of $4,671,334* (*all income estimates with the exception of PCPI are in thousands of dollars). This TPI ranked 6th in the state and accounted for 4% of the state total. The 1997 TPI reflected a 4.8% increase from 1996. The 1996-97 state change was 5.7% while the national change was 5.7%.

COMPONENTS OF TOTAL PERSONAL INCOME

The TPI includes the earnings (wages, salaries, other labor income, and proprietors' income); dividends, interest, and rent; and transfer payments received by the residents of Middlesex. In 1997, earnings were 69.9% of TPI; dividends, interest, and rent were 18.0%; and transfer payments were 12.1%. From 1996 to 1997, earnings increased 5.0%; dividends, interest, and rent increased 4.3%; and transfer payments increased 4.4%.

EARNINGS BY INDUSTRY

Earnings by persons employed in Middlesex increased from $2,625,132* in 1996 to $2,800,458* in 1997, an increase of 6.7%. The largest industries in 1997 were services; durable goods manufacturing (18.4%), and finance, insurance, and real estate. In 1997, the industries that accounted for at least 5% of earnings showed the slowest growing from 1996 to 1997 was finance, insurance, and real estate while the fastest growing was durable goods manufacturing (increased 24.4%; Regional Economic Information Systems, Bureau of Economic Analysis, Bearfacts - *http://www.bea.doc.gov /bea/regional/bearfacts/bf9697/09/09007.htm*).

In 1990, Middlesex County had 143,196 residents allocated among 38,125 families and 54,694 households. For 1997, the population was estimated to be 149,010 and for 2000 to be 155,071. According to 1990 Census data in Middlesex County, there were 14 white non-Hispanic male captains or other officers of fishing vessels and 28 non-Hispanic white male fishermen.

In 1990, 11% of the 61,593 housing units in the county were empty while 30% of the occupied units were rental units and 54% of the vacant units were for seasonal, recreational or occasional use.

In 1990, 63% of all residents were born in the state of Connecticut while another 21% were born in the Northeast United States. Furthermore, 56% of persons age 5 and over were living in the same house in 1990 that they had occupied in 1985. An additional 20% were living in a different house in 1985 but still within Middlesex County, and 13% were living in a different house but still in Connecticut.

The racial composition of Middlesex County in 1990 was 94% white, 4% black, and 2% other groups. Of those other groups the largest number were Chinese and then Asian Indian. Furthermore, 2% of all persons were of Hispanic origin. When reporting first ancestry, Italian was the largest group (17%) followed by English (13%), Irish (13%), then German (12%). The vast majority of persons age 5 years and over speak only English (87%) and only 2% of households are classified as linguistically isolated.

In 1990, 30% of county residents age 25 and older were high school graduates and 18% held a bachelor's degree. According to the Bureau of Labor Statistics, the civilian labor force in 1996 was 80,770 with a 5.9% unemployment rate. According to the 1999 CBP, there were 4,206 establishments employing 59,997 individuals with an annual payroll of $2,071 million. When fishing dependent industries are included, the level of dependence increases; however, it is difficult to calculate due to the data reporting restrictions in the County Business Pattern data. Overall, 88% of the establishments in Middlesex County employ 1-19 employees.

In 1989, the median *household* income was $43,212 with the median family income of $50,891 and the median non-family *household* income of $26,547. The *per capita* income in 1989 was $19,660. In 1997, the median *household* income was estimated to be $53,624 while 5.2% of the county's population was estimated to be living in poverty.

Port of Clinton

Clinton is located in Middlesex County, Connecticut overlooking Long Island Sound. It is approximately 38 miles south of the capital city of Hartford. Equidistant from New York and Boston, it is within comfortable commuting distance of the metropolitan industrial centers of New Haven, Middletown, and New London. Clinton is contained within 17.2 square miles and has 72 miles of town roads with an estimated population of 13,500. During the summer months, its estimated population reaches around 20,000 individuals (*http://clintonct.com*).

In 1990, Clinton had 3,374 residents allocated among 884 families and 1,383households. According to 1990 Census data in Clinton, there were 24 persons employed in occupations of agricultural services, forestry and fishing (1% of all employed persons 16 or over) and 36 employed in agriculture, forestry and fisheries industries.

In 1990, 9% of the1,564 housing units in the area were empty while 38% of the occupied units were rental units.

In 1990, 60% of all residents were born in the state of Connecticut and the next largest group (26%) were born in the Northeast United States. In the classification of persons age 5 and over, 48% were living in the same house in 1990 that they had occupied in 1985. An additional 22% were living in a different house in 1985 but still within Middlesex County, and 16% were living in a different house but still in Connecticut. In addition, 26% of all workers 16 and over worked in their place of residence while 54% worked in their county of residence.

The racial composition of Clinton in 1990 was 97% white, 1% American Indian, 1% black, and less than 2% of any other group. Furthermore, 4% of all persons were of Hispanic origin. When reporting first ancestry, English was the largest group (20%) followed by Irish (16%), then German and Italian (14%). The majority of persons age 5 years and over speak only English (90%) and 3% of households are classified as linguistically isolated.

In 1990, 33% of residents age 25 and over were high school graduates and 16% held a bachelor's degree. In 1989, the median *household* income was $37,145 (86% of the Middlesex County average) with the median family income of $44,091 (87% of the county average) and the median non-family *household* income of $22,434 (85% of the county average). The *per capita* income in 1989 was $17,059 (87% of the county average). Approximately 5% of persons for whom poverty status was determined (98% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was retail trade followed by durable goods manufacturing and construction.

Clinton traces its history from 1663 when the land between Guilford and Saybrook, as they were then bounded, was known as Homonoscitt. During this time, a committee was appointed by the General Court at Hartford to lay out this area as a plantation. In 1667, the settlement was designated a town and named Kenilworth. By the middle of the eighteenth century, through changes in usage, this name became Killingworth. In 1838, the southern portion was incorporated by the General Assembly as the town of Clinton, the northern portion retaining the name of Killingworth. The line marking the division between the towns of Killingworth and Clinton was the same as that which divided the first and second ecclesiastical societies, or as they were later known "school societies," which were established in 1735.

As in most small New England shore towns, life centered about fishing, farming, shipbuilding, and the church. One of the early leaders of Clinton's church was the Reverend Abraham Pierson. In 1701, when the General Court of the Colony in Hartford granted a charter for "the founding of a collegiate school within His Majesty's Colony of Connecticut, " its founders chose the Reverend Mr. Pierson as its rector. The first classes were held in his parsonage in Clinton. In later years, the school was moved to Saybrook and then to New Haven, where it eventually became Yale University (Clinton Historical Society - *http://clinton.com/hist.htm*).

New London County, Connecticut

New London is one of the 8 counties in Connecticut and is part of the New London-Norwich Metropolitan Area. In 1997, the total population for the county of 248,838 individuals ranked 4th in the State.

PER CAPITA PERSONAL INCOME

In 1997, New London had a PCPI of $28,466. This PCPI ranked 4th in the state, and was 79% of the state average ($35,863) and 113% of the national average ($25,288). The 1997 PCPI reflected an increase of 3.7% from 1996. The 1996-97 state change was 5.5% while the national change was 4.7%.

TOTAL PERSONAL INCOME

In 1997, New London had a TPI of $7,083,512* (* all income estimates with the exception of PCPI are in thousands of dollars). This TPI ranked 4th in the state and accounted for 6% of the state total. The 1997 TPI reflected a 3.6% increase from 1996. The 1996-97 state change was 5.7% and the national change was 5.7%.

COMPONENTS OF TOTAL PERSONAL INCOME

The TPI includes the earnings (wages, salaries, other labor income, and proprietors' income); dividends, interest, and rent; and transfer payments received by the residents of New London. In 1997, earnings were 66.1% of TPI; dividends, interest, and rent were 17.5%; and transfer payments were 16.4%. From 1996 to 1997, earnings increased 3.0%; dividends, interest, and rent increased 4.3%; and transfer payments increased 4.9%.

EARNINGS BY INDUSTRY

Earnings by persons employed in New London increased from $4,983,674* in 1996 to $5,286,511* in 1997, an increase of 6.1%. The largest industries in 1997 were services (34.4% of earnings), durable goods manufacturing (12.6%), and nondurable goods manufacturing (9.9%). In 1999, the industries that accounted for at least 5% of earnings showed the slowest growing from 1996 to 1997 was durable goods manufacturing (which decreased 7.9%) while the fastest growing was construction (5.2% of earnings in 1997 which increased 23.6%) (Regional Economic Information System, Bureau of Economic Analysis - *http://www.bea.doc.gov/ bea/ regional/bearfacts/bf9697/09/09011.htm*).

In 1990, New London County had 254,957 residents allocated among 67,291 families and 93,542 households. For 1997, the population was estimated to have dropped to 252,958 and estimated to be 259,088 by 2000. According to 1990 Census data in New London County, there were 19 white non-Hispanic male captains or other officers of fishing vessels and 85 fishermen (all non-Hispanic white, 67 male and 18 female).

In 1990, 11% of the 104,461 housing units in the county were empty while 35% of the occupied units were rental units and 43% of the vacant units were for seasonal, recreational or occasional use and 13% were "usual home elsewhere".

In 1990, 52% of all residents were born in the state of Connecticut while 25% were born in the Northeast United States. Furthermore, 53% of persons age 5 and over were living in the same house in 1990 that they had occupied in 1985. An additional 25% were living in a different house in 1985 but still within New London County, and 6% were living in a different house but still in Connecticut.

The racial composition of New London County in 1990 was 92% white, 5% black, and 3% other groups (the largest numbers were Filipino and American Indian). Furthermore, 3% of all persons were of Hispanic origin. When reporting first ancestry, Irish, English and German were the largest groups (12% each). The majority of persons age 5 years and over speak only English (86%) and only 1% of households are classified as linguistically isolated.

In 1990, 33% of county residents age 25 and older were high school graduates and 13% held a bachelors degree. According to the Bureau of Labor Statistics, the civilian labor force in 1996 was 132,890 with a 5.9% unemployment rate. According to the 1999 CBP, there were 103,728 employees and 5,705 establishments with an annual payroll of $3.4 billion. When fishing dependent industries are included, the level of dependence increases; however, it is difficult to calculate due to data reporting restrictions in the County Business Pattern data. Overall, 88% of establishments in New London County employ 1-19 employees.

In 1989, the median *household* income was $37,488 with the median family income of $43,256 and the median non-family *household* income of $22,457. The *per capita* income in 1989 was $16,702. In 1997 the median *household* income was estimated to be $43,725, and 7.3% of the county's population was estimated to be living in poverty.

The city of New London, founded in 1659, is Connecticut's twelfth largest city by population. The city was incorporated in May, 1784. New London is located 50 miles southeast of Hartford and covers an area of 5.5 square miles surrounded by the town of Waterford on the north and west, the Thames River on the east, and Long Island Sound on the south. The city is centrally located approximately 120 miles northeast of New York City and approximately 100 miles southwest of Boston, Massachusetts.

The city is about three hours from New York City by rail or highway. Providence, Rhode Island, is approximately an hour from the city and Boston is approximately two hours away. The city is served by interstate, intrastate, and local bus lines. New London is served by Interstate 95 to Boston and New York (routes 82, 32 and 2 link the city with Hartford). Rail transportation and freight service are available to major points including New York, Boston, Providence, and Montreal. Air service is available at Groton-New London Airport to the south, Green Airport (Providence) to the east and Bradley Airport to the north. The city has one of the finest natural harbors on the eastern seaboard and State Pier in New London is a noted cargo port.

Port of East Lyme

In 1990, East Lyme (county subdivision) had 15,340 residents allocated among 4,116 families and 5,490 households. According to 1990 Census data in East Lyme, there were 134 persons employed in occupations of agricultural services, forestry and fishing (2% of all employed persons 16 or over) and 111 employed in agriculture, forestry and fishing industries.

In 1990, 19% of the 6,772 housing units in the area were empty while 21% of the occupied units were rental units.

In 1990, 56% of all residents were born in the state of Connecticut and the next largest group (25%) were born in the Northeast United States. In the classification of persons age 5 and over, 58% were living in the same house in 1990 that they had occupied in 1985. An additional 21% were living in a different house in 1985 but still within New London County, and 11% were living in a different house but still in Connecticut. In addition, 4% of all workers 16 and over worked in their place of residence while 84% worked in their county of residence.

The racial composition of East Lyme in 1990 was 94% white, 3% black, and less than 3% of any other group. Furthermore, 2% of all person were of Hispanic origin. When reporting first ancestry, Irish was the largest group (15%) followed by English (14%), German (13%), and Italian (11%). The majority of persons age 5 and over speak only English (88%) and less than 1% of the households are classified as linguistically isolated.

In 1990, 28% of residents age 25 and over were high school graduates and 17% held a bachelor's degree. In 1989, the median *household* income was $46,979 (25% above the New London County average) with the median family income of $52,434 (21% above the county average) and the median non-family *household* income of $30,887 (38% above the county average). The *per capita* income in 1989 was $20,004 (20% above the county average). Approximately 3% of persons for whom poverty status was determined (94% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was retail trade followed by durable goods manufacturing and health services.

Nassau County, New York

Nassau is one of the 62 counties in New York and is part of the Nassau-Suffolk Metropolitan Area. The 1997, the total population for the county of 1,299,485 individuals ranked 5th in the State.

PER CAPITA PERSONAL INCOME

In 1997, Nassau had a PCPI of $39,691. This PCPI ranked 3rd in the state, and was 131% of the state average ($30,250) and 157% of the national average ($25,288). The 1997 PCPI reflected a 4.2% increase from 1996. The 1996-97 state change was 4.3% while the national change was 4.7%.

TOTAL PERSONAL INCOME

In 1997, Nassau had a TPI of $51,578,265* (*all income estimates with the exception of PCPI are in thousands of dollars). This TPI ranked 3rd in the state and accounted for 9.4% of the state total. The 1997 TPI reflected a 4.2% increase from 1996. The 1996-97 state change was 4.3% and the national change was 5.7%.

COMPONENTS OF TOTAL PERSONAL INCOME

The TPI includes the earnings (wages, salaries, other labor income, and proprietors' income); dividends, interest, and rent; and transfer payments received by the residents of Nassau. In 1997, earnings were 62.9% of TPI; dividends, interest, and rent were 23.6%; and transfer payments were 13.6%. From 1996 to 1997, earnings increased 4.6%; dividends, interest, and rent increased 3.1%; and transfer payments increased 3.9%.

EARNINGS BY INDUSTRY

Earnings by persons employed in Nassau increased from $25,386,409 in 1996 to $26,642,198 in 1997, an increase of 4.9%. The largest industries in 1997 were services (37.4% of earnings), state and local government (12.1%), and finance, insurance, and real estate (11.5%). In 1999, the industries that accounted for at least 5% of earnings showed the slowest growing from 1996 to 1997 was finance, insurance, and real estate (which increased 1.5%) while the fastest growing was wholesale trade (8.3% of earnings in 1997 which increased 5.8%; Regional Economic Information Systems, Bureau of Economic Analysis, Bearfacts - *http://www.bea.doc.gov/bea/ regional/bearfacts/bf9697/36/36059.htm*).

In 1990, Nassau County had 1,287,348 residents allocated among 346,790 families (average family size 3.3) and 431,148 households. The population was estimated to be 1,303,686 in 1997 and 1,334,544 in 2000. According to 1990 Census data in Nassau County, there were 14 captains or other officers of fishing vessels (all white, non-Hispanic males) and 62 fishermen (40 non-Hispanic white males, 5 non-Hispanic white females and 17 non-Hispanic black males).

In 1990, 3% of the 446,292 housing units in the county were empty while 20% of the occupied units were rental units.

In 1990, 77% of all residents were born in the state of New York and the next largest group (13%) were foreign born. Furthermore, 72% of persons 5 age and over were living in the same house in 1990 that they had occupied in 1985. An additional 15% were living in a different house in 1985 but still within Nassau County and 9% were living in a different house but still in the state of New York. In addition, 14% of all workers 16 and over worked in their place of residence while 60% worked in their county of residence.

The racial composition of Nassau County in 1990 was 87% white, 9% black, and 3% Asian (primarily Asian Indian and Chinese) and less than 1% other groups. Furthermore, only 6% of all persons were of Hispanic origin. When reporting first ancestry, Italian was the largest group (21%) followed by Irish (14%), German (12%), "Race or Hispanic origin groups" (10%), and Russian (6%). The vast majority of persons age 5 years and over speak only English (81%) and only 4% of households are classified as linguistically isolated.

In 1990, 84% of county residents age 25 and over were high school graduates and 30% were college graduates. According to the Bureau of Labor Statistics, the civilian labor force in 1996 was 674,308 with a 3.8% unemployment rate. According to the 1999 CBP, there were 46,686 establishments employing 543,465 individuals with an annual payroll of $19.6 billion . When fishing dependent industries are included, the level of dependence increases: however, it is difficult to calculate due to data reporting restrictions in the County Business Pattern data. Overall, 90% of establishments in Nassau County employ 1-19 employees.

In 1989, the median *household* income was $54,283 with the median family income of $60,619 and the median non-family *household* income of $25,062. The *per capita* income in 1989 was $23,352. In 1997, the median *household* income was estimated to be $58,155, and 5.1% of the county's population was estimated to be living in poverty.

Nassau County is indeed a vacation paradise. As the heart of Long Island the largest island adjoining the continental United States, Nassau County delivers the finest activities, entertainment, scenic environments and pure relaxation for world traveling tourists. Miles of sandy beaches and top-rated parks, an abundance of historical landmarks, quality restaurants and five star hotels greatly enhance the region's leisure and economic lure.

With the Hamptons to the east and the Statue of Liberty to the west, Nassau County has become one of the fastest growing regions in the country. Located just east of Kennedy and Laguardia Airports, Nassau County offers a unique system of transportation. Manhattan's daily Broadway Plays, Museum of Natural History and the Empire State Building are only 15 minutes from Nassau County's western boarder.

Nassau County has something for everyone. Whether its boating, swimming, bicycling, fishing, landmark and historical exploration, shopping or fitness activities like walking, running, golfing or tennis, the region provides a wide array of superior facilities for all to enjoy. Beaches are some of the most renowned natural resources of Nassau's unique location. While the north shore of Nassau County provides wonderful views across the tranquil Long Island Sound to the shores of Connecticut and Rhode Island, the south shore adjoins the vast and exhilarating Atlantic Ocean. A day on Jones Beach, Long Beach, Lido Beach or Atlantic Beach will bring hours of memorable fun for the whole family and some of the most unforgettable sunsets at day's end.

The North Shore of Nassau County and Long Island is known as the Gold Coast for good historical reason. Millionaires such as the Vanderbilts constructed magnificent mansions here in the early 1900's where they spent summers entertaining the world's elite. Many of these breathtaking homes provide a taste of the world's richest lifestyles through daily public tours.

The natural beauty of Nassau County is a driving force behind the region's continually growing popularity among tourists. The easy accessibility by auto, air, train and ferry makes Nassau County and Long Island the ideal destination for a special vacation (*http://www.co.nassau.ny.us/paradise.html*).

Port of Freeport

The Village of Freeport, New York, is located on Long Island's south shore in Nassau County. Freeport covers five square miles and is home to approximately 45,000 people. The principal industry in the Village of Freeport is fishing and the Nautical Mile is home to charter fishing boats and many shops and seafood restaurants.

In 1990, Freeport Village had 39,894 residents allocated among 9,717 families and 13,230 households. According to 1990 Census data in Freeport, there were 247 persons employed in occupations of agricultural services, forestry and fishing (1% of all employed persons 16 or over) and 241 employed in agriculture, forestry and fishing industries.

In 1990, 3% of the 13,660 housing units in the village were empty while 35% of the occupied units were rental units.

In 1990, 64% of all residents were born in the state of New York and the next largest group (22%) were foreign born. Furthermore, 62% of persons age 5 and over were living in the same house in 1990 that they had occupied in 1985. An additional 24% were living in a different house in 1985 but still within Nassau County and 8% were living in a different house but still in New York. In addition, 23% of all workers 16 and over worked in their place of residence while 69% worked in their county of residence.

The racial composition of Freeport Village in 1990 was 56% white, 32% black, 2% Asian or Pacific Islander (especially Filipino, Asian Indian, and Chinese), and less than 1% of any other group. Furthermore, 20% of all persons were of Hispanic origin. When reporting first ancestry, "Race or Hispanic origin groups" was the largest group (36%) followed by Irish and Italian (9% each), German (8%), then West Indian (6% excluding Hispanic origin groups). The majority of persons age 5 years and over speak only English (73%) and only 7% of households are classified as linguistically isolated.

In 1990, 30% of Village residents age 25 and over were high school graduates and 12% held a bachelor's degree. In 1989, the median *household* income was $43,948 (81% of the Nassau County average) with the median family income of $49,829 (81% of the county average) and the median non-family *household* income of $27,272 (10% above the county average). The *per capita* income in 1989 was $17,018 (73% of the county average). Approximately 7%% of persons for whom poverty status was determined (99% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was retail trade followed by health services, educational services, and durable goods manufacturing. Freeport ranks second in the list of top ten places in Nassau County in the 1992 Economic Census, based on population, number of establishments, and sales. In 1992, there were 241 retail establishments with total sales of $305 million, 137 wholesale establishments with total sales of $463 million and 315 services establishments with total sales of $134 million.

Freeport and neighboring Point Lookout (included in the Freeport port code) are almost entirely dependent on otter trawl landings (over 89% poundage, 87% value), and the major species are *loligo* squid and silver hake, with smaller amounts of scup, weakfish, bluefish, butterfish, summer flounder, other flounders, Atlantic mackerel. Gillnets are used for bluefish, angler, and other species, and there are small handline, pot, pound-net and bay shellfisheries associated with these ports (McCay and Cieri 2000).

There are three commercial fishing docks in Freeport. One dock has a small retail shop; only one boat works from the dock. Fishermen sell mostly to Fulton Fish Market because they give the highest dollar. although some sell catch to the main fish house in Point Lookout.

Fishermen believe they are developing the area for tourists and pleasure boaters, squeezing the commercial fishermen off the docks. Today, there are only three boats (65' plus trawlers) that go out of the port full-time.

Suffolk County, New York

Suffolk is one of the 62 counties in New York and is part of the Nassau-Suffolk Metropolitan Area. In 1997, the total population for the county of 1,362,616 individuals ranked 4th in the state.

PER CAPITA PERSONAL INCOME

In 1997, Suffolk had a PCPI of $30,330. This PCPI ranked 6th in the state, and was 100% of the state average ($30,250) and 120% of the national average ($25,288). The 1997 PCPI reflected a 4.0% increase from 1996. The 1996-97 state change was 4.3% and the national change was 4.7%.

TOTAL PERSONAL INCOME

In 1997, Suffolk had a TPI of $41,282,942* (*all income estimates with the exception of PCPI are in thousands of dollars). This TPI ranked 5th in the state and accounted for 7.5% of the state total. The 1997 TPI reflected a 4.5% increase from 1996. The 1996-97 state change was 4.3% and the national change was 5.7%.

COMPONENTS OF TOTAL PERSONAL INCOME

The TPI includes the earnings (wages, salaries, other labor income, and proprietors' income); dividends, interest, and rent; and transfer payments received by the residents of Suffolk. In 1997, earnings were 67.2% of TPI; dividends, interest, and rent were 17.3%; and transfer payments were 15.5%. From 1996 to 1997, earnings increased 5.0%; dividends, interest, and rent increased 3.3%; and transfer payments increased 3.9%.

EARNINGS BY INDUSTRY

Earnings by persons employed in Suffolk increased from $20,897,961* in 1996 to $22,116,323* in 1997, an increase of 5.8%. The largest industries in 1997 were services (28.6% of earnings), state and local government (17.2%), and retail trade (9.3%). In 1997, the industries that accounted for at least 5% of earnings showed the slowest growing from 1996 to 1997 was durable goods manufacturing (8.5% of earnings in 1997 which increased 0.7%) while the fastest growing was construction (6.1% of earnings in 1997 which increased 9.6%) (Regional Economic Information Systems, Bearfacts - *http://govinfo.library.orst.edu/bfact?9_9_ 30- 103.nyc*).

In 1990, Suffolk County had 1,321,864 residents allocated among 343,611 families and 424,623 households. The population was estimated to be 1,362,616 in 1997 and 1,419,369 in 2000. According to 1990 Census data in Suffolk County, there were 9,294 persons employed in agricultural services, forestry and fishing (1% of all employed persons 16 or over). There were 101 non-Hispanic white male captains or other officers of fishing vessels and 662 fishermen (650 non-Hispanic white males, 8 non- Hispanic white females, and 4 non-Hispanic black males).

According to a 1997-98 survey of private sector firms in the county conducted by the Suffolk County Department of Labor (DOL) and the Private Industry Council, 96.8% of firms responding (response rate was 45.5%) expected their employment to remain stable or expand over the following year. Manufacturing and finance, insurance, and real estate were the most optimistic sectors. The largest industry in the county is services with 35.9% of private sector jobs. In agriculture, forestry and fishing, 96.8% of firms expected increasing or stable employment while 3.2% expected decreases (*http://www.co.suffolk.ny.us/labor/EmployerSurvey97-98.htm*).

Occupations expected to be in demand were sales representative-agent, truck driver, auto-truck mechanic, engineers, carpenters (144 jobs), construction laborers (141 jobs), HVAC mechanics, plumbers, electricians, dental assistants, physical therapists, registered nurses, and home health aides. Three percent of needed employees (293 persons) were in agriculture, forestry and fishing, but only 4 fishermen, 1 fish packer/cutter, 13 marina workers, and 9 boat/marine mechanics were listed. The industry with the most difficulty in finding qualified personnel was the services industry, followed by retail trade and manufacturing. Average hourly wages in agriculture, forestry and fishing were reported to be $9.84 per hour. Construction jobs averaged $12.19 per hour and manufacturing $11.96 per hour. while retail trade averaged only $7.96 per hour. However, for the one firm reporting as employing fishermen, average wages per fisherman were $24 per hour (for the one firm employing licensed seamen wages averaged $29 per hour). This is considerably higher than plumbers who received $13.73 per hour, carpenters received $13.26 per hour, machinists received $13.29 per hour, boat/marine mechanics received $11.83 per hour, truck-van drivers received $9.87 per hour, construction laborers received $9.60 per hour, and marina workers received $8.29 per hour. By employer zip code, 53 of the needed jobs (based in 27 firms) were located in Hampton Bays and 27 jobs (in 16 firms) were in Montauk.

In 1990, 12% of the 481,317 housing units in the county were empty while 20% of the occupied units were rental units.

In 1990, 81% of all residents were born in the state of New York while the next largest group (4%) were born in the Northeast United States. Furthermore, 67% of persons age 5 and over were living in the same house in 1990 that they had occupied in 1985. An additional 20% were living in a different house in 1985 but still within Suffolk County and 9% were living in a different house but still in New York.

The racial composition of Suffolk County in 1990 was 90% white, 6% black, and 3% other groups (largest numbers were Chinese and Asian Indian). Furthermore, 6% of all persons were of Hispanic origin. When reporting first ancestry, Italian was the largest group (24%) followed by German and Irish (16%), then "Race or Hispanic origin groups"(10%). The vast majority of persons age 5 years and over speak only English (85%) and only 2% of households are classified as linguistically isolated.

In 1990, 33% of county residents age 25 and over were high school graduates and 13% held a bachelor's degree. According to the Bureau of Labor Statistics, the civilian labor force in 1996 was 691,154 with a 4.7% unemployment rate. According to the 1999 CBP, there were 499,811 employees and 42,477 establishments with an annual payroll of $17 billion. When fishing dependent industries are included, in the level of dependence increases; however, it is difficult to calculate due to data reporting restrictions in the County Business Pattern data. Overall, 89% of establishments in Suffolk County employ1-19 employees.

In 1989, the median *household* income was $49,128 with the median family income of $53,247 and the median non-family income of $24,016. The *per capita* income in 1989 was $18,041. In

1997, the median household income was estimated to be $53,560 while 7.6% of the county's population was estimated to be living in poverty. Approximately 5% of persons for whom poverty status was determined (98% of all residents) had 1989 income below the poverty line.

Suffolk County occupies the eastern two thirds of Long Island, New York, which juts about 120 miles into the Atlantic. The County covers roughly 1,000 square miles of territory and is 86 miles long and 26 miles wide at the widest point. The weather is temperate, clean water abundant, and the soil is good. In fact, Suffolk is the leading agricultural county in the state of New York. It is still number one in farming despite all of the building developments and urban sprawl is a tribute to the excellent soil, favorable weather conditions, and the farmers of this region.

Over the past millennium there has been a procession of all kinds of people from Indians, explorers, pirates and colonists, to an invading army that maintained control for years. There have also been an influx of whalers, railroad men, Nazis, summer people, bootleggers, groupies, commuters, and spacemen. Homeowners, farmers, and fisherman have always been the mainstay of this county. There is a cosmopolitan mixture of 1,300,000 people of all kinds today and the population is still growing (*http://www.co.suffolk.ny.us*).

Port of Ammagansett

The NMFS data are collected for the port of Ammagansett as well as unspecified "other Suffolk" fishing. "Other Suffolk" probably includes landings from the fishermen at Orient/Orient Point, Shelter and Fisher Islands, Southold, Cutchogue, and many other smaller places in Suffolk County on both the north and the south forks of eastern Long Island including Mount Sinai.

Bay clamming (for hard clams or quahogs) is the major fishery, representing over 71% of the area's value in 1998 while lobstering is next, representing14% of the value. Other important shellfisheries are for oysters, soft clams, horseshoe crabs, blue crabs, and green crabs. Harvesting bay scallops is an important fishery for all east end ports, but landings vary widely from one year to the next. There is tremendous diversity in gears used, bespeaking the mixed bay, sound, and ocean nature of these fisheries. They include handlines, longlines, harpoons, seines, otter trawls, gillnets, pound nets, pots for fish, eels, conch, crabs, and lobster, fyke-nets, cast nets, diving gear, crab and oyster dredges, shovels, rakes, tongs, patent tongs, and "by hand" (McCay and Cieri 2000).

Ammagansett and Three Mile Harbor

According to NMFS weighout data "Ammagansett" shows the profiles of three traditional, small-scale fisheries of the South Fork of eastern Long Island. To clarify, the town of Ammagansett has no dock facilities and thus is not a "port" in the traditional sense. Fish and shellfish are trucked to consignment houses in Ammagansett from various locations in the area, including but not restricted to Three Mile Harbor, which is in the town of Springs (most fish landed here are sent to Fulton Fish Market). Both Ammagansett and Springs are part of the township of East Hampton.

Beach seines, pound-nets, and handlining were the major gear types identified for Ammagansett weighout data in 1998. Beach seines are used for bluefish, eels, Atlantic silverside and other species, totaling 6% of the 1998 value. The greatest value (36% in 1998) came from pound-nets or fish weirs. In 1998, 41 species were landed in these fish weirs. The landings of pound-nets provide a sample of the biodiversity of the inshore waters as well as the diversity of preferences in local and metropolitan markets. The species included bluefish (54%), summer flounder (16%), *Loligo* squid (6.5%), weakfish (6%), carp (4%), striped bass (3%), scup (2%), and white perch (1.6%). Less than 1% of the poundage were winter flounder, butterfish, Spanish mackerel, tautog, lobster, black sea bass, Atlantic silverside, skates, dogfish, bonito, Atlantic mackerel, smooth dogfish, crevalle, American shad, albacore tuna, northern puffer, silver hake, sea robins, king mackerel, herring, conger eel, king whiting, oyster toadfish, conchs, periwinkles, menhaden, cunner, crab, tuna (general), blue runner, black drum, triggerfish, and angler.

Another traditional fishery, handlining, is about the same in value as pound-nets in Ammagansett (34.5%). It is used primarily for scup, striped bass, and bluefish, however, 28 other species were also caught handlining, ranging from small amounts of cod, butterfish, eels, king, Spanish and Atlantic mackerel, and white perch, to larger amounts of summer flounder and dogfish. One of the wholesalers in Ammagansett does a significant business in live fish (McCay and Cieri 2000).

Port of Hampton Bays

In 1990, Hampton Bays had 7,893 residents allocated among 2,095 families and 3,243 households. According to 1990 Census data in Hampton Bays, there were 116 persons employed in occupations of agricultural services, forestry and fishing (3% of all employed persons 16 or over), and 133 employed in agriculture, forestry and fishing industries.

In 1990, 37% of the 5,227 housing units in the port area were empty while 28% of the occupied units were rental units.

In 1990, 81% of all residents were born in the state of New York and the next largest group (7%) were born in the Northeast United States. In the classification of persons age 5 and over, 61% were living in the same house in 1990 that they had occupied in 1985. An additional 23% were living in a different house in 1985 but still within Suffolk County, and 9% were living in a different house but still in New York. In addition, 30% of all workers 16 and over worked in their place of residence while 90% worked in their county of residence.

The racial composition of Hampton Bays in 1990 was 98% white, 1% black, and less than 1% of any other group. Furthermore, 2% of all persons were of Hispanic origin. When reporting first ancestry, Irish was the largest group (20%) followed by German (17%), Italian (16%), then English (9%). The vast majority of persons age 5 years and over speak only English (91%) and only 2% of households are classified as linguistically isolated.

In 1990, 34% of residents age 25 and over were high school graduates and 12% held a bachelor's degree. In 1989, the median *household* income was $35,736 (almost a quarter lower than the Suffolk County average) with the median family income of $41,676 (over 20% below the county average) and the median non-family income of $21,023 (7% lower than the county average). The *per capita* income in 1989 was $18,249 (almost exactly the county average). Approximately 6% of persons for whom poverty status was determined (98% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was retail trade followed by educational services and construction.

Hampton Bays is situated on the South Shore of Long Island at the beginning of the South Fork. The community is bounded on the west by East Quogue, on the east by Southampton Village and Shinnecock Hills, on the north by Great Peconic Bay, and on the south by the Atlantic Ocean. The glacial Ronkonkoma Moraine runs through the north part of the community, with hills winding their way into Shinnecock Hills and eventually to Montauk. South of this hilly moraine, the land flattens into the sandy outwash plain leading to Shinnecock Bay and the barrier beach on the Atlantic Ocean.

This area was not called Hampton Bays until 1922, previously eleven small hamlets, each containing no more than a dozen homes. Good Ground was the main hamlet in the area occupying roughly what is now Main Street, Hampton Bays. Other surrounding hamlets were Ponquogue, Squiretown, East Tiana, Canoe Place, Southport, Springville, Red Creek, West Tiana, Newtown, and Rampasture. Most of these hamlets were settled by one or two families and had their own school house (Note: Shinnecock and Hampton Bays entries refer to the same port.).

In 1922, as tourism from New York City increased in the surrounding villages such as Westhampton, Southampton and East Hampton, these hamlets, by now generally called Good Ground, consolidated under the name of Hampton Bays in order to reap some of the benefits in being part of the exclusive "Hamptons" tourist trade (*http://www.hamptonbaysonline.com/external/historical_history.cfm*).

Shinnecock/Hampton Bays is second only to Montauk as a commercial fishing center in New York. The offshore fishing industry in this part of Long Island is concentrated to the west of Shinnecock Inlet, on a barrier island that is just to the south of Hampton Bays. "Shinnecock," as it is known, is part of the town of Southampton. There is a large county-owned dock that is run by the town, where most commercial boats tie-up. The pack-out facilities and their associated docks are on private land, including two private unloading docks and one belonging to the Shinnecock Fishermen's Cooperative. The rest of the land to the east and west of the inlet is a county park. The NMFS codes for this fishery are for Shinnecock and Hampton Bays. We have combined them for this analysis because both refer to the same place (bluefin tuna and other large pelagic landings are collected using the Shinnecock port code while the rest use Hampton Bays).

This is primarily a dragger fishing port (otter trawl landings making up 84% of the poundage and 74% of the value in 1998). Silver hake (whiting) and *Loligo* squid made up over 70% of these landings (66 other species were landed by draggers, including bluefish, butterfish, red hake, and summer flounder). Gillnets are second in importance, accounting for 12% of the value of landings in 1998. They too had diverse landings, totaling 39 species, led by bluefish (31% of poundage), angler (28%), and skates (23%). Bottom longlines (7.3% of value) were used for tilefish while pelagic longlines for swordfish and tunas. There is also a diverse assemblage of inshore techniques, including haul seines, pound-nets, pots (for crab, fish, eel, conch, and both inshore and offshore lobster), fyke-nets, and the shellfish techniques of shovels, rakes, and "by hand" (McCay and Cieri 2000).

Port of Mattituck

In 1990, Mattituck had 3,849 residents allocated among 1,126 families and 1,519 households. According to 1990 Census data in Mattituck, there were 103 persons employed in industries of agricultural services, forestry and fishing (6% of all employed persons 16 or over), and 80 employed in agriculture, forestry and fishing occupations.

In 1990, 33% of the 2,157 housing units in the town were empty while 29% of the occupied units were rental units.

In 1990, 85% of all residents were born in the state of New York and the next largest group (4%) were born in the Northeast United States. In the classification of persons age 5 and over, 67% were living in the same house in 1990 that they had occupied in 1985. An additional 21% were living in a different house in 1985 but still within Suffolk County, and 5% were living in a different house but still in New York. In addition, 26% of all workers 16 and over worked in their place of residence while 96% worked in their county of residence.

The racial composition of Mattituck in 1990 was 98% white and less than 1% of any other group. Furthermore, under 1% of all persons were of Hispanic origin. When reporting first ancestry, German was the largest group (22%) followed by Polish (20%), Irish (17%), then English (11%). The vast majority of persons age 5 years and over speak only English (93%) and 3% of households are classified as linguistically isolated.

In 1990, 33% of residents age 25 and over were high school graduates, and 11% held a bachelor's degree while 22% had some college. In 1989, the median *household* income was $36,415 (74% of the Suffolk County average) with the median family income of $44,688 (84% of the county average) and the median non-family income of $22,159 (92% of the county average). The *per capita* income in 1989 was $17,511 (95% of the county average). Approximately 4% of persons for whom poverty status was determined (99.6% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was retail trade followed by education al services and health services.

Although Greenport and Mattituck are very dissimilar ports, landings information was combined to protect confidentiality. Otter trawl landings are by far the most important, over 95%, and the classic Mid-Atlantic complement of species is found, led by silver hake and *Loligo* squid, but including butterfish, summer and winter flounder, scup, striped bass, angler, and other species. There is also pound-net fishing, haul-seining, gillnetting, handlining, pelagic longlining, lobster and conch pot fishing, and raking for clams and dredging for bay scallops.

Over 90% of the weighout landings attributed to Mattituck came from otter trawl fishing, and the full complement of Mid-Atlantic species were major landings(25%), butterfish (12%), summer flounder (14.5%), scup (4.4%), dogfish 3.1%). Lobster and striped bass were also significant, among the 37 species landed. Total landings in 1998 were less than 275,000 pounds. "Other New York" includes lobster and other landings which probably came from places like Mattituck.

Greenport is the largest fishing center on the north fork of Long Island. People from Greenport own and fish with vessels in other ports. Two sea scallopers owned by a company in Cape May, New Jersey, use Greenport's docks. There is a lot of overlap, often the lobstermen, conchers, gillnetters, etc., are the same people, adapting to the seasons and the regulations. Regulations and decline in some species have made a difference. Despite local support, commercial fishing is not nearly as big in Greenport as it was 10 or 20 years ago. Opportunities exist for work at other trades in the region, including a local shipyard, as well as machinist, welding, electrician and similar jobs.

At Mattituck Creek off East Mill Road they run boats averaging 35-45'. Most lobster on Long Island Sound. They also do some handlining and gillnetting. There are a few draggers that also work out of the inlet. A seafood house across the creek has its own dock and advertises a lobster business.

Another marina closer to the mouth of the inlet is a combination commercial and recreational dock with few amenities. This is reportedly the only other place where any commercial fishermen docked. At one time Mattituck had a lot of fishing activity, particularly before 1992, when dragging was sharply cut back by closures of many areas such as western Long Island Sound and zones along the western shore of Long Island and Peconic. These closures affected many places besides Mattituck and they forced some small dragger operations to move to the open ocean and to other fisheries (McCay and Cieri 2000).

Port of Montauk

The information presented in this section was partially modified from the port and community description provided in the Tilefish FMP (MAFMC 2000).

Montauk is the largest fishing port in New York. It is situated near the eastern tip of the South Fork of Long Island. Otter-trawls and longlines are the principal gear-types, in terms of pounds landed and value. Loligo squid and silver hake were the two most important fin-fish caught in 1998, however, tilefish, swordfish and tuna landings were important as well. Montauk is the leading tilefish port in the U.S., but the tilefish fishery has declined greatly. For the years 1998-1999, some of the Montauk-based tilefish boats were unloading their catches in Rhode Island. Nonetheless, tilefish accounted for 21% of the value of landings in this port in 1998. The number of species landed at Montauk is staggering. The methods used to harvest fish and shellfish are diverse, including pound nets or fish weirs, box traps, haul seines, and spears, along with the more usual pots, lines, and trawl nets.

In 1990, Montauk had 3,001 residents allocated among 817 families and 1,284 households. According to 1990 Census data in Montauk, there were 151 persons employed in occupations of agricultural services, forestry and fishing (9% of all employed persons 16 or over) and 139 persons employed in agriculture, forestry and fisheries industries.

In 1990, 69% of the 3,984 housing units in Montauk were empty while 29% of the occupied units were rental units.

In 1990, 70% of all residents were born in the state of New York and the next largest group (14%) were foreign born. In the classification of persons age 5 and over, 58% were living in the same house in 1990 that they had occupied in 1985. An additional 25% were living in a different house in 1985 but still within Suffolk County, and 9% were living in a different house but still in New York. In addition, 65% of all workers 16 and over worked in their place of residence while 90% worked in their county of residence.

The racial composition of Montauk was 98% white, 1% black, and less than 1% of any other group. Furthermore, 7% of all persons were of Hispanic origin. When reporting first ancestry, German was the largest group (20%) followed by Irish (17%), Italian (10%), then "race or Hispanic origin groups" (8%). The majority of persons age 5 years and over speak only English (81%) and only 1% of households are classified as linguistically isolated.

In 1990, 35% of port residents age 25 and over were high school graduates and 13% held a bachelor's degree. In 1989, the median *household* income was $31,849 (almost a third lower than the Suffolk County average) with the median family income of $39,292 (almost a quarter below the county average) and the median non-family income of $22,417 (only 7% lower than the county average). The *per capita* income in 1989 was $20,502 (11% higher than the county average). Approximately 3% of persons for whom poverty status was determined (98% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was retail trade followed by personal services, construction and other professional and related services.

Montauk is an isolated community on the tip of Long Island, New York. Baymen originally fished for subsistence and barter using weirs and inshore seine nets. The vessel of choice was the piragua, a small sail-powered craft for fishing in nearshore bays and inlets. Shellfish fishing was also important and remains a seasonal summer activity. Although baymen have disappeared in Montauk, some still follow this simple lifestyle in nearby Shelter Island, Snug Harbor, and Freeport.

Shore seining for menhaden ("bunkers") was an early commercial activity that supported over 30 "seine gangs" in the early 1800's. Shore gangs were replaced at the turn of the century by menhaden steamers using haul seines. Women used to play an important part in the fishery by helping out on the beach (seining for alewives). They also worked in marketing and processing of bunkers. Bunker factories made millions for their owners, and fish were converted into fish meal, fertilizer, and oil. Local menhaden stocks were eventually depleted, and the bunker industry lasted until 1968 when the last fish factory, the Promise Land, closed.

Despite the closure of the bunker factories and a small groundfish fleet, Montauk remains New York state's most important commercial fishing port. A large portion of the catch, which also includes 10% of the *Illex* and *Loligo* squid landings in the northeast, is sold for export (Dyer and Griffith 1996). Commercial and recreational fishing are the primary activities in Montauk, with the community business sector being geared to servicing these two fishing sectors. The summer season is also important for tourists as summer rates for hotels and other seasonal housing will reflect.

A local community leader in the recreational sector estimated that 100 resident families make their living in recreational fishing services (Clay pers. comm.). With 24 estimated commercial vessels averaging three crew each, there are approximately 72 families that are directly dependent on the production side of commercial fishing. This does not include those in the processing, transportation, and infrastructure support sector (e.g., fish market owners/operators, dock workers, welders, fish processors, and carpenters) (Dyer and Griffith 1996).

The winter community is small and insular, consisting of commercial fishermen and their families, small businesses, and local charter boat owners/operators. Some of the recreational fishermen will overwinter in Montauk or nearby East Hampton. Many others will drydock their vessels and spend the winter months elsewhere. The height of the fishing season begins around mid-March after Saint Patrick's Day, which is marked by a celebration of the rites of spring and the renewal of fishing.

Fishing is most active during the months of June to September, and least active from December to February. The winter fishery targets tilefish, pollock and cod along the shelf. In the summer, a large charter boat fleet goes after tuna. A summer fishery for yellowfin, bluefin, and big eye tuna is conducted by a day and charter boat fleet. The importance of the recreational sector has been steadily growing as recreational fishing pressure increases and as some commercial fishermen convert their boats for charter fishing and whale watching (Dyer and Griffith 1996).

Montauk is also home of a productive tilefish fleet. Tilefish are caught during the fall and winter months by longline in deep water at the edge of the continental shelf. Montauk led the northeast in tilefish landings in 1993 with 2,200,000 pounds valued at $2.75 million. Tilefish are sold in restaurants in New York or bought by the Japanese to make sashimi. One tilefish operation consisted of three boats owned by two brothers and each boat had two crews of three deckhands and a captain. They would fish the deep water valleys off of New Jersey for ten days, return, and rotate out with another crew (Dyer and Griffith 1996). In 1998, tilefish landings in Montauk were again the highest in the northeast, with landings of 1,388,905 valued at $2,569,783. Montauk has three docks run by three fish houses. One dock primarily handles tilefish, one handles groundfish and lobster boats in the summer, and one handles draggers (McCay *et al.* 1993).

The docks are a couple of miles away from the town's main street. Around the docks are a number of associated industries such as restaurants, fish markets and marinas, with most of these businesses closed for the winter season. There are four marinas, three party boats and eight charter boats with posted telephone numbers at the Chamber of Commerce. Marinas which cater to the recreational sector include the Montauk Marine Basin, the Montauk Yacht Club, Uihlien's Marina and Boat Rental, and West Lake Fishing Lodge. Commercial vessels are located at two city docks opposite each other on the harbor. One is located near two fish markets and one next to the Coast Guard station.

Most of Montauk's fish are packed out at four commercial facilities including Inlet Seafood, a fishing cooperative; Gosman's Dock; Montauk Fish Dock; and Deep Water Seafood. Except for Inlet Seafood, which opens after Saint Patrick's Day for the spring-summer season, there is little local processing and sale of fish. Some fish goes to local restaurants during the summer. The commercial catch is shipped to Fulton's Fish Market in New York City. Fish are generally shipped whole frozen. In the past, there have been problems with the legitimacy of the market. Although a precise number of boxes (of fish) were sent to Fulton, Fulton claimed to receive a lesser amount in many instances. According to one fishermen, those practices have changed since the government take-over of the market. There are few marketing alternatives for fishermen, and Fulton's continues to be the primary destination.

Areas previously dominated by baiting shanties near the state docks are taken over by whale watching and charter boat operations. Baiting longlines is now carried out on board by deckhands. "Fifteen years ago there used to be bait shanties here, but now they are all gone. You can see the whale watching and charter boats all along the docks where the bait shanties used to be. We used the bait to fish longlines. Now, we fish for squid and bait our hooks by hand on board. We fish deep water for squid and tilefish, because the other species such as flounder are played out. Most of the inshore fish are gone." --Commercial Fisherman (Clay pers. comm.).

In February of 1996, a total of 18 of the commercial fleet of medium to large scale vessels ranging from 32 to 90 feet were counted at the dock, and another six reported out fishing. All commercial vessels observed were trawlers with the exception of two lobster vessels. Party boats, tuna head boats, and whale watching boats dominated the drydock area. In 1998, there were 188 vessels which landed fish or shellfish in Montauk according to the NMFS Commercial Landings Database.

Fishing effort off Montauk and on commercial stocks targeted by Montauk fishermen (e.g., *Loligo*) is increasing somewhat from migration of vessels from other ports since the closure of portions of the Georges Bank. This has caused some concern and conflict between local fishermen and these "outsiders" (key respondents -- two commercial fishermen). A key respondent reported that the large boats from the New England fishery now fishing out of Ocean City, Maryland, are directly competing with the Montauk fleet for whiting, squid and other species.

There has been a transition from commercial to charter boat/recreational fishing with the decline of local fishery stocks. Part of this conversion includes a shift of effort into tuna fishing, which is seen as a viable alternative as groundfish fishing has become less lucrative in the Long Island Sound.

"I switched over to tuna because it is easier to make money. You can make a lot of money catching tuna, and you don't have the same overhead as with groundfish. Also, if you take out guests on charter, they don't have to catch a fish to be happy." -- Former Captain of Groundfish Fishing Vessel (Dyer and Griffith 1996).

Avoiding pollution and abiding by nearshore restrictions means longer trips at greater distances offshore. Fishing farther offshore has increased risk for those who traditionally fished the Sound, and two local baymen died at sea in 1993 while fishing far from shore. Traditional fishing cycles of 2-4 days were tied into "making market". With trip lengths increasing to 5 days or more, including greater transit distance and costs to reach the grounds, it has made earning an income more unpredictable. A local crewman explains "We have to fish with the cycles - when markets open up to buy fish -- if we can't do this it makes it difficult to make a living - your income becomes very erratic".

In response to such events and economic concerns over fishing families, the Montauk Emergency Fishermen's Fund was initiated in 1993. The purpose of this fund is to take care of fishermen and their immediate families who experience loss of life at sea, medical hardship, or severe economic hardship (Dyer and Griffith 1996).

Communication with management was expressed as a lack of understanding of what fishermen and the fishing industry was all about. Interviews with local commercial fishermen indicated a frustration with the management process, and that fishermen felt their concerns were ignored even when they did have a chance to speak (Clay pers. comm.).

"We hold our local meetings in a room above the firehouse. When the state representatives come by to listen to us, they nod their heads a lot but nothing is ever done about our concerns. We don't see the situation the same, there are more fish out there than they say. Those public hearings are just a rubber stamp so they can go ahead and do whatever they want anyway (Dyer and Griffith 1996).

Given the isolation of Montauk, with few options other than marine resource utilization, this community is highly dependent on sustaining its commercial fishing enterprise. As in other secondary ports in this study, the commercial groundfish fishing sector in Montauk does not appear to be expanding, nor does it appear to be reproducing itself through replacement of old vessels with new, increased processing capacity, or increasing social yield (the number of fishermen who participate on a sustainable basis). Declines in all of these areas are being hastened by the growth of the recreational sector, increasing fishing costs, pollution impacts on stocks, and regulatory restrictions. However, the expansion of fishermen into new fisheries such as tilefish, and switching to tuna fishing and other strategies (e.g., whale watching) has given the commercial fishing community more flexibility than in larger ports such as Gloucester (Dyer and Griffith 1996).

Cape May County, New Jersey

Cape May is one of 21 counties in New Jersey and is part of the Atlantic-Cape May Metropolitan Area. In 1997, the total population for the county of 97,961 individuals ranked 20th in the state.

PER CAPITA PERSONAL INCOME

In 1997, Cape May had a PCPI of $26,419. This PCPI ranked 15th in the state, and was 82% of the state average ($32,356) and 104% of the national average ($25,288). The 1997 PCPI reflected a 2.6% increase from 1996. The 1996-97 state change was 4.7% while the national change was 4.7%.

TOTAL PERSONAL INCOME

In 1997, Cape May had a TPI of $2,587,984* (*all income estimates with the exception of PCPI are in thousands of dollars). This TPI ranked 20th in the state and accounted for 1% of the state total. The 1997 TPI reflected a 2.6% increase from 1996. The 1996-97 state change was 5.4% while the national change was 5.7%.

COMPONENTS OF TOTAL PERSONAL INCOME

The TPI includes the earnings (wages, salaries, other labor income, and proprietors' income); dividends, interest, and rent; and transfer payments received by the residents of Cape May. In 1997, earnings were 55.3% of TPI; dividends, interest, and rent were 24.2%; and transfer payments were 20.5%. From 1996 to 1997, earnings increased 1.9%; dividends, interest, and rent increased 3.4%; and transfer payments increased 3.5%.

EARNINGS BY INDUSTRY

Earnings by persons employed in Cape May increased from $1,150,717 in 1996 to $1,200,447 in 1997, an increase of 4.3%. The largest industries in 1997 were services, state and local government (22.7%), and retail trade (18.6%). In 1997, the industries that accounted for at least 5% of earnings showed the slowest growing from 1996 to 1997 was transportation and public utilities (5.6% of earnings in 1997 which decreased 0.7%) while the fastest growing was finance, insurance, and real estate (5.7% of earnings in 1997 which increased 5.6%) (Regional Economic Information System, Bureau of Economic Analysis, Bearfacts - *http://www. bea.doc.gov/bea/regional/ bearfacts/bf9697/34/34009.htm*).

In 1990, Cape May County had 95,089 residents allocated among 25,955 families and 38,035 households. For 1997, the population was estimated to be 98,125 and 102,326 for 2000. According to 1990 Census data in Cape May County, there were 82 white non-Hispanic male captains or other officers of fishing vessels and 275 fishermen (262 non-Hispanic white males, 12 non-Hispanic black males, and 1 non-Hispanic white female).

In 1990, 56% of the 85,537 housing units in the county were empty while 28% of the occupied units were rental units.

In 1990, 45% of all residents were born in the state of New Jersey while another 41% were born in the Northeast United States. Furthermore, 54% of persons age 5 and over were living in the same house in 1990 that they had occupied in 1985. An additional 22% were living in a different house in 1985 but still within Cape May County, and 9% were living in a different house but still in New Jersey.

The racial composition of Cape May County in 1990 was 92% white, 5% black, and 2% other groups (largest numbers were American Indian and Filipino). Furthermore, 2% of all persons were of Hispanic origin. When reporting first ancestry, German was the largest group (22%) followed by Irish (19%), Italian (11%), then English (10%). The vast majority of persons age 5 years and over speak only English (85%) and only 1% of households are classified as linguistically isolated.

In 1990, 36% of county residents age 25 and over were high school graduates and 12% held a bachelor's degree. According to the Bureau of Labor Statistics, the civilian labor force in 1996 was 46,599 with an 11.7% unemployment rate. According to the 1999 CBP, there were 3,984 establishments employing 24,960 individuals with an annual payroll of $671 million. When fishing dependent industries are included, the level of dependence increases; however, it is difficult to calculate due to data reporting restrictions in the County Business Pattern data. Overall, 94% of the establishments in Cape May County employ 1-19 employees.

In 1989, the median *household* income was $30,435 with the median family income of $35,476 and the median non-family *household* income of $16,975. The *per capita* income in 1989 was $15,536. In 1997, the median *household* income was estimated to be $36,211 while 11% of the county's population was estimated to be living in poverty.

Cape May County is a peninsula, located at the southernmost tip of New Jersey between the Atlantic Ocean and the Delaware Bay. There is something for everyone on a Jersey Cape vacation from the thrill and excitement of the boardwalk to the gracious hospitality of Victorian Inns.

The common thread of a Jersey Cape vacation is the 30 mile ribbon of clean, white sandy beaches which winds along the cool gentle surf of the Atlantic Ocean and connects the resorts of Ocean City, Sea Isle City, Avalon, Stone Harbor, the Wildwoods, and Cape May. Each of the resort communities of the Jersey Cape offers a wide variety of activities for seashore getaway (*http://www.thejerseycape.net*).

With 30 miles of the most naturally beautiful beaches in the state, Cape May county offers visitors a relaxing, family oriented seaside vacation. While jetskiing, boating, and fishing abound, plan to spend plenty of time just strolling and taking in the view.

For generations, the world famous Wildwood boardwalk has been a premier shore attraction. With several piers featuring all the latest rides, there's plenty of excitement to go around for the whole family. The Wildwoods has 2 miles of boardwalk with 5 amusement piers.

Cape May is the southernmost resort on the Jersey shore and one of the nation's oldest vacation spots. It's famous for its preserved victorian architecture and pleasant charm. The Cape May lighthouse was built in 1859 and stands 159 feet tall and is open year round. Visitors can climb the Cape May point lighthouse for a panoramic view of the ocean and Delaware bay. The Cape May-Lewes ferry runs daily between Cape May and Lewes Delaware. The 17 mile trip takes a little over an hour. The 80 foot tall Yankee schooner sails the water in the area making trips available to the public.

For generations, families have enjoyed the summertime pleasures found only on the Jersey Cape, making Cape May County one of the best vacation destinations on the east coast. Cape May City acquired its name from Cornelius Mey who gave his name to the Cape peninsula on a voyage there in 1620. He was not the first to enter the bay, but he was the first to give it a definite name, Cape Mey. Captain Mey made another voyage from Holland in 1623. He brought thirty refuge families from Holland and settled with them at Fort Nassau on the Delaware River. May became the first director-general of the territory claimed by the Dutch.

The first town was a whaling village that existed on the cape by the 1690's, perhaps as early as 1650. The village was generally referred to as Town Bank, although some referred to it as Potshot, Cape May Town, or New England Village. The Town Bank whalers congregated on a high bluff overlooking the point where Delaware Bay met the Atlantic Ocean, especially during the winter whaling season. The whalers rowed out to catch the whales in wooden boats not much more than 30 feet long. They would harpoon the whale until it bled to death, then drag the carcass to shore. A whale might be 60 feet long, 40 feet in circumference and 250 tons in weight and yield 3,500 gallons of whale oil and whalebone worth at least a $1,000. It was a very dangerous occupation, but very well paid, if you lived to collect. The whales disappeared from the Delaware Bay by 1700 and Town Bank was abandoned. The bay claimed the land that was known as Town Bank which is now under water off the Cape May coast.

The exact date for the founding of Cape May City is not established, however, an act of the New Jersey Assembly in 1697 calls for a road between Cape May and Burlington. The report on the road says it was completed from Egg Harbor to Cold Spring in 1706 and from there to Town Bank in 1707.

Cape May referred to anything on the Cape but by 1801, there were ads in the Philadelphia Daily Aurora advertising Cape Island as a seaside resort. The Atlantic Hotel placed ads and ran daily trips from 1806-1811. The town really took off as a summer destination after the arrival of steam powered boats, because then trips up and down the Delaware no longer had to be dependent on the tide.

On March 8, 1848, Cape Island was incorporated as the borough of Cape May. Cape May City was a thriving seaside community, attracting many politicians and many wealthy plantation owners. Huge hotels were built, some accommodating as many as 2,000 guests. There were gambling casinos and horse racing on the beach. In 1850, Senator Abraham Lincoln and family vacationed there . The Civil War led to the first decline of Cape May by interrupting the normal vacationing habits of the southern plantation owners.

Ocean City was founded by a group of ministers who ban the sale of liquor in 1879. This ban is still in effect and makes the 8 mile beach here a favorite of families. After the war, frequent train service and savvy marketing to the Philadelphia and New York area revived Cape May as a seaside resort. A great fire in 1878 destroyed most of the city, but the wealthy vacationers did not abandon their vacation site. Nearly all the buildings in Cape May were built during this ''Victorian Age''. Because wealthy patrons were used to coming to the area they rebuilt and competed for the best "cottages".

A pleasant alternative to the beaches, the Cape May County Park and Zoo opened in 1942. Plenty of recreational facilities such as playground areas, tennis, and volleyball courts, baseball fields, nature, walking, jogging, bike trails, and fresh water fishing. There are plenty of benches with shade trees, covered pavilions, picnic tables, open-pit barbecues and clean restrooms. The Zoo has over 100 species of wildlife housed in a beautiful setting in the well maintained zoo.

A hurricane swept through Cape May City in 1962. It destroyed the boardwalk, convention center and most of the beachfront. Again, Cape May City was rebuilt. T he Victorian homes were still intact, but they built a new convention center and boardwalk. The extension of the Garden State Parkway into Cape May City, the advent of the ferry to Delaware and the designation of the City as a Historic District, have led to the rise again of a great resort town.

The United State Coast Guard Training Center in Cape May is located on a 450 acre point of land between the Atlantic Ocean and Cape May Harbor. The training center was established in 1948 after moving all east coast recruit training facilities from Mayport, FL (*http://www.usgennet.org/usa/nj/county/capemay/Cape%20May%20City.htm*).

Port of Cape May

In 1990, the City of Cape May had 4,668 residents allocated among 1,119 families and 1,860 households. According to 1990 Census data in Cape May, there were 33 persons employed in occupations of agricultural services, forestry and fishing (2% of all employed persons 16 or over) and 25 employed in agriculture, forestry and fishing industries.

In 1990, 54% of the 4,052 housing units in the area were empty while 48% of the occupied units were rental units.

In 1990, 24% of all residents were born in the state of New Jersey while 41% were born in the Northeast United States. In the classification of persons age 5 and over, 41% were living in the same house in 1990 that they had occupied in 1985. An additional 14% were living in a different house in 1985 but still within Cape May County, and 7% were living in a different house but still in New Jersey. In addition, 72% of all workers 16 and over worked in their place of residence while 94% worked in their county of residence.

The racial composition of Cape May in 1990 was 90% white, 8% black, and 3% of any other group. Furthermore, 2% of all person were of Hispanic origin. When reporting first ancestry, Irish was the largest group (22%) followed by German (21%), then English (12%). The majority of persons age 5 and over speak only English (81%) and none of the households were classified as linguistically isolated.

In 1990, 29% of residents age 25 and over were high school graduates and 17% held a bachelor's degree. In 1989, the median *household* income was $27,560 (91% of the Cape May County average) with the median family income of $35,568 (about the same as the county average) and the median non-family *household* income of $13,713 (81% of the county average). The *per capita* income in 1989 was $15,884 (about the same as the county average). Approximately 5% of persons for whom poverty status was determined (86% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was retail trade followed by educational services and public administration.

Cape May is New Jersey's largest commercial fishing port in terms of landings and value. When combined with neighboring Wildwood (the fishing port is often referred to as "Cape May/Wildwood"), its landings exceeded 93 million pounds, worth over $29 million in 1998.

Draggers, or vessels using bottom otter trawls, account for 69% of Cape May's landings and 70% of its value. Most are used for a wide variety of finfish species while some are also used for scallops. Cape May has a long history of combined or alternating fin-fishing and scalloping. Squid is also very important. In 1998, 17% of Cape May's landed value came from *Illex* squid and another 22% from *Loligo* squid. Much of the squid is processed locally as Atlantic mackerel, caught with draggers and midwater pair trawls. Summer flounder has been a major species but regulations have severely reduced catches (4% landed value in 1998). Scup is another dragger-caught species of historic importance in Cape May. In 1998, it represented 6% of landed value. Cape May is also the home of one of the very few vessels allowed to use purse seines for bluefin tuna in U.S. waters. This vessel lands its catch in Gloucester, Massachusetts. The only purse seine landings in Cape May in 1998 were for menhaden using smaller vessels. Fishing for large pelagics is also done with longlines and troll lines.

Although sea scallop management measures have reduced opportunities for many Cape May fishermen, scalloping remains important. In addition to scalloping with otter trawls, scallop dredges are also utilized, accounting for 15% of the total value of Cape May's landings in 1998. Angler (monkfish) are caught with scallop dredges as well as gillnets, otter trawls, and scallop otter trawls (1.8% of landed value). Dogfish catches are now relatively small (0.3% of total landings in 1998) (McCay and Cieri 2000).

<u>Port of Sea Isle City</u>

In 1990, Sea Isle City had 2,700 residents allocated among 805 families and 1,250 households. According to 1990 Census data in Sea Isle City, there were 10 persons employed in occupations of agricultural services, forestry and fishing (1% less than all employed persons 16 or over).

In 1990, 80% of the 5,989 housing units in the area were empty while 37% of the occupied units were rental units.

In 1990, 38% of all residents were born in the state of New Jersey and 51% were born in the Northeast United States. In the classification of persons age 5 and over, 49% were living in the same house in 1990 that they had occupied in 1985. An additional 18% were living in a different house in 1985 but still within Sea Isle City, and 13% were living in a different house but still in New Jersey. In addition, 30% of all workers 16 and over worked in their place of residence while 66% worked in their county of residence.

The racial composition of Sea Isle City in 1990 was 99% white and 1% of any other group. When reporting first ancestry, Irish was the largest group (28%) followed by German (25%), then Italian (14%). The majority of persons age 5 and over speak only English (96%) and 2% of the households are classified as linguistically isolated.

In 1990, 39% of residents age 25 and over were high school graduates and 14% held a bachelor's degree. In 1989, the median *household* income was $32,218 (less than 1% above the Cape May County average) with the median family income of $34,145 (96% of the county average) and the median non-family *household* income of $23,750 (40% above the county average). The *per capita* income in 1989 was $17,768 (14% above the county average). Approximately 4% of persons for whom poverty status was determined (99% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was retail trade followed by construction and health services.

Sea Isle City is one of the premier vacation spots along the New Jersey Shore. Nestled on Ludlam's Island in Cape May County, it is conveniently located just 35 minutes from Atlantic City, 90 minutes from Philadelphia, and 2 ½ hours from New York City. Sea Isle is more than just June, July and August. The friendly town is just as attractive during the "bookend months" of the spring and fall.

Over the last century, Sea Isle has grown from a small fishing village into one of the Jersey Shore's most spectacular vacation resorts. The clean, white sandy beaches and peaceful meadows have been attracting family vacationers for many years. Sea Isle offers a diverse array of restaurants and shops, biking, boating, swimming, free summer concerts and strolls along our famous promenade (*http://www.seaislecity.org*).

Essex County, New Jersey

Essex is one of 21 counties in New Jersey and is part of the Newark Metropolitan Area. In 1999, the total population of 747,355 individuals ranked 2nd in the state.

PER CAPITA PERSONAL INCOME

In 1999, Essex had a PCPI of $34,824. This PCPI ranked 8th in the state, and was 98% of the state average ($35,612) and 122% of the national average ($28,546). In 1989, the PCPI of Essex was $22,198 and ranked 10th in the state. The average annual growth rate of PCPI over the past 10 years was 4.6%. The average annual growth rate for the state was 4.2% and the nation was 4.4%.

TOTAL PERSONAL INCOME

In 1999, Essex had a TPI of $26,025,825* (*all income estimates with the exception of PCPI are in thousands of dollars). This TPI ranked 2nd in the state and accounted for 9% of the state total. In 1989, the TPI of Essex was $17,526,474* and ranked 2nd in the state. The average annual growth rate of TPI over the past 10 years was 4.0%. The average annual growth rate for the state was 4.8% and for the nation was 5.4%.

COMPONENTS OF TOTAL PERSONAL INCOME

The TPI includes the earnings (wages, salaries, other labor income, and proprietors's income); dividends, interest, and rent; and transfer payments received by the residents of Essex. In 1999, earnings were 67.0% of TPI (compared with 68.4% in 1989); dividends, interest, and rent were 18.5% (compared with 18.0% in 1989); and transfer payments were 14.5% (compared with 13.6% in 1989). From 1989 to 1999, earnings increased on average 3.8% each year; dividends, interest, and rent increased on average 4.3%; and transfer payments increased on average 4.7%.

EARNINGS BY INDUSTRY

Earnings of persons employed in Essex increased from $14,313,723* in 1989 to $20,416,471* in 1999, an average annual growth rate of 3.6%. The largest industries in 1999 were services, (33.3% of earnings), state and local government (15.2%), and finance, insurance, and real estate (3.2%). In 1989, the largest industries were services (29.1% of earnings), state and local government (14.7%), and finance, insurance, and real estate (10.3%). In 1999, the industries that accounted for at least 5% of earnings showed the slowest growing from 1989 to 1999 was nondurable goods manufacturing (6.4% of earnings in 1999 which increased at an average annual rate of 0.5%) while the fastest growing was finance, insurance, and real estate (which increased at an average annual rate of 6.2%) (Regional Economic Information System, Bureau of Economic Analysis, Bearfacts - *http://www. bea.doc.gov/bea/regional/bearfacts/bf9697/34/ 34009.htm*).

In 1990, Essex County had 778,206 residents allocated among 193,081 families and 277,667 households. For 1997, the population was estimated to be 750,842 and 793,633 for 2000. According to 1990 Census data in Newport County, there were 17 non-Hispanic white male fishermen.

In 1990, 7% of the 298,710 housing units in the county were empty while 55% of the occupied units were rental units.

In 1990, 55% of all residents were born in the state of New Jersey and another 11% were born in the Northeast United States. Furthermore, 61% of persons age 5 and over were living in the same house in 1990 that they had occupied in 1985. An additional 25% were living in a different house in 1985 but still within Essex County, and 5% were living in a different house but still in New Jersey.

The racial composition of Essex County in 1990 was 51% white, 41% black, and 3% other groups (the largest numbers were Filipino and Asian Indian). Furthermore, 12% of all persons were of Hispanic origin. When reporting first ancestry, "Race or Hispanic Origin" was the largest group (37%) followed by Italian (13%), Irish (6%), then German (5%). The vast majority of persons age 5 years and over speak only English (74%) and 9% of households are classified as linguistically isolated.

In 1990, 22% of county residents age 25 and over were high school graduates and 11% held a bachelor's degree. According to the Bureau of Labor Statistics, the civilian labor force in 1996 was 373,293 with a 7.7% unemployment rate. According to the 1999 CBP, there were 19,944 establishments employing 334,015 individuals with an annual payroll of $13 billion. When fishing dependent industries are included, the level of dependence increases; however, it is difficult to calculate due to data reporting restrictions in the County Business Pattern data. Overall, 87% of the establishments in Essex County employ 1-19 employees.

In 1989, the median *household* income was $34,518 with the median family income of $42,150, and the median non-family *household* income of $18,869. The *per capita* income in 1989 was $17,574. In 1989, 17% of persons for whom poverty status was determined (98% of all residents) had 1989 income below the poverty line. In 1997, the median *household* income was estimated to be $39,823 while 17% of the county's populations was estimated to be living in poverty.

The recorded history of Essex County begins in 1666, when 30 Connecticut families headed by Robert Treat arrived to establish a settlement along the banks of the Passaic River in what is now the City of Newark. The following year the settlers purchased the land from the Lenni Lenape Indians for $800.

Essex County was officially established in 1682 by the East Jersey Legislature as one of the four original counties of present day New Jersey (Bergen, Monmouth and Middlesex were the others).

By the time of the American Revolution, Essex County had become quite prosperous. After the war, the country entered into a period of unprecedented industrial growth. This was due in part to the completion of the New Jersey Railroad, the Morris Canal, and the establishment of the Morris and Essex Railroad. Factories that grew up around the rail and canal arteries drew waves of immigrants from Europe and the population began to swell.

In 1895, Essex County became the first county in the United States to create a countywide park system. That year, the Governor of New Jersey signed legislation creating the Essex County Parks Commission and the first 60 acres of land were acquired from the City of Newark as the beginning of Branch Brook Park. The Parks Commissioners had the foresight to retain Frederick Law Olmsted, the creator of New York's Central Park, to design 20 of Essex County's 25 parks and reservations. Those first 60 acres have grown into 5,745 acres of greenspace which include vast reservations, developed parks, golf courses, tennis courts, ice and roller skating complexes and a zoo.

The "roaring 20's" was a decade of growth and prosperity, particularly with the construction of Newark's first skyscrapers and the development of the building trades industry. Newark Airport was opened, Port Newark came into being, and the Newark City Subway was under construction. It was also at this time that many of the County's boroughs and townships experienced major development and expansion and that early suburban shopping centers were begun.

The stock market crash of 1929, along with the enforcement of prohibition, temporarily crippled the thriving economy of Essex. With the repeal of prohibition, the reopening of many major breweries and the gradual national recovery, Essex began to grow.

The central section of the county, once known as the "trolley car suburbs", grew rapidly after the turn of the century when trolley lines were built to carry workers from industrial Newark to the less crowded outlying towns of Irvington, East Orange, Orange and Bloomfield. Commuter railroads which passed through Newark carried commuters to Manhattan from suburban towns such as South Orange, Maplewood, Millburn, Glen Ridge, and Montclair.

Development of the western section of the county was slowed because of the difficulty and expense of crossing First and Second Mountains. However, the demand for modern industrial development and new residential spaces forced development to the west. With the completion of Route 280, communities such as Livingston, Fairfield, Roseland, Cedar Grove, Essex Fells and the Caldwells become the County's fastest growing communities. Residents of the western section enjoy modern homes and shopping malls as well as room for further development and expansion.

New industrial and professional office parks, hi-tech centers, and luxury condominiums and townhouses in the western portion of the County provide an attractive setting along with an expanding tax ratable base.

Since its inception, Essex County has been the industrial and financial hub of New Jersey. Countywide, total real property values now exceed $36 billion with an annual growth in 1996 of $78 million. With the opening in 1997 of the New Jersey Performing Arts Center in Newark, Essex will rival New York City as a cultural center for music and dance showcasing the nation's and the world's best artists. A county-sponsored baseball and soccer stadium complex will bring minor league baseball back to Essex County in the 1998 season.

With Newark International Airport and Port Newark located within its borders, Essex County is a major national transportation hub with a superior network of rail, highway, air and sea transportation and is home to one of the world's largest containerized shipping ports.

Today Essex County, with 22 municipalities ranging over 127 square miles and a total population of 765,348, is New Jersey's second most populous County. The Essex County economy continues to shift from a manufacturing base to a service oriented economy and many corporate giants as PSE&G, Bell Atlantic, ADP, and Prudential have their headquarters located in Essex County (*http://co.essex.nj.us/history0.htm*).

Monmouth County, New Jersey

Monmouth is one of 21 counties in New Jersey and is part of the Monmouth-Ocean Metropolitan Area. In 1999, the total population for the county of 611,444 individuals ranked 4th in the state.

PER CAPITA PERSONAL INCOME

In 1999, Monmouth had a PCPI of $37,356. This PCPI ranked 7th in the state, and was 105% of the state average ($35,612) and 131% of the national average ($28,546). In 1989, the PCPI of Monmouth was $24,974 and ranked 5th in the state. The average annual growth rate of PCPI over the past 10 years was 4.1%. The average annual growth rate for the state was 4.2% and for the nation was 4.4%.

TOTAL PERSONAL INCOME

In 1999, Monmouth had a TPI of $22,841,109* (*all income estimates with the exception of PCPI are in thousands of dollars). This TPI ranked 5th in the state and accounted for 7.9% of the state total. In 1989, the TPI of Monmouth was $13,789,875* and ranked 4th in the state. The average annual growth rate of TPI over the past 10 years was 5.2%. The average annual growth rate for the state was 4.8% and for the nation was 5.4%.

COMPONENTS OF TOTAL PERSONAL INCOME

The TPI includes the earnings (wages, salaries, other labor income, and proprietors's income); dividends, interest, and rent; and transfer payments received by the residents of Monmouth. In 1999, earnings were 71.5% of TPI (compared with 70.9% in 1989); dividends, interest, and rent were 19.2% (compared with 20.8% in 1989); and transfer payments were 9.3% (compared with 8.4% in 1989). From 1989 to 1999, earnings increased on average 5.3% each year; dividends, interest, and rent increased on average 4.4%; and transfer payments increased on average 6.3%.

EARNINGS BY INDUSTRY

Earnings by persons employed in Monmouth increased from $7,319,587* in 1989 to $11,994,325* in 1999, an average annual growth rate of 5.1%. The largest industries in 1999 were services (36.4% of earnings), state and local government (11.1%), and finance, insurance, and real estate (9.4%). In 1989, the largest industries were services (30.6% of earnings), state and local government (11.4%), and retail trade (10.8%). In 1999, the industries that accounted for at least 5% of earnings showed the slowest growing from 1989 to 1999 was federal civilian government (5.1% of earnings in 1999 which increased at an average annual rate of 0.3%) while the fastest growing was finance, insurance, and real estate (which increased at an average annual rate of 9.6%).

In 1990, Monmouth County had 553,124 residents allocated among 146,947 families and 197,325 households. For 1997, the population was estimated to be 596,250 and 615,301 for 2000. According to 1990 Census data in Monmouth County, there were 41 white non-Hispanic male captains or other officers of fishing vessels and 142 fishermen (all non-Hispanic white males).

In 1990,218,408 housing units in the county were empty in 1990 while 27% of the occupied units were rental units.

In 1990, 57% of all residents were born in the state of New Jersey while another 25% were born in the Northeast United States. Furthermore, 60% of persons age 5 and over were living in the same house in 1990 that they had occupied in 1985. An additional 19% were living in a different house in 1985 but still within Monmouth County, and 9% were living in a different house but still in New Jersey.

The racial composition of Monmouth County in 1990 was 87% white, 9% black, and 4% other groups (the largest numbers were American Indian and Filipino). Furthermore, 4% of all persons were of Hispanic origin. When reporting first ancestry, Irish and Italian were the largest groups (17% each) followed by German (13%), then Race or Hispanic Origin (11%). The vast majority of persons age 5 years and over speak only English (81%) and 2% of households are classified as linguistically isolated.

In 1990, 30% of county residents age 25 and over were high school graduates and 18% held a bachelor's degree. According to the Bureau of Labor Statistics, the civilian labor force in 1996 was 306,158 with a 5.2% unemployment rate. According to the 1999 CBP, there were 18,456 establishments employing 204,186 individuals with an annual payroll of $7 billion. When fishing dependent industries are included, the level of dependence increases; however, it is difficult to calculate due to data reporting restrictions in the County Business Pattern data. Overall, 90% of the establishments in Monmouth County employ 1-19 employees.

In 1989, the median *household* income was $45,912 with the median family income of $53,590 and the median non-family *household* income of $24,003. The *per capita* income in 1989 was $20,565. In 1997, the median *household* income was estimated to be $57,985 while 6.6% of the county's population was estimated to be living in poverty.

<u>Ports of "Other Essex"</u>

This port denomination corresponds or refers to landings occurring in just about any port in Essex County, New Jersey. It could also include ports where marine and estuarine fishes are landed. As such, individual characterization by port is difficult to determine.

NMFS weighout data shows that two species accounted for over 92% ($0.9 million) of the total ex-vessel value of all species landed under this port category and these species were: Loligo squid (81.9%) and summer flounder (10.47%).

Port of Monmouth/Belford

The fishermen of Belford fish in the same area as Monmouth fishermen. Historically, the fisheries have been primarily in the bay and inshore waters however, offshore dragging has increased in the past decade. The fishing port is within a region that is primarily residential with small businesses, and a major military installation. However, tourism is insignificant.

In 1990, Port Monmouth had 3,558 residents allocated among 954 families and 1,204 households. According to 1990 Census data in Port Monmouth, there were 84 persons employed in occupations of agricultural services, forestry and fishing (3% of all employed persons 16 or over) and 71 employed in agriculture, forestry and fishing industries.

In 1990, 7% of the 1,281 housing units in the area were empty while 20% of the occupied units were rental units.

In 1990, 72% of all residents were born in the state of New Jersey and the next largest group (20%) were born in the Northeast United States. In the classification of persons age 5 and over, 67% were living in the same house in 1990 that they had occupied in 1985. An additional 18% were living in a different house in 1985 but still within Monmouth County, and 11% were living in a different house but still in New Jersey. In addition, 4% of all workers 16 and over worked in their place of residence while 42% worked in their county of residence.

The racial composition of Port Monmouth in 1990 was 97% white and 3% of any other group. Furthermore, 5% of all persons were of Hispanic Origin. When reporting first ancestry, Irish was the largest group (26%) followed by German (21%), then Italian (20%). The majority of persons age 5 and over speak only English (93%) and less than 1% of the households are classified as linguistically isolated.

In 1990, 43% of residents age 25 and over were high school graduates and 7% held a bachelor's degree. In 1989, the median *household* income was $38,516 (84% of the Monmouth County average) with the median family income of $40,169 (75% of the county average) and the median non-family *household* income of $17,321 (72% of the county average). The *per capita* income in 1989 was $13,610 (66% of the county average). Approximately 4% of persons for whom poverty status was determined (96% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was retail trade followed by finance, insurance, and real estate, and durable goods manufacturing.

The fishing port of Belford is on a tidal creek leading out to Raritan Bay and the New York Bays. Its fishery is oriented both to the bay and to the Atlantic Ocean, which is reached by going out around Sandy Hook, a few miles from Belford. Belford and neighboring Port Monmouth were once large industrial fishing and processing centers for menhaden, but the menhaden factory closed in 1982. Menhaden are still caught with small purse-seine boats and pound-nets, primarily for the bait market. In 1998, they accounted for over two-thirds of the landings in Belford. Today, Belford's fisheries are small-scale and owner-operated. Most of the finfish are handled through a fishermen's cooperative, which sells wholesale but also runs a small retail store and restaurant. Lobsters are sold in other ways, including through a local lobster pound. Otter trawl finfishing is the most important activity, accounting for 50% of the landed value in 1998. It is a multi-species fishery (42 species were landed in 1998). Major species caught by otter trawlers landing in Belford, by landed value, were summer flounder, *Loligo* squid, silver hake, winter flounder, spiny dogfish and skates. Lobster pot fishing is third only to purse seining and dragging (it accounted for 17% of landed value in 1998).

In recent years, surfclam and ocean quahog vessels have been offloading at Belford, however, in 1998, they accounted for less than 4% of the landed value (in contrast to 1992, when ocean quahogs accounted for over 30% of landed value). Crab dredging in Raritan Bay is of equal value. The last of New Jersey's pound-nets are in Raritan and Sandy Hook Bays (they accounted for 3.9% of Belford's total landed value in 1998). Some of the total landed value was from menhaden but 27 other species were also landed from the pound-nets, notably bluefish, weakfish, summer flounder, butterfish, small amounts of tuna, skates, shad, and tautog. Other fishing techniques used include crab and fish pots, handlining, and diving (McCay and Cieri 2000).

Sussex County, Delaware

Sussex is one of 3 counties in Delaware and is not part of a Metropolitan Area. In 1999, the total population for the county of 140,308 individuals ranked 2nd in the state.

PER CAPITA PERSONAL INCOME

In 1999, Sussex had a PCPI of $23,700. This PCPI ranked 2nd in the state, and was 77% of the state average ($30,701), and 83% of the national average ($28,546). In 1989, the PCPI of Sussex was $17,511 and ranked 2nd in the state. The average annual growth rate of PCPI over the past 10 years was 3.1%. The average annual growth rate for the state was 3.9% and for the nation was 4.4%.

TOTAL PERSONAL INCOME

In 1999, Sussex had a TPI of $3,325,275* (*all income estimates with the exception of PCPI are in thousands of dollars). This TPI ranked 2nd in the state and accounted for 14.4% of the state total. In 1989, the TPI of Sussex was $1,951,375* and ranked 2nd in the state. The average annual growth rate of TPI over the past 10 years was 5.5%. The average annual growth rate for the state was 5.3% and for the nation was 5.4%.

COMPONENTS OF TOTAL PERSONAL INCOME

The TPI includes the earnings (wages, salaries, other labor income, and proprietors's income); dividends, interest, and rent; and transfer payments received by the residents of Sussex. In 1999, earnings were 57.9% of TPI (compared with 63.4% in 1989); dividends, interest, and rent were 22.1% (compared with 22.6% in 1989); and transfer payments were 20.0% (compared with 14.0%

in 1989). From 1989 to 1999, earnings increased on average 4.5% each year; dividends, interest, and rent increased on average 5.3%; and transfer payments increased on average 9.3%.

EARNINGS BY INDUSTRY

Earnings by persons employed in Sussex increased from $1,255,546* in 1989 to $1,982,230* in 1999, an average annual growth rate of 4.7%. The largest industries in 1999 were services (22.4% of earnings), nondurable goods manufacturing (15.6%), and retail trade (15.6%). In 1989, the largest industries were nondurable goods manufacturing (19.8% of earnings), services (15.9%), and farming (12.7%). In 1999, the industries that accounted for at least 5% of earnings showed the slowest growing from 1989 to 1999 was nondurable goods manufacturing (which increased at an average annual rate of 2.2%) while the fastest growing was finance, insurance, and real estate (which increased at an average annual rate of 9.8%).

In 1990, Sussex County had 113,229 residents allocated among 32,150 families and 43,483 households. For 1997, the population was estimated to be 134,034 and 156,638 for 2000. According to 1990 Census data in Sussex County, there were 7 white non-Hispanic male captains or other officers of fishing vessels and 105 fishermen (100 non-Hispanic white males and 5 non-Hispanic white females).

In 1990,41% of the74,253 housing units in the county were empty while 21% of the occupied units were rental units.

In 1990, 53% of all residents were born in the state of Delaware while another 16% were born in the Northeast United States. Furthermore, 56% of persons age 5 and over were living in the same house in 1990 that they had occupied in 1985. An additional 26% were living in a different house in 1985 but still within Sussex County and 4% were living in a different house but still in Delaware.

The racial composition of Sussex County in 1990 was 82% white, 17% black, and 2% other groups (largest number were American Indian and Filipino). Furthermore, 1% of all persons were of Hispanic origin. When reporting first ancestry, English was the largest group (20%) followed by race or Hispanic Origin (17%), German (13%), then Irish (11%). The vast majority of persons age 5 years and over speak only English (94%) and less than 1% of households are classified as linguistically isolated.

In 1990, 37% of county residents age 25 and over were high school graduates and 9% held a bachelor's degree. According to the Bureau of Labor Statistics, the civilian labor force in 1996 was 67,866 with a 4.5% unemployment rate. According to the 1999 CBP, there were 4,516 establishments employing 48,677 individuals with an annual payroll of $1.45 billion. When fishing dependent industries are included, the level of dependence increases; however, it is difficult to calculate due to data reporting restrictions in the County Business Pattern data. Overall, 91% of the establishments in Sussex County employ 1-19 employees.

In 1989, the median *household* income was $26,904 with the median family income of $31,112 and the median non-family *household* income of $14,076. The *per capita* income in 1989 was

$12,723. In 1997, the median *household* income was estimated to be $33,281 while 12.7% of the county's population was estimated to be living in poverty.

Because of its small size and strategic location, President Thomas Jefferson compared Delaware to a jewel, some believe he was referring to Sussex County. The southernmost county in Delaware, Sussex lies at the confluence of the Delaware River and the Atlantic Ocean. Sussex County has a proud history that has been shaped by the people, the ocean, and the land. Archaeologists estimate that the first inhabitants of Sussex County arrived between 10,000 and 14,000 years ago. The people were later called American Indians by European Colonial powers who mistakenly thought that the New World they reached was India. Native Americans in Delaware called themselves by various tribal names of the Algonquin Nation. Most notable were the Leni Lenape and Nanticoke tribes. They settled along the tributaries of numerous bays, streams, branches, and rivers. In the fall and winter, they harvested fish, oysters, and other shellfish. In the warmer months, they planted crops and hunted for small deer and mammals. Many members of the Nanticoke Tribe reside along the banks of the Indian River. Every year the Nanticoke hold an annual Pow Wow in Oak Orchard that celebrates their traditional culture. In addition, the Nanticoke Museum is open year round to teach visitors and tourists about their way of life.

During the nineteenth century, Delaware continued to prosper. The agricultural leanings of Sussex County were off set by the industrial areas in New Castle. Throughout the nineteenth century, Sussex County and all of Delaware built the foundations of the modern infrastructure. The Chesapeake and Delaware Canal was opened, allowing transportation from the markets of Maryland to the shops of Philadelphia. Equally impressive, the Delaware breakwater at Lewes was constructed to harbor ships. The breakwater was the first national harbor and it indicated both the importance and the danger of the Delaware Bay.

Toward the middle of the nineteenth century, the railroads arrived. When the Junction and Breakwater Railroad arrived in 1869, the economy of the Sussex was on the decline. The vast majority of Sussex Courtians were farm owners and many were slave holders. The agriculturally based economy that provided slave labor had few northern supporters during the Civil War. The Quakers of New Castle County vehemently preached against the excesses of their southern neighbors. Long after the Civil War ended and after slavery was abolished in the south, it persisted in Delaware. The Emancipation Proclamation had no effect on Delaware as a "northern state". Delaware was the last state in the Union to ratify the thirteenth amendment to the constitution, and formally ended slavery early in the twentieth century.

By the middle of the nineteenth century, the railroads began to change the Sussex County landscape. The community of Ellendale was built around the railroad, and communities from Bridgeville to Delmar started to have more regular contact with the rest of Delaware. Farmers could load their crops and themselves on a train that would leave Milford and arrive in Wilmington two hours later. Transportation, as it had always done, created new opportunities for businesses.

From the1890's through the Golden Age of the 1920's, Americans discovered the beach. The Rehoboth camp meeting was established close to 1892, as a religious camp. From that time on, city dwellers flocked to the water in ever increasing numbers. Steamboats carried travelers from

Philadelphia and other urban areas to the beach at regular intervals. As trips to local beaches established some of our nations first resort areas, Sussex County became noted for its beautiful beaches.

While most of southwestern Sussex County is agricultural, the DuPont plant in Seaford is an exception. In 1939, DuPont located one of its first nylon plants in Sussex. This plant was an important source of nylon for parachutes during World War II. Because of DuPont's success, Seaford is a center for industry, bordered by the Nanticoke River and agricultural areas. Modern Sussex is a combination of old and new. Sussex County has a rich past, and a wonderful heritage to draw from to lead it wisely into a very prosperous future (*http://www.co.sussex.de.us/historical/index.html*).

Port of Lewes/Indian River

Indian River fishermen fish out of the same port as Lewes fishermen because there is no actual port in Indian River.

In 1990, Lewes had 13,628 residents allocated among 3,928 families and 6,063 households. According to 1990 Census data in Lewes, there were 202 persons employed in occupations of agricultural services, forestry and fishing (2% of all employed persons 16 or over) and 235 employed in agriculture, forestry and fishing industries.

In 1990, 36% of the 16,845 housing units in the area were empty while 23% of the occupied units were rental units.

In 1990, 46% of all residents were born in the state of Delaware and the next largest group (26%) were born in the Northeast United States. In the classification of persons age 5 and over, 48% were living in the same house in 1990 that they had occupied in 1985. An additional 27% were living in a different house in 1985 but still within Sussex County and 6% were living in a different house but still in Delaware. In addition, 12% of all workers 16 and over worked in their place of residence while 92% worked in their county of residence.

The racial composition of Lewes in 1990 was 89% white, 9% black, and 1% of any other group. Furthermore, less than 1% of all persons were of Hispanic origin. When reporting first ancestry, English was the largest group (23%) followed by German (16%), then Irish (12%). The majority of persons age 5 and over speak only English (92%) and less than 1% of the households are classified as linguistically isolated.

In 1990, 32% of residents age 25 and over were high school graduates and 14% held a bachelor's degree. In 1998, the median *household* income was $26,153 (97% of the Sussex County average) with the median family income of $33,646 (about 1% above the county average) and the median non-family *household* income of $15,757 (12% above the county average). The *per capita* income in 1989 was $16,189 (27% above the county average). Approximately 9% of persons for whom poverty status was determined (90% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was retail trade followed by construction and health services.

Bounded on the east by the mighty Atlantic Ocean and on the west by Rehoboth Bay and Indian River Bay, the 2018-acre park is a beach-goer's delight. Throughout history, the forces of wind and water have kept this barrier island largely inaccessible, due to the frequent natural changes of the inlet channel between the bays and the sea. Transportation along this narrow stretch of land was difficult until the federal government completed construction of two large steel and stone jetties in 1939, stabilizing the Indian River Inlet. The State Park Commission (now the Division of Parks and Recreation) began operating Delaware Seashore State Park in 1965. Today, the park is a major attraction or millions of visitors who enjoy the large variety of water-related activities available along Delaware's coast. The main attraction for many visitors is swimming and sunbathing along the park's spectacular beaches. Two ocean swimming areas feature modern bathhouses with showers and changing rooms. Lifeguards patrol the beaches from 9 am to 5 pm daily between Memorial Day weekend and Labor Day. Snack foods are available at the bathhouses, and umbrellas, chairs and rafts can be rented on the beach. Another swimming area is located on Rehoboth Bay, at Tower Road. The calm bay waters are suitable for families with small children, and the beach is guarded during the summer months.

Surfers enjoy riding the mighty ocean waves at Delaware Seashore, too. The beach just north of the Inlet is one of the few designated areas in the state for this exciting sport. Other beaches throughout the park are set aside for surffishing. Marked dune crossings allow fishing access for four-wheel drive vehicles. A surffishing vehicle permit is required to drive onto the beach. Permits and related information are available at the park office.

The shallow bays provide many additional opportunities to enjoy the water. Windsurfing and sailing are growing in popularity, and the sports are colorful to watch from the shore. A non-motorized boat launch provides access for sail boards and boats in the New Road area. Clamming and crabbing are permitted in some sections of the bays. A short nature trail on Burton's Island affords scenic views of the salt marshes and bay islands, where gulls and terns gather in their noisy summer nesting colonies.

For group activities with family and friends, two picnic pavilions are available on a first-come, first-served basis, one on the bay shore at Savages Ditch Road and the other at the Inlet. Entertaining and informative programs, such as bay seining and marsh hikes, are held throughout the summers. The park also hosts a popular Sandcastle Contest each July, where amateur participants create unique sculptures and castles to compete for prizes.

Fishing is a very popular year-round pastime at Delaware Seashore. In addition to surffishing on the ocean beaches, anglers may try their luck along the banks of the Indian River Inlet. A special access pier at the inlet allows people with disabilities to get close to the fishing action.

Headboats and charter boats welcome visitors aboard for ocean fishing excursions. Several captains operate fishing boats from the Indian River Marina, located on the bay side north of the Inlet. The park's marina features many convenient services for boaters and fisherman, including bait and tackle sales, fish cleaning, fuel and sewage pumps, oil recycling, and year-round marine repairs and service. A snack bar provides refreshments during the summer months. The marina's

295 boat slips can be rented on a yearly basis, and for those bringing boats for the day, a launching ramp at the marina allows access to the bays and ocean (fee required).

The campground at Delaware Seashore State Park is a vacation destination for thousands of visitors each year. Open mid-March to mid-November, the campground can accommodate a variety of camping units, from tents to large recreational vehicles. Three-point hookups for electricity, water, and sewer service are available on some sites. Showers, laundry and snack vending machines add to the convenience of outdoor living at the Indian River Inlet. Campsites are available on a first-come, first-served basis.

Thompson Island on Rehoboth Bay is a new addition to the park. Located northwest of the Inlet, Thompson Island Preserve is a good example of the productive salt marsh habitat once common around the inland bays. Due to its importance to local wildlife, human activities on the island are limited, and there is no motor vehicle access or parking available at this time (*http://www. destateparks.com/dssp/dssp.htm*).

Worcester County, Maryland

Worcester is one of 24 counties in Maryland and is not part of a Metropolitan Area. In 1999, the total population for the county of 43,672 individuals ranked 17th in the state. Worcester is located on Maryland's Eastern Shore, a peninsula bordered by the Chesapeake Bay and the Atlantic Ocean.

PER CAPITA PERSONAL INCOME

In 1999, Worcester had a PCPI of $26,471. This PCPI ranked 16th in the state, and was 81% of the state average ($32,517), and 93% of the national average ($28,546). In 1989, the PCPI of Worcester was $19,640 and ranked 11th in the state. The average annual growth rate of PCPI over the past 10 years was 3.0%. The average annual growth rate for the state was 4.0% and for the nation was 4.4%.

TOTAL PERSONAL INCOME

In 1999, Worcester had a TPI of $1,156,046* (*all income estimates with the exception of PCPI are in thousands of dollars.) This TPI ranked 19th in the state and accounted for 0.7% of the state total. In 1989, the TPI of Worcester was $680,075* and ranked 19th in the state. The average annual growth rate of TPI over the past 10 years was 5.4%. The average annual growth rate for the state was 4.9% and for the nation was 5.4%.

COMPONENTS OF TOTAL PERSONAL INCOME

The TPI includes the earnings (wages, salaries, other labor income, and proprietors's income); dividends, interest, and rent; and transfer payments received by the residents of Worcester. In 1999, earnings were 54.0% of TPI (compared with 59.8% in 1989); dividends, interest, and rent were 28.5% (compared with 27.4% in 1989); and transfer payments were 17.6% (compared with 12.9% in 1989). From 1989 to 1999, earnings increased on average 4.4% each year; dividends, interest, and rent increased on average 5.9%; and transfer payments increased on average 8.8%.

EARNINGS BY INDUSTRY

Earnings by persons employed in Worcester increased from $452,719* in 1989 to $680,474* in 1999, an average annual growth rate of 4.2%. The largest industries in 1999 were services (27.3% of earnings), retail trade (23.4%), and state and local government (13.3%). In 1989, the largest industries were services (22.9% of earnings), retail trade (22.9%), and state and local government (11.2%). In 1999, the industries that accounted for at least 5% of earnings showed the slowest growing from 1989 to 1999 was nondurable goods manufacturing (7.3% of earnings in 1999 which increased at an average annual rate of 1.8%) and the fastest growing was services (which increased at an average annual rate of 6.0%).

In 1990, Worcester County had 35,028 residents allocated among 9,828 families and 14,233 households. For 1997, the population was estimated to be 42,115 and 46,543 for 2000. According to 1990 Census data in Worcester County, there were 33 white non-Hispanic male captains or other officers of fishing vessels and 87 fishermen (79 non-Hispanic white males, 8 non-Hispanic white females).

In 1990, 34% of the 41,800 housing units in the county were empty while 31% of the occupied units were rental units.

In 1990, 63% of all residents were born in the state of Maryland while another 11% were born in the Northeast United States. Furthermore, 50% of persons age 5 and over were living in the same house in 1990 that they had occupied in 1985. An additional 28% were living in a different house in 1985 but still within Worcester County and 11% were living in a different house but still in Maryland.

The racial composition of Worcester County in 1990 was 78% white, 21% black, and less than 1% of any other groups (the largest numbers were American Indian and Korean). Furthermore, less than 1% of all persons were of Hispanic origin. When reporting first ancestry, English was the largest group (20%) followed by Race or Hispanic Origin (18%), German (13%), then Irish (10%). The vast majority of persons age 5 years and over speak only English (95%) and less than 1% of households are classified as linguistically isolated.

In 1990, 56% of county residents age 25 and over were high school graduates and 10% held a bachelor's degree. According to the Bureau of Labor Statistics, the civilian labor force in 1996 was 24,836 with a 9.5% unemployment rate. According to the 1999 CBP, there were 2,137 establishments employing 17,402 individuals with an annual payroll of $405 million. When fishing dependent industries are included, the level of dependence increases; however, it is difficult to calculate due to data reporting restrictions in the County Business Pattern data. Overall, 92% of the establishments in Worcester County employ 1-19 employees.

In 1989, the median *household* income was $27,586 with the median family income of $33,089 and the median non-family *household* income of $15,005. The *per capita* income in 1989 was $14,341. In 1997, the median *household* income was estimated to be $32.815 while 11.9% of the county's population was estimated to be living in poverty.

Port of Ocean City

In 1990, Ocean City had 7,880 residents allocated among 2,158 families and 3,882 households. According to 1990 Census data in Ocean City, there were 55 persons employed in occupations of agricultural services, forestry and fishing (1% of all employed persons 16 or over) and 85 employed in agriculture, forestry and fishing industries.

In 1990, 87% of the 27,808 housing units in the area were empty while 36% of the occupied units were rental units.

In 1990, 58% of all residents were born in the state of Maryland and the next largest group (18%) were born in the southern part of the United States. In the classification of persons age 5 and over, 45% were living in the same house in 1990 that they had occupied in 1985. An additional 26% were living in a different house in 1985 but still within Worcester County and 16% were living in a different house but still in Maryland. In addition, 30% of all workers 16 and over worked in their place of residence while 50% worked in their county of residence.

The racial composition of Ocean City in 1990 was 95% white, 4% black, and 1% of any other group. When reporting first ancestry, German was the largest group (20%) followed by English (19%), then Irish (15%). The majority of persons age 5 and over speak only English (92%) and less than 1% of the households are classified as linguistically isolated.

In 1990, 33% of residents age 25 and over were high school graduates and 13% held a bachelor's degree. In 1989, the median *household* income was $27,423 (99% of the Worcester County average) with the median family income of $35,021 (6% above the county average) and the median non-family *household* income of $18,995 (27% above the county average). The *per capita* income in 1989 was $19,271 (34% above the county average). Approximately 10% of persons for whom poverty status was determined (90% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was retail trade followed by personal services and construction.

Ocean City is situated on approximately ten miles of barrier island and is next to an inlet that was created during a hurricane in the 1930's. It is a huge tourist community, with hotels, motels and condos for rent stretching for miles from south to north on the Ocean City peninsula. Ocean City has grown into a major summer resort area in the last twenty to twenty-five years. On the sports fishing side, Ocean City is billed as the "White Marlin Capital of the World" and the waterfront is dominated by recreational marinas. There are several marinas in Ocean City and one in West Ocean City at the harbor, used for commercial fishing. This harbor is directly west of the inlet at the southern end of the city.

Ocean City is the only major ocean fishing community in Maryland, though some of the Chesapeake communities do bring in species of interest to the Council from the bay. It is important to note that the commercial fishing industry in "Ocean City" is actually located in West Ocean City. Parts of the industry, at one time, were located at the southern tip of Ocean City. Tucked away in West Ocean City, just across from the southern tip of the Ocean City peninsula, is the commercial fishing industry, situated primarily on South Harbor Road just a short distance from Assateague Island and the inlet leading to the Atlantic Ocean. On South Harbor Road itself, the seafood businesses and boats are on one side of the street and small houses are on the other (McCay and Cieri 2000).

Ocean City and Worcester County are the only part of the state of Maryland to touch the sea. The area was settled shortly after the American Revolution by Eastern Shore Virginians. According to legend, Ocean City began its path towards becoming a resort in 1869 when Isaac Coffin built the first cottage on the beach to have paying guests. Before Isaac Coffin, the area was merely referred to as "The Ladies Resort to the Ocean". In those days, people traveled to Ocean City by stage coach and ferry. It wasn't long before other boarding houses were built on this ten mile strip of sand. The new attraction soon brought prominent businessmen from the Eastern Shore, Baltimore and Philadelphia, but these businessmen were not on vacation. They were looking for an opportunity. They decided to develop 250 lots which were cut into the barrier island. There were 4,000 original shares and each sold for $25 each, which was a good investment.

The first luxury hotel was opened July 4, 1875. The Atlantic Hotel featured billiards and dancing, and boasted over 400 rooms. A railroad to Berlin was completed in 1878, and the line went all the way to the sand in 1881.

In 1933, a severe storm formed what is now the Inlet. Engineers decided this inlet would make for easy access to fishing in the Atlantic Ocean. They decided to make the south end inlet of Ocean City permanent.

Due to surf and wind, the island is gradually moving westward. If nature has its way, in hundreds of years, Ocean City will no longer be an island but will instead be connected to the mainland. Millions of dollars have been poured into the sand to prevent the slow erosion of the shoreline.

In 1952, post-war America rapidly completed the Chesepeake Bay Bridge and suddenly Ocean City was readily available to everyone along the Baltimore-Washington corridor. In 1964 the Bay Bridge Tunnel was completed and a path for potential southern visitors was made.

Throughout the 1970's, Ocean City flourished with more than 10,000 condominiums built. Within just a few years, condo row and its spectacular high-rise ocean view had been created. Ocean City now has all the makings of a modern resort in the north end of town, while the south end still boasts an old town aura.

Ocean City has changed a great deal in the 130 years since Isaac Coffin opened his first cottage. It has extended from a few cottages between 1st and 9th street to hundreds of high rise condominiums reaching all the way to 145th Street. The Boardwalk has grown from a few wooden boards that were laid in the sand each morning and picked up each night to a concrete-based, wooden-topped permanent fixture that features a variety of shops, eateries, and other attractions. One thing that hasn't changed is the main attraction of Ocean City, the fresh, clean smell of the salt air, the unparalleled feel of sand between your toes, and the mesmerizing view of the ocean (*http://www.oceancity.md*).

Accomack County, Virginia

Accomack is one of 105 counties and independent cities in Virginia and is not part of a Metropolitan Area. In 1999, the total population for the county of 32,121 individuals ranked 47th in the state.

PER CAPITA PERSONAL INCOME

In 1999, Accomack had a PCPI of $20,194. This PCPI ranked 73rd in the state, and was 68% of the state average ($29,794), and 71% of the national average ($28,546). In 1989, the PCPI of Accomack was $13,950 and ranked 68th in the state. The average annual growth rate of PCPI over the past 10 years was 3.8%. The average annual growth rate for the state was 4.2% and for the nation was 4.4%.

TOTAL PERSONAL INCOME

In 1999, Accomack had a TPI of $648,645* (*all income estimates with the exception of PCPI are in thousands of dollars.) This TPI ranked 49th in the state and accounted for 0.3% of the state total. In 1989, the TPI of Accomack was $444,572* and ranked 44th in the state. The average annual growth rate of TPI over the past 10 years was 3.8%. The average annual growth rate for the state was 5.4% and for the nation was 5.4%.

COMPONENTS OF TOTAL PERSONAL INCOME

The TPI includes the earnings (wages, salaries, other labor income, and proprietors's income); dividends, interest, and rent; and transfer payments received by the residents of Accomack. In 1999, earnings were 54.3% of TPI (compared with 56.1% in 1989); dividends, interest, and rent were 24.7% (compared with 26.9% in 1989); and transfer payments were 21.0% (compared with 17.0% in 1989). From 1989 to 1999, earnings increased on average 3.5% each year; dividends, interest, and rent increased on average 3.0%; and transfer payments increased on average 6.1%.

EARNINGS BY INDUSTRY

Earnings by persons employed in Accomack increased from $278,834* in 1989 to $385,971* in 1999, an average annual growth rate of 3.3%. The largest industries in 1999 were services (20.4% of earnings), nondurable goods manufacturing (18.9%), and state and local government (13.3%). In 1989, the largest industries were nondurable goods manufacturing (20.0% of earnings), services (13.1%), and federal civilian government (12.3%). In 1999, the industries that accounted for at least 5% of earnings showed the slowest growing from 1989 to 1999 was retail trade (8.2% of earnings in 1999 which increased at an average annual rate of 1.6%) while the fastest growing was services (which increased at an average annual rate of 7.9%).

In 1990, Accomack County had 31,703 residents allocated among 8,809 families and 12,646 households. For 1997, the population was estimated to be 32,096 and for 2000 to be 38,305. According to 1990 Census data in Accomack County, there were 25 white non-Hispanic male captains or other officers of fishing vessels and 360 fishermen (334 non-Hispanic white males, 12 non-Hispanic white females, and 26 non-Hispanic black males).

In 1990, 20% of the 58,840 housing units in the county were empty while 25% of the occupied units were rental units.

In 1990, 69% of all residents were born in the state of Virginia while another 16% were born in the southern part of the United States. Furthermore, 64% of persons age 5 and over were living in the same house in 1990 that they had occupied in 1985. An additional 19% were living in a different house in 1985 but still within Accomack County and 5% were living in a different house but still in Virginia.

The racial composition of Accomack County in 1990 was 65% white, 34% black ,and less than 1% of any other groups (the largest numbers were American Indian and Filipino). Furthermore, 1% of all persons were of Hispanic origin. When reporting first ancestry, Race or Hispanic Origin was the largest group (30%) followed by English (16%), American (15%), then German (7%). The vast majority of persons age 5 years and over speak only English (95%) and less than 1% of households are classified as linguistically isolated.

In 1990, 32% of county residents age 25 and over were high school graduates and 6% held a bachelor's degree. According to the Bureau of Labor Statistics, the civilian labor force in 1996 was 14,806 with a 9.1% unemployment rate. According to the 1999 CBP, there were 823 establishments employing 9,050 individuals with an annual payroll of $163 million. When fishing dependent industries are included, the level of dependence increases; however, it is difficult to calculate due to data reporting restrictions in the County Business Pattern data. Overall, 91% of the establishments in Accomack County employ 1-19 employees.

In 1989, the median *household* income was $20,431 with the median family income of $24,063, and the median non-family *household* income of $11,741. The *per capita* income in 1989 was $10,506. In 1997, the median *household* income was estimated to be $25,309 while 29% of the county's population was estimated to be living in poverty.

Port of Chincoteague

In 1990, Chincoteague had 3,572 residents allocated among 1,080 families and 1,684 households. According to 1990 Census data in Chincoteague, there were 83 persons employed in occupations of agricultural services, forestry and fishing (5% of all employed persons 16 or over) and 81employed in agriculture, forestry and fisheries industries.

In 1990, 46% of the 3,167 housing units in the area were empty while 20% of the occupied units were rental units.

In 1990, 45% of all residents were born in the state of Virginia and the next largest group (32%) were born in the southern part of the United States. In the classification of persons age 5 and over, 63% were living in the same house in 1990 that they had occupied in 1985. An additional 16% were living in a different house in 1985 but still within Accomack County and 4% were living in a different house but still in Virginia. In addition, 35% of all workers 16 and over worked in their place of residence while 47% worked in their county of residence.

The racial composition of Chincoteague in 1990 was 99% white, less than 1% black, and 1% Hispanic origin. When reporting first ancestry, American was the largest group (20%) followed by English (16%), then Irish (11%). The majority of persons age 5 and over speak only English (97%) and none of the households are classified as linguistically isolated.

In 1990, 40% of residents age 25 and over were high school graduates and 8% held a bachelor's degree. In 1989, the median *household* income was $21,996 (7% above the Accomack County average) with the median family income of $24,341 (1% above the county average) and the median non-family *household* income of $15,909 (35% above the county average). The *per capita* income in 1989 was $12,586 (20% above the county average). Approximately14% of persons for whom poverty status was determined (87% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was retail trade followed by construction and personal services.

Chincoteague Island, Virginia's only resort island, is perhaps the most beautiful island on Virginia's Eastern Shore. World famous for its oyster beds and clam shoals, Chincoteague is the gateway to the Assateague Island National Seashore and the Chincoteague Wildlife Refuge. Adventure awaits everywhere as history and legend blend with the wild loveliness of the seasonal shore. This serene fishing village, seven miles long and one and one-half miles wide and abounding with history and natural charm, welcomes you to explore its unique island heritage.

Chincoteague, a beautiful island by the sea, is part of the Eastern Shore of Virginia, the peninsula which bounds the Chesapeake Bay. The island, which is nine miles long by perhaps a mile and a half wide, is sheltered not only by the long mainland to the west, but to the east by Assateague, an island running up through Maryland, and is connected with the mainland by a five mile causeway and bridges. This little island town of about four thousand inhabitants has indeed been given the right name meaning "The Beautiful Land Across the Water."

The island received its name from the tribe of Indians known as the Gingo-Teague Tribe. The name Chincoteague has been spelled in various ways; Gingoteague, Gingoteak, Gengoteie, Jengoteague. Even today in some sections of our country, we can hear it pronounced Gingoteague (*http://www.chincoteaguechamber.com*).

Hampton County, Virginia

Hampton (Independent City) is one of 105 counties and independent cities in Virginia and is part of the Norfolk-Virginia Beach-Newport News Metropolitan Area. In 1999, the total population for the county of 137,193 individuals ranked 12th in the state.

PER CAPITA PERSONAL INCOME

In 1999, Hampton (Independent City) had a PCPI of $22,250. This PCPI ranked 50th in the state, and was 75% of the state average ($29,794) and 78% of the national average ($28,546). In 1989, the PCPI of Hampton (Independent City) was $15,767 and ranked 44th in the state. The average annual growth rate of PCPI over the past 10 years was 3.5%. The average annual growth rate for the state was 4.2% and for the nation was 4.4%.

TOTAL PERSONAL INCOME

In 1999, Hampton (Independent City) had a TPI of $3,052,570* (*all income estimates with the exception of PCPI are in thousands of dollars.) This TPI ranked 15th in the state and accounted for 1.5% of the state total. In 1989, the TPI of Hampton (Independent City) was $2,102,186* and ranked 14th in the state. The average annual growth rate of TPI over the past 10 years was 3.8%. The average annual growth rate for the state was 5.4% and for the nation was 5.4%.

COMPONENTS OF TOTAL PERSONAL INCOME

The TPI includes the earnings (wages, salaries, other labor income, and proprietors's income); dividends, interest, and rent; and transfer payments received by the residents of Hampton (Independent City). In 1999, earnings were 69.5% of TPI (compared with 73.7% in 1989); dividends, interest, and rent were 16.8% (compared with 16.3% in 1989); and transfer payments were 13.8% (compared with 9.9% in 1989). From 1989 to 1999, earnings increased on average 3.2% each year; dividends, interest, and rent increased on average 4.1%; and transfer payments increased on average 7.3%.

EARNINGS BY INDUSTRY

Earnings by persons employed in Hampton (Independent City) increased from $1,878,148* in 1989 to $2,891,439* in 1999, an average annual growth rate of 4.4%. The largest industries in 1999 were services (20.5% of earnings), military (19.8%), and federal civilian government (18.7%). In 1989, the largest industries were military (24.8% of earnings), federal civilian government (21.9%), and services (16.7%). In 1999, the industries that accounted for at least 5% of earnings showed the slowest growing from 1989 to 1999 was military (which increased at an average annual rate of 2.1%) while the fastest growing was wholesale trade (which increased at an average annual rate of 15.0%).

The port of Hampton is located in the City of Hampton County. In 1990, Hampton County had 133,793 residents allocated among 35,322 families and 49,699 households. For 1997, the population was estimated to be 138,555 and for 2000 to be 146,437.

In 1990, 7% of the53,623 housing units in the county were empty while 41% of the occupied units were rental units.

In 1990, 47% of all residents were born in the state of Virginia while another 25% were born in the southern part of the United States. Furthermore, 42% of persons age 5 and over were living in the same house in 1990 that they had occupied in 1985. An additional 19% were living in a different house in 1985 but still within Hampton County and 11% were living in a different house but still in Virginia.

The racial composition of Hampton County in 1990 was 58% white, 39% black, and 3% of any other groups (largest numbers were Vietnamese and Filipino). Furthermore, 2% of all persons were of Hispanic origin. When reporting first ancestry, Race or Hispanic Origin was the largest group (39%) followed by German (12%), English (10%), then American (7%). The vast majority of persons age 5 years and over speak only English (83%) and less than 1% of households are classified as linguistically isolated.

In 1990, 29% of county residents age 25 and over were high school graduates and 13% held a bachelor's degree. According to the Bureau of Labor Statistics, the civilian labor force in 1996 was 65,959 with a 5% unemployment rate. According to the 1999 CBP, there were 2,467 establishments employing 48,646 individuals with an annual payroll of $1 billion. When fishing dependent industries are included, the level of dependence increases; however, it is difficult to calculate due to data reporting restrictions in the County Business Pattern data. Overall, 83% of the establishments in Hampton County employ 1-19 employees.

In 1989, the median *household* income was $30,144 with the median family income of $34,291 and the median non-family *household* income of $19,869. The *per capita* income in 1989 was $13,099. In 1997, the median *household* income was estimated to be $36,297 while 14.6% of the county's population was estimated to be living in poverty.

Port of Hampton Roads/Hampton

Like Newport News, Hampton and Seaford are important sea scalloping ports near the mouth of Chesapeake Bay. Scallops accounted for 69% of landed value in 1998. In Hampton, a significant portion of the scallops are caught with otter trawls rather than scallop dredges. The sea scallop fleet of Seaford relies entirely on dredges and accounts for virtually all of the landings and landed value. Besides scallops these dredge-equipped vessels caught large amounts of angler as well as a small amount of summer flounder.

Finfish dragging is also important in Hampton. Species diversity is extremely high and he otter trawl fleet of Hampton takes *Illex* and *Loligo* squid, black sea bass (a substantial amount is also caught with handlines), Atlantic mackerel, Atlantic croaker (a large portion was caught by haul seines as well as pound nets and sink gillnets), and angler (although most was landed by scallop dredges and scallop otter trawls). A small amount of pelagic longlining is also done from Hampton for black tip, mako, shortfin, thresher sharks, and tuna (big eye, yellowfin, and albacore).

The inshore and bay fisheries of Hampton include the pound-net and seine fisheries for Atlantic croaker, gillnetting and handlining, blue crabs, (caught with dredges, pots, and scrapes) and hard clams or quahogs (harvested with patent tongs and crabs). We have combined the weighout data for Hampton and Seaford to preserve the confidentiality of data for fisheries. Species diversity in the landings at Hampton and Seaford is extremely high. Fourteen species had either poundage or value at or above 2% in 1998, led by sea scallops, summer flounder, *Illex* squid, Atlantic croaker, blue crab, and angler (McCay and Cieri 2000).

City of Virginia Beach County, Virginia

Virginia Beach (Independent City) is one of 105 counties and independent cities in Virginia and is part of the Norfolk-Virginia Beach-Newport News Metropolitan Area. In 1999, the total population for the county of 433,461 individuals ranked 2nd in the state.

PER CAPITA PERSONAL INCOME

In 1999, Virginia Beach (Independent City) had a PCPI of $28,356. This PCPI ranked 17th in the state, and was 95% of the state average ($29,794), and 99% of the national average ($28,546). In 1989, the PCPI of Virginia Beach (Independent City) was $20,237 and ranked 12th in the state. The average annual growth rate of PCPI over the past 10 years was 3.4%. The average annual growth rate for the state was 4.2% and for the nation was 4.4%.

TOTAL PERSONAL INCOME

In 1999, Virginia Beach (Independent City) had a TPI of $12,291,242* (*all income estimates with the exception of PCPI are in thousands of dollars.) This TPI ranked 2nd in the state and accounted for 6% of the state total. In 1989, the TPI of Virginia Beach (Independent City) was $7,777,160* and ranked 2nd in the state. The average annual growth rate of TPI over the past 10 years was 4.7%. The average annual growth rate for the state was 5.4% and for the nation was 5.4%.

COMPONENTS OF TOTAL PERSONAL INCOME

The TPI includes the earnings (wages, salaries, other labor income, and proprietors's income); dividends, interest, and rent; and transfer payments received by the residents of Virginia Beach (Independent City). In 1999, earnings were 74.6% of TPI (compared with 78.9% in 1989); dividends, interest, and rent were 18.0% (compared with 16.1% in 1989); and transfer payments were 7.4% (compared with 5.0% in 1989). From 1989 to 1999, earnings increased on average 4.1% each year; dividends, interest, and rent increased on average 5.8%; and transfer payments increased on average 8.8%.

EARNINGS BY INDUSTRY

Earnings by persons employed in Virginia Beach (Independent City) increased from $3,654,713* in 1989 to $6,430,500* in 1999, an average annual growth rate of 5.8%. The largest industries in 1999 were services (29.3% of earnings), military (16.3%), and retail trade (11.0%). In 1989, the largest industries were military (24.8% of earnings), services (23.1%), and retail trade (11.5%). In 1999, the industries that accounted for at least 5% of earnings showed the slowest growing from 1989 to 1999 was military (which increased at an average annual rate of 1.5%) and the fastest growing was finance, insurance, and real estate (which increased at an average annual rate of 12.3%).

The port of Virginia Beach/Lynnhaven is located in the City of Virginia Beach County. In 1990, the City of Virginia Beach County had 393,069 residents allocated among 102,963 families and 135,736 households. For 1997, the population was estimated to be 432,545 and for 2000 to be 425,257.

In1990, 81% of the 147,037 housing units in the county were empty while 38% of the occupied units were rental units.

In 1990, 36% of all residents were born in the state of Virginia while another 22% were born in the southern part of the United States. Furthermore, 36% of persons age 5 and over were living in the same house in 1990 that they had occupied in 1985. An additional 24% were living in a different house in 1985 but still within the City of Virginia Beach County and 11% were living in a different house but still in Virginia.

The racial composition of the City of Virginia Beach County in 1990 was 78% white, 21% black, and less than 6% of any other groups (largest numbers were Filipino and American Indian). Furthermore, 3% of all persons were of Hispanic origin. When reporting first ancestry, German and Race or Hispanic Origin were the largest groups (17%) followed by English (12%), then Irish (10%). The vast majority of persons age 5 years and over speak only English (89%) and less than 1% of households are classified as linguistically isolated.

In 1990, 29% of county residents age 25 and over were high school graduates and 18% held a bachelor's degree. According to the Bureau of Labor Statistics, the civilian labor force in 1996 was 206,969 with a 4.1% unemployment rate. According to the 1999 CBP, there were 10,185 establishments employing 139,142 individuals with an annual payroll of $3.2 billion. When fishing dependent industries are included, the level of dependence increases; however, it is difficult to calculate due to data reporting restrictions in the County Business Pattern data. Overall, 86% of the establishments in the City of Virginia Beach County employ 1-19 employees.

In 1989, the median *household* income was $36,271 with the median family income of $39,112, and the median non-family *household* income of $26,224. The *per capita* income in 1989 was $15,242. In 1997, the median *household* income was estimated to be $44,714 while 9% of the county's population was estimated to be living in poverty.

A granite cross at Cape Henry marks the spot where the Jamestown settlers first touched down on the Virginia shores in 1607. Sailing aboard the Susan Constant (100 tons), the Godspeed (40 tons), and the Discovery (20 tons) under the command of Captain Christopher Newport, the one hundred colonists were sent by the Virginia Company chiefly for trading purposes. Shortly after landing at Cape Henry, the colonists moved up the James River to the site where they would build the first permanent English settlement in the New World.

The first settlement inside the city limits of Virginia Beach was made on Lynnhaven Bay in 1621, but the area that is now Virginia Beach, remained thinly settled for well over a century. In the 1880's, the resort was developed along the beach, and by the turn of the century was very popular. In 1906, it became a town but the rest of the area remained undeveloped.

That began to change during WWII when the navy built Oceana Naval Air Station in what is now the middle of Virginia Beach. The end of the war saw the advent of suburbs and encroachment by neighboring Norfolk. To forestall being gobbled up by Norfolk, the resort of Virginia Beach merged with Princess Anne county in 1963 to form the modern city. Geographically, Virginia Beach is huge. Covering 310 square miles, it is the largest city in Virginia and claims to be the largest resort city in the world (*http://www.vabeach.com*).

Port of Virginia Beach/Lynnhaven

Most of the commercial fishing activity in Virginia Beach occurs in the Lynnhaven section, along Long Creek, which empties into Lynnhaven Bay and eventually Chesapeake Bay. Two active federally permitted dealers in this port also operate as packing houses for two out-or-town dealers. In the past, there was significant activity at Rudee Inlet on the Atlantic side of the city, but now there are only 3 or 4 commercial boats.

The commercial fishery at Virginia Beach/Lynnhaven is inlet-dependent and pressured by competition for waterfront from tourist-related development and recreational boaters and fishermen. The major gear type used as reported to the NMFS is the sink gillnet, used to catch a large number of species including bluefish, striped bass, Atlantic croaker, summer flounder, shad, dogfish, weakfish and spot. Drift and stake gillnets are also used, the latter for spiny dogfish and bluefish among other species. This is also a center of pot fishing for blue crabs, eels, conchs (whelks) and fish. The fish catches were mainly black sea bass and tautog. Handlines accounted for 9% of the landed value in 1998, mostly from black sea bass and summer flounder catches, but also striped bass, tautog, tilefish, tunas, and others. Pound nets accounted for 3.3% of the value in 1998. Species fished in the area included striped bass, bluefish, butterfish, Atlantic croaker, summer flounder, Spanish mackerel, spot, and weakfish (McCay and Cieri 2000).

Carteret County, North Carolina

The information presented in this section was partially modified from the port and community description provided in the Tilefish FMP (MAFMC 2000).

Carteret is one of the 100 counties in North Carolina and is not part of a Metropolitan Area. In 1997, the total population of 59,560 individuals ranked 38th in the state.

PER CAPITA PERSONAL INCOME

In 1997, Carteret had a PCPI of $20,798. This PCPI ranked 31st in the state, and was 90% of the state average ($23,168), and 82% of the national average ($25,288). The 1997 PCPI reflected an increase of 5.1% from 1996. The 1996-97 state change was 5.1% and the national change was 4.7%.

TOTAL PERSONAL INCOME

In 1997, Carteret had a TPI of $1,238,751* (*all income estimates with the exception of PCPI are in thousands of dollars). This TPI ranked 36th in the state and accounted for 0.7% of the state total. The 1997 TPI reflected an increase of 6.8% from 1996. The 1996-97 state change was 6.8 and the national change was 5.7%.

COMPONENTS OF TOTAL PERSONAL INCOME

The TPI includes the earnings (wages, salaries, other labor income, and proprietors' income); dividends, interest, and rent; and transfer payments received by the residents of Carteret. In 1997, earnings were 56.6% of TPI; dividends, interest, and rent were 19.8%; and transfer payments were

23.6%. From 1996 to 1997, earnings increased 7.5%; dividends, interest, and rent increased 6.3%; and transfer payments increased 5.5%.

EARNINGS BY INDUSTRY

Earnings by persons employed in Carteret increased from $504,266* in 1996 to $552,679* in 1997, an increase of 9.6%. The largest industries in 1997 were services (22.2% of earnings), retail trade (19.1%), and state and local government (18.2%). In 1997, the industries that accounted for at least 5% of earnings showed the slowest growing from 1996 to 1997 was transportation and public utilities (5.3% of earnings in 1997 which increased 5.6%), the fastest growing was construction (11.4% of earnings in 1997 which increased 26.8% (*http://www.bea.doc.gov/bea/regional/bearfacts/bf9697/37/37031.htm*).

In 1990, Carteret County had 52,556 residents allocated among 15,351 families (average size 2.88) and 21,221 households. According to 1990 Census data in Carteret County, there were 86 white non-Hispanic male captains or other officers of fishing vessels and 591 fishermen (511 white males, 24 white females, 36 black males, 7 black females, 13 American Indian and Alaska native males).

Agricultural services, forestry and fishing account for 1% of employees, 2% of establishments and 2% of annual payroll. When fishing dependent industries are included, the level of dependence increases; however, it is difficult to calculate due to data reporting restrictions in the County Business Pattern data. Overall, 91% of establishments in Carteret County employ 1-19 employees

In 1990, 39% of the 34,576 housing units in the county were empty, 26% of the occupied units were rental units, and 76% of the vacant units were for seasonal, recreational or occasional use while 9% were "usual home elsewhere."

In 1990, 64% of all residents were born in the state of North Carolina, another 14% were born in the southern United States, and 11% were born in the Northeast United States. Furthermore, 52% of persons age 5 and over were living in the same house in 1990 that they had occupied in 1985. An additional 22% were living in a different house in 1985 but still within Carteret County and 11% were living in a different house but still in North Carolina. Three percent of all workers age 16 or over, who reside in the county, also work within the county.

The racial composition of Carteret County in 1990 was 91% white, 8% black, and 1% other groups. Less than 1% of all persons were of Hispanic origin. When reporting first ancestry, English was the largest group (24%) followed by German (13%), then Irish, United States or American, and Race or Hispanic Origin Groups (10% each). The vast majority of persons age 5 years and over speak only English (97%) and less than 1% of households are classified as linguistically isolated.

In 1990, 31% of county residents 25 years and over were high school graduates and 11% held a bachelor's degree. Another 22% had some college, and 16% had 9th through 12th grade but no diploma. According to the Bureau of Labor Statistics, the civilian labor force in 1996 was 28,319 with a 4.9% unemployment rate. According to the 1999 CBP, there were 1,912 establishments employing 17,300 individuals with an annual payroll of $323 million. When fishing dependent industries are included, the level of dependence increases; however, it is difficult to calculate due to data reporting restrictions in the County Business Pattern data. Overall, 91% of the establishments in Carteret County employ 1-19 employees.

In 1989, the median *household* income was $25,811 with the median family income of $30,241 and the median non-family income of $14,038. The *per capita* income in 1989 was $13,227. In 1997, the median *household* income was estimated to be $34,348 while 11.8% of the county's population was estimated to be living in poverty.

Carteret County provides a good example of the significance of the fishing industry to local communities in North Carolina. Centrally located along North Carolina's coast, it is one of the state's most important commercial and recreational fishing destinations. A study by the Carteret County Economic Development Council concluded that about 20% of the civilian labor force in the county is directly or indirectly employed in commercial fishing. The study further concluded that without commercial fishing, the county's economy would suffer. Although recreational fishing was not analyzed in this study, it undoubtedly supports a significant number of jobs in Carteret County (*http://www.nmfs.gov/habitat/publications/habitatconections/num2.htm*).

Port of Atlantic

In 1990, Atlantic township had 660 residents allocated among 198 families and 294 households. According to 1990 Census data in Atlantic township, there were 33 persons employed in occupations of agricultural services, forestry and fishing (13% of all employed persons 16 or over) and 41 employed in agriculture, forestry and fisheries industries.

In 1990, 26% of the 426 housing units in the area were empty while 29% of the occupied units were rental units.

In 1990, of the 534 residents born in the state of North Carolina, 80% were born in the southern United States. In the classification of persons age 5 and over, 54% were living in the same house in 1990 that they had occupied in 1985. An additional 26% were living in a different house in 1985 but still within Carteret County and 16% were living in a different house but still in North Carolina. In addition, 29% of all workers 16 and over worked in their county of residence. In 1990, the racial composition of Atlantic township was 100% white.

In 1990, 39% of Atlantic Townships residents age 25 and over were high school graduates and 8% held a bachelor's degree. An additional 20% had some college and another 10% had 9th through 12th grade but no diploma. In 1989, the median *household* income was $16,307 with the median family income of $20,536 and the median non-family income of $10,769 (77% of the county average). The *per capita* income in 1989 was $10,293 (78% of the county average). Approximately 17% of persons for whom poverty status was determined (85% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was agriculture, forestry and fishing followed by retail trade.

Port of Beaufort

In 1990, Beaufort township had 7,568 residents allocated among 2,175 families and 3,092 households. According to 1990 Census data in Beaufort township, there were 201 persons employed in occupations of agricultural services, forestry and fishing (6% of all employed persons 16 or over)and146 employed in agriculture, forestry and fishing industries.

In 1990, 15% of the 3,622 housing units in the area were empty while 59% of the 3,070 occupied units were owner occupied and 26% were rental units.

In 1990, 75% of all residents were born in the state of North Carolina and the next largest group (10%) were born in the southern United States. In the classification of persons age 5 and over, 63% were living in the same house in 1990 that they had occupied in 1985. An additional 21% were living in a different house in 1985 but still within Carteret County and 7% were living in a different house but still in North Carolina. In addition, 60% of all workers 16 and over worked in their county of residence.

The racial composition of Beaufort township in 1990 was 76% white and 22% black. When reporting first ancestry, English was the largest group (26%) followed by Hispanic origin (22%), then United States or American (13%). The majority of persons age 5 years and over speak English (40%) and no households were classified as linguistically isolated.

In 1990, 22% of port's residents age 25 and over were high school graduates and 6% held a bachelor's degree. In 1989, the median *household* income was $23,601 with the median family income of $28,342 and the median non-family income of $11,522. The *per capita* income in 1989 was $10,981.

According to the 1990 census, the largest employment sector was retail trade followed by public administration.

Dare County, North Carolina

The information presented in this section was partially modified from the port and community description provided in the Tilefish FMP (MAFMC 2000).

Dare is one of 100 counties in North Carolina and is not part of a Metropolitan Area. In 1997, the total population of 27,935 individuals ranked 68th in the state.

PER CAPITA PERSONAL INCOME

In 1997, Dare had a PCPI of $21,624. This PCPI ranked 25th in the state, and was 93% of the state average ($23,168) and 86% of the national average ($25,288). The 1997 PCPI reflected an increase of 4.1% from 1996. The 1996-97 state change was 5.1% and the national change was 4.7%.

TOTAL PERSONAL INCOME

In 1997, Dare had a TPI of $604,066* (*all income estimates with the exception of PCPI are in thousands of dollars). This TPI ranked 67th in the state and accounted for 0.4% of the state total. The 1997 TPI reflected an increase of 8.4% from 1996. The 1996-97 state change was 6.8% and the national change was 5.7%.

COMPONENTS OF TOTAL PERSONAL INCOME

The TPI includes the earnings (wages, salaries, other labor income, and proprietors' income); dividends, interest, and rent; and transfer payments received by the residents of Dare. In 1997, earnings were 60.9% of TPI; dividends, interest, and rent were 20.5%; and transfer payments were 18.6%. From 1996 to 1997, earnings increased 9.4%; dividends, interest, and rent increased 6.4%; and transfer payments increased 7.4%.

EARNINGS BY INDUSTRY

Earnings by persons employed in Dare increased from $374,509* in 1996 to $411,465* in 1997, an increase of 9.9%. The largest industries in 1997 were retail trade (24.1% of earnings), services (22.0%), and construction (14.4%). In 1997, the industries that accounted for at least 5% of earnings showed the slowest growing from 1996 to 1997 was state and local government (14.3% of earnings in 1997 which increased 7.8%) while the fastest growing was finance, insurance, and real estate (10.7% of earnings in 1997 which increased 11.1%) (Regional Economic Information System, Bureau of Economic Analysis (*http://www.bea.doc.gov/bea/regional/bearfacts/bf9697/37/37055.htm*).

In 1990, Dare County had 22,746 residents allocated among 6,469 families and 9,359 households. For 1995, the population was estimated to be 26,847 and for 1998 to be 28,953. According to 1990 Census data in Dare County, there were 30 white, non-Hispanic male captains or other officers of fishing vessels and 440 fishermen (391 male non-Hispanic white, and 49 female non-Hispanic white).

In 1990, 57% of the 21,567 housing units in the county were empty while 29% of the occupied units were rental units and 53% of vacant units were for seasonal, recreational or occasional use.

In 1990, 41% of all residents were born in the state of North Carolina and the next largest group (36%) were born in the Northeast United States. Furthermore, 35% of persons age 5 and over were living in the same house in 1990 that they had occupied in 1985. An additional 24% were living in a different house in 1985 but still within Dare County and 8% were living in a different house but still in North Carolina.

In 1990, the racial composition of Dare County was 95% white, 4% black, and 1% other groups. Furthermore, under 1% of all persons were of Hispanic origin. When reporting first ancestry, English was the largest group (23%), followed by German (15%), United States or American (11%), then Irish (9%). The vast majority of persons age 5 years and over speak only English (97%) and less than 1% of households are classified as linguistically isolated.

In 1990, 30% of county residents age 25 and over were high school graduates and 15% held a bachelor's degree. According to the Bureau of Labor Statistics, the civilian labor force in 1996 was 16,039 with a 5.9% unemployment rate. According to the 1999 CBP, there were 1,648 establishments employing 11,695 individuals with an annual payroll of $254 million. When fishing dependent industries are included, the level of dependence increases; however, it is difficult to calculate due to data reporting restrictions in the County Business Pattern data . Overall, 14% of establishments in Dare County employ 1-19 employees.

In 1989, the median *household* income was $29,322 with the median family income of $34,891 and the median non-family income of $16,858. The *per capita* income in 1989 was $15,107. In 1997, the median *household* income was estimated to be $35,258 and 8% of the county's population was estimated to be living in poverty.

Recreational fishing by small boat (private, rental, charter) is popular in the Pamlico, Croatian, Albemarle, and Roanoke Sounds. Anglers can expect to catch a wide variety of fish including trout, spot, croaker, summer flounder, sheepshead, and at night, even red drum. Also popular is cobia, which hits its peak in late May or early June. In recent years, there have been good catches of striped bass during the fall, winter and spring.

There are public boat ramps located at numerous places including the Manteo waterfront, Oregon Inlet, Pirate's Cove, Kill Devil Hills on Durham Street and on Hatteras Island.

In addition, headboats which carry 40-50 people run half-day trips and stay in the sound and inlet waters. Depending on the season, the catch is usually spot, sea trout, summer flounder, croaker, and black sea bass.

In the summer, summer flounder, croaker and small bluefish are the mainstay, though spot, croaker and grey trout are also plentiful. Surffishing really takes off by Outer Banks standards in August when pompano and Spanish mackerel begin to make a showing and a few tarpon are hooked. September is the best month for all three (*http://www.outerbanks.org/fishing.htm*).

Port of Wanchese

In 1990, Wanchese had 1,374 residents allocated among 383 families and 503 households. According to 1990 Census data in Wanchese, there were 131 persons employed in occupations of agricultural services, forestry and fishing (19% of all employed persons 16 or over) and 137 employed in agriculture, forestry and fishing industries.

In 1990, 12% of the 583 housing units in the area were empty while 25% of the occupied units were rental units and 14% of the vacant units were classified as for seasonal, recreational or occasional use only while 11% were "usual home elsewhere."

In 1990, 61% of all residents were born in the state of North Carolina and the next largest group (23%) were born in the southern United States. In the classification of persons age 5 and over, 53% were living in the same house in 1990 that they had occupied in 1985. An additional 27% were living in a different house in 1985 but still within Dare County and 4% were living in a different house but still in North Carolina. In addition, 38% of all workers 16 and over worked in their place of residence while 97% worked in their county of residence.

The racial composition of Wanchese in 1990 was 99% white. Only 1% of all persons were of Hispanic origin. When reporting first ancestry, United States or American was the largest group (28%) followed by English (14%), then German (10%). The majority of persons age 5 years and over speak only English (98%) and no households were classified as linguistically isolated.

In 1990, 31% of Wanchese residents age 25 and over were high school graduates and 5% held a only bachelor's degree. In 1989, the median *household* income was $25,977 (89% of the Dare County average) with the median family income of $28,828 (83% of the county average) and the median non-family income of $13,015 (77% of the county average). The *per capita* income in 1989 was $10,830 (72% of the county average). Approximately 9% of persons for whom poverty status was determined (99% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was agriculture, forestry and fishing followed by retail trade.

Wanchese is located on the southern part of Roanoke Island, located in the northern Outer Banks. This small fishing village is said to have changed as little as those who have lived here for generations (Cutchin 1997). The village actually received its name from a Native American leader named Wanchese who greeted these first English settlers in 1584. Wanchese was officially named when the federal postal system was established in 1886 (Cutchin 1997, Wilson *et al.* 1999).

Fishing has long been important to the town. Today, the village still revolves around fishing but has expanded to include processing plants. Though traditionally a commercial fishing community, recent growth in tourism and recreational fishing has sparked competition between the new and the old for a restricted resource (Wilson *et al.* 1999).

Wanchese's first fish house began in 1936 by the grandfather of the current generation that still runs two fish houses in the community. His son fished the first trawler in Wanchese in the 1950s. He took a little 65 foot wooden boat and converted it into a fishing trawler. The grandfather stayed and helped pack boats but he was a gillnetter at heart and would rather be catching fish. In those days, they were fishing more in Pamlico and Albemarle Sounds than in the ocean. They beach fished for sea mollusks, trout, croakers, spots, striped bass, and bluefish. In the Sounds, they fished croakers, butterfish, Spanish mackerel, spots, and pigfishes. With the trawler, they began flounder fishing in the winter. Then they would go offshore and catch some black sea bass later in the year. They bought another similar boat and then a WWI converted subchaser. The subchaser was the first boat to try scalloping. The owner of a third fish house built the first flynet in 1971 (Wilson *et al.*1999).

Fishermen along the Outer Banks and from Wanchese are especially sensitive to the historical importance of their fisheries and related marine lifestyles, beginning with the shore-based whaling fisheries of the early colonial period and going through subsequent periods where fishing families provided life-saving services to hundreds of ships that make up the "Ghost Fleet" of the Outer Banks. Fishermen mentioned the importance of this history in terms of the memories of old fishermen. One claimed, for example, that there have been periods in local fishermen' pasts that they had to migrate to Florida because of declines in local fish stocks, making the argument that regulations need to consider extreme fluctuations in fish stocks as part of the economic hazards of commercial fishing. This same fisherman noted the importance of life-time experience in fishing and of the difference between knowledge gained through direct experience and knowledge gained through scientific methods. These methods may suffer from sampling biases, while the former may suffer from other kinds of biases (economic, political, religious, etc.), yet combining the two could far better inform the regulatory community than sole reliance on one or the other.

The heavy dependence on Wanchese as a fishing community demands special attention in this section. Seven principal families of seafood dealers ring the seafood industrial park and serve as the central locations of the estimated 200 fishing families who live in Wanchese as well as anchor the southern marketing behaviors of fishermen from as far away as New Bedford, Massachusetts and Portland, Maine. The fleets that originate from here, and the fishing activity focused by the seafood dealers and the ports, concentrate around the seafood industrial park and fleets of trawlers organized or encouraged by seafood dealers. The large, greater than100 foot vessels, have been less active recently and their captains and crews are now fishing from smaller crafts.

These arrangements have been replicated in the Newport News/Hampton area. As one leaves either Wanchese or migrates across the Chesapeake to Virginia's Eastern Shore and the other parts of the Delmarva Peninsula, more independent owner-operator fishing operations prevail. Some with long-time loyalties between fishermen and fish dealers that hinge on the questions of slip space and access. In recent years, fishermen in this region have become increasingly concerned that real estate development will entice dealers to sell their space to developers less interested in commercial fishing than in providing marinas and condominiums for recreational boating traffic (Dyer and Griffith 1996).

Hyde County, North Carolina

Hyde is one of 100 counties in North Carolina and is not part of a Metropolitan Area. In 1999, the total population for the county of 5,828 individuals ranked 99th in the state.

PER CAPITA PERSONAL INCOME

In 1999, Hyde had a PCPI of $17,613. This PCPI ranked 93rd in the state, and was 67% of the state average, $26,417, and 62% of the national average, $28,546. In 1989, the PCPI of Hyde was $13,476 and ranked 59th in the state. The average annual growth rate of PCPI over the past 10 years was 2.7%. The average annual growth rate for the state was 4.8% and for the nation was 4.4%.

TOTAL PERSONAL INCOME

In 1999, Hyde had a TPI of $102,646*. This TPI ranked 99th in the state and accounted for 0.1% of the state total. In 1989, the TPI of Hyde was $73,982* and ranked 98th in the state. The average annual growth rate of TPI over the past 10 years was 3.3%. The average annual growth rate for the state was 6.4% and for the nation was 5.4%.

COMPONENTS OF TOTAL PERSONAL INCOME

The TPI includes the earnings (wages, salaries, other labor income, and proprietors's income); dividends, interest, and rent; and transfer payments received by the residents of Hyde. In 1999, earnings were 61.3% of TPI (compared with 64.4% in 1989); dividends, interest, and rent were 12.7% (compared with 18.7% in 1989); and transfer payments were 25.9% (compared with 16.9% in 1989). From 1989 to 1999, earnings increased on average 2.8% each year; dividends, interest, and rent decreased on average 0.6%; and transfer payments increased on average 7.8%.

EARNINGS BY INDUSTRY

Earnings of persons employed in Hyde increased from $45,285* in 1989 to $62,417* in 1999, an average annual growth rate of 3.3%. The largest industries in 1999 were state and local government (34.2% of earnings), services (11.1%), and retail trade (10.0%). In 1999, the industries that accounted for at least 5% of earnings in 1999 showed the slowest growing from 1989 to 1999 was farm (6.0% of earnings in 1999 which decreased at an average annual rate of 13.5%) while the fastest growing was state and local government which increased at an average annual rate of 10.0%.

In 1990, Hyde County had 5,411 residents allocated among 1,572 families and 2,092 households. According to 1990 Census data in Hyde County, there were no captains or other officers of fishing vessels however, there were 235 fishermen (196 white non-Hispanic males, 38 black non-Hispanic males and 8 white non-Hispanic females).

In 1990, 28% of the 2,905 housing units in the county were empty while 56% of the 2,094 occupied units were owner occupied and 17% were rental units.

In 1990, 78% of all residents in Hyde County were born in the state of North Carolina while another 10% were born in the southern part of the United States. Furthermore, 72% of persons age 5 and over were living in the same house in 1990 that they had occupied in 1985. An additional 16% were living in a different house in 1985 but still within Hyde County and 5% were living in a different house but still in North Carolina.

The racial composition of Hyde County in 1990 was 67% white and 33% black. When reporting first ancestry, English was the largest group (13%) followed by United States or American (11%), then German (8%). The vast majority of persons age 5 years and over speak English (98%).

In 1990, 35% of county residents age 25 and over were high school graduates and 5% held a bachelor's degree. According to the Bureau of Labor Statistics, the civilian labor force in 1996 was 2,819 with a 9.5% unemployment rate. According to the 1999 CBP, there were 168 establishments employing 938 individuals with an annual payroll of $17 million. When fishing dependent industries are included, the level of dependence increases; however, it is difficult to calculate due to data reporting restrictions in the County Business Pattern data. Overall, 95% of the establishments in Hyde County employ 1-19 employees.

In 1989, the median *household* income was $17,665 with the median family income of $19,929, and the median non-family *household* income of $10,286. The *per capita* income in 1989 was $9,434. In 1997, the median *household* income was estimated to be $23,568 while 24.8% of the county's population was estimated to be living in poverty.

Port of Engelhard

The fishermen of Engelhard fish out of the same areas as Wanchese fishermen. Engelhard has fewer ocean fishermen than in Wanchese but more than Belhaven. There are approximately twenty large boats in Engelhard. These boats use Oregon Inlet when it is navigable; however, most of the larger boats dock in the Virginia area during the winter because they cannot use Oregon Inlet. Sometimes the larger boats have to go as far as Morehead City to get out into the ocean.

Ocean fishing generally starts in August when fishermen fish off of Chincoteague and Delaware Bay. They then work south as the season progresses and they continue fishing all the way down to Diamond Shoals. From mid-November to mid-January, some smaller boats fish south of Diamond Shoals. In mid-January, the big boats go to the edge around Norfolk Canyon and Washington Canyon. Small boats with double rigs will fish down to Ocracoke; however, most boats do not usually go much further south than Hatteras. These fishermen fish primarily for flounder; however, from September15 through March, many also fish for croaker, trout, bluefish, and sea mullet from off of Chesapeake Bay south. In October, November and December, croaker can be caught in the area between the shore and the Point. During the months of May and June, some boats go to Brunswick, Georgia to shrimp in the ocean. Those who continue to fish during this time go to Nantucket or to Georges Banks to fish for flounder (McCay and Cieri 2000).

Pamlico County, North Carolina

Pamlico is one of 100 counties in North Carolina and is not part of a Metropolitan Area. In 1999, the total population for the county of 12,314 individuals ranked 91st in the state.

PER CAPITA PERSONAL INCOME

In 1999, Pamlico had a PCPI of $21,919. This PCPI ranked 50th in the state, and was 83% of the state average ($26,417) and 77% of the national average ($28,546). In 1989, the PCPI of Pamlico was $14,545 and ranked 46th in the state. The average annual growth rate of PCPI over the past 10 years was 4.2%. The average annual growth rate for the state was 4.8% and for the nation was 4.4%.

TOTAL PERSONAL INCOME

In 1999, Pamlico had a TPI of $269,912* (*all income estimates with the exception of PCPI are in thousands of dollars). This TPI ranked 89th in the state and accounted for 0.1% of the state total. In 1989, the TPI of Pamlico was $164,115* and ranked 90th in the state. The average annual growth rate of TPI over the past 10 years was 5.1%. The average annual growth rate for the state was 6.4% and for the nation was 5.4%.

COMPONENTS OF TOTAL PERSONAL INCOME

The TPI includes the earnings (wages, salaries, other labor income, and proprietors's income); dividends, interest, and rent; and transfer payments received by the residents of Pamlico. In 1999, earnings were 56.7% of TPI (compared with 65.3% in 1989); dividends, interest, and rent were

22.5% (compared with 20.5% in 1989); and transfer payments were 20.8% (compared with 14.2% in 1989). From 1989 to 1999, earnings increased on average 3.6% each year; dividends, interest, and rent increased on average 6.1%; and transfer payments increased on average 9.2%.

EARNINGS BY INDUSTRY

Earnings of persons employed in Pamlico increased from $53,431* in 1989 to $85,714* in 1999, an average annual growth rate of 4.8%. The largest industries in 1999 were services (26.4% of earnings), state and local government (23.8%), and retail trade (12.0%). In 1989, the largest industries were state and local government (18.5% of earnings), services (12.0%), and retail trade (11.8%). In 1999, the industries that accounted for at least 5% of earnings showed the slowest growing from 1989 to 1999 was agricultural services, forestry, fishing, & other (5.1% of earnings in 1999 which increased at an average annual rate of 3.2%) and the fastest growing was services which increased at an average annual rate of 13.5%.

Pamlico County fishermen work the same areas as the Wanchese fishermen. However, they are more likely to work their way north and carry their catches to Virginia or Cape May. The exceptions to this are in November and December when the fish are further south (between Currituck Light to Hatteras Inlet). Between January and April, the fish begin to move offshore and further north (McCay and Cieri 2000).

In 1990, Pamlico County had 11,372 residents allocated among 3,377 families and 4,489 households. According to 1990 Census data in Pamlico County, there were 36 white non-Hispanic captains or other officers of fishing vessels and 251 fishermen (222 white non-Hispanic males, 29 black non-Hispanic males, and 3 white non-Hispanic females).

In 1990, 25% of the 6,050 housing units in the county were empty while 81% of the 4,523 occupied units were owner occupied and 14% were rental units.

In 1990, 79% of all residents in Pamlico County were born in the state of North Carolina while another 8% were born in the southern part of the United States. Furthermore, 66% of persons age 5 and over were living in the same house in 1990 that they had occupied in 1985. An additional 16% were living in a different house in 1985 but still within Pamlico County and 9% were living in a different house but still in North Carolina.

The racial composition of Pamlico County in 1990 was 73% white, 26% black, and less than 1% were of Hispanic origin. When reporting first ancestry, English was the largest group (17%) followed by United States or American (14%), then Irish (10%). The vast majority of persons age 5 years and over speak only English (96%).

In 1990, 31% of county residents age 25 and over were high school graduates and 8% held a bachelor's degree. According to the Bureau of Labor Statistics the civilian labor force in 1996 was 5,412 with a 5.1% unemployment rate. According to the 1999 CBP, there were 230 establishments employing 1,849 individuals with an annual payroll of $37 million. When fishing dependent industries are included, the level of dependence increases; however, it is difficult to calculate due to data reporting restrictions in the County Business Pattern data. Overall, 90% of the establishments in Pamlico County employ 1-19 employees.

In 1989, the median *household* income was $21,060 with the median family income of $26,168 and the median non-family *household* income of $10,000. In 1997, the median *household* income was estimated to be $28,629 while 16.8% of the county's population was estimated to be living in poverty.

<u>Port of Bayboro</u>

In 1990, the Port of Bayboro had 704 residents allocated among 197 families and 276 households. According to 1990 Census data in Bayboro, there were 14 persons employed in occupations of agricultural services, forestry and fishing (5% of all employed persons 16 or over) and 19 employed in agriculture, forestry and fishing industries.

In 1990, 11% of the 320 housing units in the area were empty while 23% of the 285 occupied units were rental units.

In 1990, 79% of all residents were born in the state of North Carolina and 11% were born in the southern part of the United States. In the classification of persons age 5 and over, 60% were living in the same house in 1990 that they had occupied in 1985. An additional 22% were living in a different house in 1985 but still within Pamlico County and 7% were living in a different house but still in North Carolina. In addition, 18% of all workers 16 and over worked in their place of residence while 31% worked in their county of residence.

The racial composition of Bayboro in 1990 was 54% white and 45% black. When reporting first ancestry, English was the largest group (13%) followed by Irish (12%), then German (4%). The majority of persons age 5 and over speak only English (61%) and none of the households are classified as linguistically isolated.

In 1990, 28% of residents age 25 and over were high school graduates and 7% held a bachelor's degree. In 1989, the median *household* income was $20,469 (97% of the Pamlico County average) with the median family income of $25,417 (97% of the county average) and the median non-family *household* income of $10,208 (2% above the county average). The *per capita* income in 1989 was $10,947. Approximately 35% of persons for whom poverty status was determined (72% of all residents) had 1989 income below the poverty line.

According to the 1990 census, the largest employment sector was retail trade followed by educational services and construction.

<u>Port of Oriental</u>

In 1990, the Port of Oriental had 804 residents allocated among 284 families and 367 households. According to 1990 Census data in Oriental, there were 9 persons employed in occupations of agricultural services, forestry and fishing (3% of all employed persons 16 or over) and 9 were employed in agriculture, forestry and fishing industries.

In 1990, 24% of the 482 housing units in the area were empty while 21% of the 367 occupied units were rental units.

In 1990, 61% of all residents were born in the state of North Carolina and the next largest group (16%) were born in the Northeast United States. In the classification of persons age 5 and over, 49% were living in the same house in 1990 that they had occupied in 1985. An additional 17% were living in a different house in 1985 but still within Pamlico County and 14% were living in a different house but still in North Carolina. In addition, 34% of all workers 16 and over worked in their place of residence while 9% worked in their county of residence.

The racial composition of Bayboro in 1990 was 87% white and 13% black. When reporting first ancestry, English was the largest group (29%) followed by German (11%), then Irish (8%). The majority of persons age 5 and over speak only English (90%) and none of the households are classified as linguistically isolated.

In 1990, 25% of residents age 25 and over were high school graduates and 19% held a bachelor's degree. In 1989, the median *household* income was $26,339 (25% above the county average) with the median family income of $30,000 (15% above the county average) and the median non-family *household* income of $11,442 (14% above the county average). The *per capita* income in 1989 was $14,719.

According to the 1990 census, the largest employment sector was retail trade followed by educational services and manufacturing for durable goods.

Port of Vandemere

In 1990, the Port of Vandemere had 338 residents allocated among 94 families and 131 households. According to 1990 Census data in Vandemere, there were 35 persons employed in occupations of agricultural services, forestry and fishing (26% of all employed persons 16 and over) and 32 were employed in agriculture, forestry and fishing industries.

In 1990, 18% of the 152 housing units in the area were empty while 25% of the 124 occupied units were rental units.

In 1990, 89% of all residents were born in the state of North Carolina and 5% were born in the Northeast United States. In the classification of persons age 5 and over, 75% were living in the same house in 1990 that they had occupied in 1985. An additional 16% were living in a different house in 1985 but still within Pamlico County and 4% were living in a different house but still in North Carolina. In addition, 27% of all workers 16 and over worked in their place of residence while 17% worked in their county of residence.

The racial composition of Vandemere in 1990 was 48% white and 52% black. When reporting first ancestry, English was the largest group (10%) followed by United States or American (9%), then German (5%). The majority of persons age 5 and over speak only English (97%) and none of the households are classified as linguistically isolated.

In 1990, 30% of residents age 25 and over were high school graduates and 5% held a bachelor's degree. In 1989, the median *household* income was $17,788 (84% of the county average) with the median family income of $18,864 (72% of the county average) and the median non-family *household* income of $15,250 (53% above the county average). The *per capita* income in 1989 was $7,836.

According to the 1990 census, the largest employment sector was agriculture, forestry and fisheries, followed by manufacturing of durable goods and retail trade.

3.5 ANALYSIS OF PERMIT DATA/HUMAN ENVIRONMENT

Federally Permitted Vessels

This analysis estimates that as of September 5, 2000, there were 1,969 vessels with one or more of the following three commercial or recreational Federal Northeast Permits: summer flounder (FLK), black sea bass (BSB), and scup (SCP). A total of 1033, 977, and 831 federal commercial permits for FLK, SCP, and BSB, respectively, were issued to Northeast region fishing vessels. For party/charter operators a total of 613, 498, and 528 federal permits were issued for FLK, SCP, and BSB, respectively.

These three fisheries (FLK, SCP, and BSB) have vessels permitted as commercial, recreational, or both. Of the 1,969 vessels with at least one federal permit there were 1,303 that held only commercial permits for FLK, SCP, or BSB while there were 546 vessels that held only a recreational permit. The remaining vessels (120) held some combination of recreational and commercial permits. Whether engaged in a commercial or recreational fishing activity vessels may hold any one of seven combinations of FLK, SCP, and BSB permits. The total number of vessels holding any one of these possible combinations of permits by species and commercial or recreational status are reported in Table 87.

Row sums in Table 87 indicate the total number of vessels that have been issued some unique combination of commercial permits. For example, there were 304 vessels whose only commercial permit was for FLK. By contrast, there were 481 that held all three commercial permits. Column totals in Table 87 indicate the total number of vessels that have been issued some unique combination of federal recreational permits. For example, there were 17 vessels whose only recreational permit was for scup while 415 vessels held all three recreational permits. Each cell in Table 87 reports the total number of vessels that have the unique combination recreational and commercial permits by species. For example, the cell entry of 5 in row 2 column 2 indicates that there were 5 vessels that held the unique combination of only a FLK commercial permit and only a FLK recreational permit. Note that each cell entry in row one corresponds to vessels that held no commercial permit for FLK, SCP or BSB, while each cell entry in column 1 corresponds to vessels that held no such recreational permit.

In addition to FLK, SCP, and BSB there are a number of alternative commercial or recreational fisheries for which any given vessel might possess a federal permit. The total number of vessels holding any one or more of these other permits is reported in Table 88.

Of the vessels that hold at least one federal permit for FLK, SCP, or BSB the largest number of commercial permit holders (Table 127) are held by Massachusetts vessels, followed closely by New York and New Jersey, then Rhode Island, and North Carolina. The fewest permits are held by Florida vessels, followed by Delaware. In terms of average tonnage, the largest commercial vessels are found in Florida, followed by Virginia, Massachusetts, Maine, and North Carolina. These rankings by state are similar for average length as well. The smallest vessels are found in Delaware, followed by New Hampshire and New York.

For party/charter vessels (Table 128), the largest number of permit holders are found in New Jersey, followed by New York and Massachusetts. The fewest permits are in Florida, followed by North Carolina. As might be expected, recreational vessels are smaller on average than commercial vessels. In terms of overall length, the largest party/charter vessels operate out of principal ports in the states of Florida and Maryland, followed by Pennsylvania, Connecticut, New York, and New Jersey; while the smallest are in New Hampshire.

For vessels that hold a combination of commercial and party/charter permits most vessels operate out of ports in the states of New York followed by Massachusetts and New Jersey (Table 129). Like the vessels that hold only party/charter FLK, SCP, or BSB, permits, these vessels are generally smaller than commercial vessels and are smaller, on average, than party/charter vessels in Massachusetts and New York but are larger than New Jersey party/charter vessels.

Summer flounder permits are allocated per state, though vessels are not constrained to land in their home state. It can be useful, therefore, to examine the degree to which vessels from different states make it a practice to land in states other than their home state. With the exception of South Carolina, commercial vessels in Massachusetts and Maryland vessels were most likely to list the same state as both the vessel owner's declared principal port of landing and the identified port of their home (Table 127), followed closely by Florida, New Jersey, Connecticut, New York, and New Hampshire. Vessels in Delaware were the least likely to land in their home port state followed by Virginia, North Carolina, and Rhode Island. Among recreational vessels (Table 128), New Hampshire vessels are the most likely to list the same state as both principal of landing and home port, followed equally by Delaware, Florida, Massachusetts, and Pennsylvania. For vessels that have a combination of commercial and party/charter permits, every such vessel operating out of Connecticut and North Carolina declared the same landing and home port (Table 129) on their year 2000 federal permit application. Those vessels which have generally made it a practice to land in their home state may have less inherent flexibility in altering their landing state to adjust to smaller quotas in their home state.

To examine landings patterns 1999 data are used, since that is the last full year from which data are available and partial year data could miss seasonal fisheries. The top commercial landings ports for FLK, SCP, and black sea bass by pounds landed are shown in Table 89. Related data for the recreational fisheries are shown in Table 130, though the nature of the recreational database (MRFSS) means that it is inappropriate to desegregate to less than state levels. Thus port-level recreational data are not shown.

Dealers

There were 199 dealers who bought summer flounder, scup and/or black sea bass in 1999. They were distributed by state as indicated in Table 131. Employment data for these specific firms are not available. In 1999 these dealers bought $16,259,534 worth of summer flounder; $3,686,648 worth of scup; and $4,793,747 worth of black sea bass.

4.0 ENVIRONMENTAL IMPACTS OF THE ALTERNATIVES (EIS)*

Table 132 is a comparison of the biological, economic, and social impacts of the all of the alternatives proposed and analyzed in this amendment. The impacts of the status quo measures are noted and the impacts of the remainder of the alternatives are stated relative to the status quo alternative in that category. Significance is evaluated by the context and intensity of the impact (40 CFR 1508.27).

4.1 BLACK SEA BASS COMMERCIAL QUOTA ALTERNATIVES

4.1.1 Status Quo: Quarterly Quota System Currently in Effect (Alternative 1)

Biological Impacts

It is difficult to predict the performance of the black sea bass fishery in the future. Although the black sea bass fishery has experienced early closures and quarterly quota overages in quarters 2, 3, and 4 of 1999 and 2000, the fishery did not exceed the annual quota. In addition, although quarter 1 quotas were not fully harvested in 1999 and 2000, the quarter 1 quota was over-harvested in 2001. If landings in quarter 4 of 2001 follow the same pattern as quarter 4 of 1999 and 2000, the possibility exists that the 2001 annual quota will be exceeded. If the annual quota is surpassed, it is likely that the target exploitation rate will be exceeded. As such, rebuilding of the stock will be slowed.

The quarterly allocations and associated possession limits in the current quota system may result in fishing practices that increase discard mortality of black sea bass and non-target species. Additionally, pot/trap fishermen may leave gear unattended after a quarterly closure, allowing for the continued capture of black sea bass and other species. Anecdotal reports indicate that fish may be left in the traps until the next quarter opens for landings. This type of behavior could potentially increase the bycatch and discard of black sea bass and other species since fish die in the traps before they can be landed.

The current system for managing the black sea bass quota may have negative biological impacts. This system could slow the rebuilding of the black sea bass stock and have detrimental impacts to stocks of non-target species.

Economic Impacts

The quarterly quota system implemented in Amendment 9 was designed to allow for black sea bass to be landed during the entire 3 months in each quarter. However, an increase in the availability of black sea bass and increased effort has promoted derby-style fishing practices under the current system. Specifically, fishermen "race" to land fish at the opening of each quarter anticipating that the quarter will close before they can land "their share." As such, the current system fails to distribute landings throughout the quarter. The fishery has experienced early closures during the last three quarters in 1999 and 2000. In fact, in quarters 3 and 4 of 2000 the quarterly allocation was harvested within one month leaving the fishery closed for the remaining two months of those quarters. In 2001, the quarters 1 through 4 also experienced early closures. Quarter 3 of 2001 was closed in less than three weeks.

Long closures have obvious economic consequences to fishermen and processors. A market glut at the beginning of the quarter allows for a drop in prices as a large number of fish flood the market. After a short landings period, the fishery is closed and fishermen, especially those that fish primarily for black sea bass, are faced with the economic concerns of decreased annual revenues. As indicated in section 3.3.4.1.2 (processing, marketing, and consumption), NMFS unpublished processing survey data indicates that in 1999, two plants reported handling black sea bass. Information regarding production for these plants is confidential. However, the overall amount contribution of black sea bass to the total poundage processed and total value of the products processed of these plants was minimal, i.e., less than 0.5%.

The current system for managing the black sea bass quota may have negative economic impacts. This system may encourage derby-style fishing practices, cause early closures and market gluts, and favors fishing operations in the northern states.

The economic impact of this alternative is further detailed in section 5.3, "Regulatory Impact Review (RIR) and Regulatory Flexibility Analysis (RFA)."

Social and Community Impacts

Derby-style fishing associated with the current quarterly quota system may promote unsafe fishing practices, e.g., fishermen will fish in unsafe weather in order to catch a "their share" of the quota. Early seasonal closures also result in burdens on fishermen as the result of no income, e.g., an increase in unemployment. Derby-style fishing practices may also 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. While seasonal closures affect the flow of black sea bass to processing plants, the low contribution of black sea bass to the total poundage processed and total value of the products processed of these plants would likely create minimal adverse impacts to revenues and employment for these processing plants.

The current management system may have created possible inequities by shifting landings temporally and geographically. In addition to early closures, the quota in the first quarter was not taken in 1998, 1999, and 2000. This relates to the fact that the allocation percentages are based on historic landings during a period of time when the mesh size for summer flounder was smaller and the fishery was mixed, i.e., fishermen targeting summer flounder with 4" mesh landed significant quantities of black sea bass as bycatch from January through March. As a result of the current system and minimum mesh sizes for summer flounder, the flounder fishery is now very direct and fewer sea bass were landed in the winter fishery in 1999 and 2000.

Possible inequities may have been created by the current management system as landings have shifted to the north. In fact, preliminary data for quarter 4 in 2000 indicate that 41% of the landings for that quarter occurred in one state, Massachusetts. A shift in abundance of black sea bass to the north could account for the higher landings. However, some fishermen have also indicated that restrictive possession limits under the current system have favored fishing operations in the north where black sea bass are caught closer to shore.

Fishermen indicate that stricter possession limits, that may help to distribute landings evenly throughout the year, favor fishing operations in the north where black sea bass are caught closer to shore. In fact, preliminary data for quarter 4 in 2000 indicate that 41% of the landings for that quarter occurred in one state, Massachusetts. The geographic inequity may affect ports and communities differently along the coast.

The current system for managing the black sea bass quota may have negative social impacts. This system may promote unsafe fishing practices, creates social burdens associated with early closures and market gluts, and creates inequities among owners of different sized vessels and in different geographic locations.

Effects on Protected Species

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines (Table 9a). The Mid-Atlantic pot/trap and mixed trawl fisheries are Category III fisheries as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the Large Whale Take Reduction Plan (LWTRP), Harbor Porpoise Take Reduction Plan (HPTRP), MMPA, and ESA. As such, retaining status quo measures is not expected to impact protected species (section 5.4.3.1).

Effects on Essential Fish Habitat

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines. As stated in sections 3.2.7.2 and 3.2.8, otter trawls have the potential to adversely impact habitat. However, the current management system for black sea bass includes a rebuilding schedule which has reduced fishing mortality in order to rebuild the stock. While the stock is in the process of rebuilding, the management measures used to lower fishing mortality should translate into lower fishing effort. Once stock biomass is rebuilt, fishing effort should remain at a low level because catchability will increase at higher stock levels. A reduction in fishing effort would mean that fishing intensity should decrease, thus having a positive impact on essential fish habitat. However, the problems in the current management system may prevent the attainment of fishing mortality targets. If the target fishing mortalities are not achieved and the rebuilding schedule is slowed there may not be as large a reduction in effort. However, if the fishing season closes early because the quota is harvested, habitat may have a chance to recover from any adverse effects of fishing that may have occurred. As such, the status quo alternative is not expected to negatively impact essential fish habitat.

4.1.2 Quarterly Quota Systems With a Rollover Provision (Alternatives 2a and 2b)

Biological Impacts

Given that all four quarters in 2001 closed early, and that 100% of the quota was landed in the first quarter of 2002, and the second quarter in 2002 closed early, it is unlikely that adding a rollover provision will have a positive impact on the black sea bass fishery. However, the possibility exists that a rollover provision may discourage derby-style fishing practices in quarters

1, 2, and 3 because fishermen would know that any unused portion of the quota would be available the next quarter.

Changing the base-years in the quarterly allocation formula would alter the quarterly quota allocation compared to the status quo (Table 1). Based on a hypothetical commercial quota of 3.024 million pounds for 2002 and the allocation formulas for Alternative 2a (1988-1997) and Alternative 2b (1993-1997), the allocations for quarter 2, 3, and 4 would increase, while the allocation for quarter 1 would decrease. However, if future landings reflect the current landings pattern, the black sea bass fishery will continue to experience early closures. This assumption is based on the fact that the all four quarters in 2001 closed early.

Given that a rollover provision is not expected to have a positive impact on the black sea bass fishery, this set of alternatives is expected to have the same negative biological impacts detailed in Alternative 1 (section 4.1.1). As such, this set of alternatives is not expected to decrease existing negative biological impacts associated with Alternative 1 (status quo).

Economic Impacts

Changing the base-years in the quarterly allocation formula would alter the quarterly quota allocation compared to the status quo (Table 1). Based on a hypothetical commercial quota of 3.024 million pounds for 2002 under the allocation formulas for Alternative 2a (1988-1997) and Alternative 2b (1993-1997). The allocations for quarter 2, 3, and 4 would increase, while the allocation for quarter 1 would decrease. However, if future landings reflect the current landings pattern, the black sea bass fishery will continue to experience early closures. This assumption is based on the fact that all four quarters in 2001 closed early. It is expected that landings by participating vessels would remain unchanged if current fishing practices continue.

If current landings patterns continue, it is unlikely that adding the rollover provision or changing the base years for a quarterly quota allocation will have any positive economic impacts. This assumption is based on the fact that all four quarters in 2001 closed early. Given that a rollover provision is not expected to have a positive impact on the black sea bass fishery, this set of alternatives is expected to have the same negative economic impacts reviewed in Alternative 1 (section 4.1.1). As such, this set of alternatives is not expected to decrease existing negative economic impacts relative to Alternative 1 (status quo).

The economic impact of this alternative is further detailed in section 5.3, "Regulatory Impact Review (RIR) and Regulatory Flexibility Analysis (RFA)."

Social and Community Impacts

If current landings patterns continue, it is unlikely that adding the rollover provision or changing the base years for a quarterly quota allocation will have any positive social impacts. This assumption is based on the redistribution of the quarterly quotas under both allocation formulas and the fact that all four quarters in 2001 closed early. As such, this alternative should result in the same negative social impacts as Alternative 1 (section 4.1.1), i.e., this alternative is not expected to decrease existing negative social impacts.

Effects on Protected Species

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines (Table 9a). The Mid-Atlantic pot/trap and mixed trawl fisheries are Category III fisheries as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA. Additionally, as discussed in the economics subsection (above) this alternative would not result in an overall increase in quota, or an increase in overall fishing effort. However, this alternative may result in changes in landings patterns throughout the year. For example, if landings are decreased in the first quarter and increased in the second quarter, then it is possible that fishing effort could follow the same pattern. As such, this alternative is expected to have the similar impacts on protected species (section 5.4.3.1) as Alternative 1 (status quo).

Effects on Essential Fish Habitat

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines. Adding a rollover provision to the status quo measures and changing the base years is not expected to increase fishing effort or redistribute effort by gear type. The systems proposed under this alternative are just as likely to achieve the rebuilding schedule as the current system (Alternative 1: status quo). This assumption is based the redistribution of the quarterly quotas under both allocation formulas and the fact that all four quarters in 2001 closed early. However, this alternative may result in changes in landings patterns throughout the year. For example, if landings are decreased in the first quarter and increased in the second quarter, then it is possible that fishing effort could follow the same pattern. However, such a shift in effort is not expected to adversely impact EFH, relative to the status quo, since overall effort would not increase. As such, this alternative is expected to have the similar impacts on EFH as Alternative 1 (status quo).

4.1.3 Quota Allocation by Permit Category (Alternatives 3a, 3b, 3c, and 3d)

Biological Impacts

Under this set of alternatives, allocations would be made to three separate permit categories. The permit category allocations may result in a more equitable distribution of landings among user groups. Possession limits can correspond to the needs of each user group in each permit category. Allocations could be subdivided over the year. Specifically, the Council and Commission could choose to further divide the allocations by permit category into two periods, January through April and May through December. Possession limits would be established for each category and period in order to distribute landings evenly throughout the year.

Distributing landings evenly throughout the year could reduce the negative impacts to stocks of non-target species that may occur under the current system. In addition, constraining landings to the commercial quota would increase the likelihood that the target exploitation rate would be met for black sea bass and, as such, allow for stock rebuilding to continue on schedule. As such, this alternative is likely to result in positive biological impacts relative to Alternative 1 (status quo).

Economic Impacts

Under this set of alternatives, each vessel would be assigned to a permit category based on their level of participation under the allocation formulas for Alternatives 3a, 3b, 3c, or 3d. Under Alternative 3a, 52 vessels would qualify for A1 permits, 98 vessels for A2 permits, and 1,688 vessels for A3 permits based on Northeast weighout and vessel trip report data. Under Alternative 3b, the number of vessels that would qualify for A1 and A2 permits would be nearly identical to those under Alternative 3a, and the number of vessels qualifying for A3 permits would be higher than those under Alternative 3a. Under Alternatives 3c, 102 vessels would qualify for B1 permits and 1,736 vessels for B2 permits. Under Alternative 3d, the number of vessels that would qualify for B1 permits would be nearly identical to those under Alternative 3c, and the number of vessels qualifying for B2 permits would be higher than those under Alternative 3c.

The allocation for each permit category would depend on the base years used in the allocation formula (Tables 2a, 2b, 3a and 3b). Possession limits would be implemented for each sector to distribute landings throughout the year. Distributing the landings throughout the year would reduce the likelihood of market gluts would stabilize prices paid to fishermen. This set of alternatives could work to reduce the likelihood of quota overages and seasonal closures, and their associated economic burdens as described in section 4.1.1. Rebuilding of the stock would occur at a more rapid rate. An increase in stock size would also allow for increased revenues as quotas increased.

Any vessel that did not qualify for a permit category that allows them to land black sea bass at the same level as their most recent landings would experience reduced economic revenue. For example, a vessel that landed 9,000 pounds in 1998 and landed an average of 20,000 pounds in 1999 and 2000 would qualify for an A2 permit under Alternatives 3a and 3b. However, because it did not qualify for an A1 permit, this vessel would experience a reduction in revenue relative to its more recent landings.

The economic impact of these alternatives is further detailed in section 5.3, "Regulatory Impact Review (RIR) and Regulatory Flexibility Analysis (RFA)."

Overall, this alternative is likely to result in positive economic impacts relative to Alternative 1 (status quo).

Social and Community Impacts

Under this set of alternatives, possession limits could be set for each permit category relative to the level of historic participation of the vessels in that permit category. For example, in Alternative 3a, a fisherman with higher landings and a larger operation would fall under the A1 permit categories. Possession limits would most likely be the largest for these operations. By distributing landings throughout the year for each sector, this set of alternatives may reduce derby-style fishing and therefore discourage unsafe fishing practices, e.g., fishermen would not fish in unsafe weather, in order to catch a share of the quota. It may also eliminate early seasonal closures and the associated burdens of no income, e.g., an increase in unemployment. This set of alternatives may also alleviate possible inequities, as detailed in section 4.1.1, that may have occurred as landings have shifted to the north. Finally, long-term social gains would be realized by adhering to the rebuilding schedule.

Overall, this alternative is likely to result in positive social impacts relative to Alternative 1 (status quo).

Effects on Protected Species

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines (Table 9a). The Mid-Atlantic pot/trap and mixed trawl fisheries are Category III fisheries as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA. Nonetheless, this set of alternatives is not expected to change fishing effort or redistribute effort by gear type. As such, this set of alternatives is not expected to impact protected species (section 5.4.3.1).

Effects on Essential Fish Habitat

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines. This set of alternatives is not expected to change fishing effort or redistribute effort by gear type. This alternative is expected to have a greater probability of achieving the annual quota relative to the current system (Alternative 1: status quo). As such, this alternative is more likely to achieve the target mortality rates. While the stock is in the process of rebuilding, the management measures used to lower fishing mortality should translate into lower fishing effort. Once stock biomass is rebuilt, fishing effort should remain at a low level because catchability will increase at higher stock levels. A reduction in fishing effort would mean that fishing intensity should decrease, thus having a positive impact on essential fish habitat. As such, this alternative is not expected to increase existing impacts on essential fish habitat, relative to the status quo.

4.1.4 Quota Allocation to Separate Subregions (Alternatives 4a and 4b)

Biological Impacts

Under this set of alternatives, the quota would be allocated to a northern and southern subregion. Subregional allocations would recognize that there are temporal and geographic differences in the fishery north and south of the New York and New Jersey border. For example, from May through December, smaller vessels fishing closer to shore land black sea bass in the northern states and larger operations fishing further offshore land black sea bass in the southern states. Subregional quotas would be further divided into two periods, January through April and May through December, based on their respective landings years. Possession limits would be implemented to constrain each subregion to their allocation for each period and to distribute landings equitably throughout the year. Additionally, tailoring the allocations and the possession limits to characteristic of the fisheries in the subregions, could allow this alternative to be more effective at constraining landings to the commercial quota.

Distributing landings evenly throughout the year could reduce the negative impacts to the stocks of non-target species that occurs under the current system (described in section 4.1.1). Constraining landings to the commercial quota would increase the likelihood that the target exploitation rate would be met. This in turn, would allow for stock rebuilding to continue on schedule. As such this alternative is likely to result in positive biological impacts relative to Alternative 1 (status quo).

Economic Impacts

These alternatives recognize the geographical differences in the fishery that have resulted from the migratory nature of black sea bass and the historic fishing practices of different areas, e.g., the fishery operates closer to shore in the north. Possession limits would be established and modified to allow for a continuous supply of product and equitable distribution of black sea bass to fishermen throughout the year. Under a subregional system, management measures can be set according to the specific needs of the subregions. As such, this set of alternatives may discourage derby-style fishing and help distribute landings equitably throughout the year. Distributing the landings throughout the year will reduce the likelihood of an initial market glut and therefore lowered prices. This set of alternatives could make it less likely that seasonal closures would occur, eliminating the economic burdens associated with little or no income as described in section 4.1.1.

This set of alternatives could result in some distributive impacts. Under these alternatives increased landings and thus increased revenues could be experienced by vessels in the southern states (Table 4). This increase would occur as a result of a decrease in landings and revenues in the northern states. For example, based on the allocations associated with Alternative 4a and a hypothetical quota of 3,024,742 lb, landings would decrease 42% in the northern region relative to 2000 landings.

The economic impact of these alternatives is further detailed in section 5.3, "Regulatory Impact Review (RIR) and Regulatory Flexibility Analysis (RFA)."

Overall, this alternative is likely to result in positive economic impacts relative to Alternative 1 (status quo).

Social and Community Impacts

This set of alternatives would recognize regional differences in the fishery and could minimize allocation effects on traditional landings patterns. In addition, by distributing landings throughout the year, this set of alternatives may also help to discourage derby-style fishing, thus promoting safety at sea. Also, under these alternatives it would be less likely that early seasonal closures would occur, thus eliminating the social burdens associated with little or no income. Specific regional cultural and social needs of the black sea bass commercial fishery could also be met by recognizing regional differences. Finally, long-term social gains would be realized by adhering to the rebuilding schedule.

However, this distribution may have some associated negative social impacts. This set of alternatives may create confusion among fishermen that are in adjacent ports at the border between the northern and southern subregions, i.e., these adjacent ports may have different regulations.

Overall, this alternative is likely to result in positive social impacts relative to Alternative 1 (status quo).

Effects on Protected Species

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines (Table 9a). The Mid-Atlantic pot/trap and mixed trawl fisheries are Category III fisheries as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA. As discussed in the economics subsection (above) this alternative would not result in an overall increase in quota, or an increase in overall fishing effort. However, this alternative may result in changes in landings patterns along the coast. For example, if landings are decreased in the northern subregion and increased in southern subregion, it is possible that fishing effort could follow the same pattern. Since overall effort is not expected to change, this set of alternatives is not expected to have an adverse impact on protected species (section 5.4.3.1).

Effects on Essential Fish Habitat

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines. This set of alternatives is not expected to increase fishing effort or redistribute effort by gear type. This alternative is expected to have a greater probability of achieving the annual quota relative to the current system (Alternative 1: status quo). As such, this alternative is more likely to achieve the target mortality rates. As discussed in the economics subsection (above) this alternative would not result in an overall increase in quota, or an increase in overall fishing effort. However, this alternative may result in changes in landings patterns along the coast. For example, if landings are decreased in the northern subregion and increased in southern subregion, it is possible that fishing effort could follow the same pattern. This shift in landings could result in a shift in effort from a more complex and vulnerable habitat type in the northern subregion to a less vulnerable habitat type in the Mid-Atlantic subregion. Such a shift in effort may positively impact EFH.

4.1.5 State-by-State Allocations (Alternatives 5a - 5f).

4.1.5.1 State-by-state allocation alternatives (Alternatives 5a, 5b, 5c, and 5d)

Biological Impacts

A state-by-state quota system could allow for the most equitable distribution of the commercial quota to fishermen. Specifically, under this set of alternatives, states 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 state specific landing patterns using possession limits and seasons to ensure a continuous and steady supply of product over the season for producers and/or a fair an equitable distribution of black sea bass to all fishermen who have traditionally landed black sea bass in their state. 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. Thus, this system could reduce the likelihood of derby-style fishing and the associated biological and ecological impacts as described in section 4.1.1. Because of the states' ability to tailor management measures to the needs of their fishery, this set of alternatives may be more effective at constraining landings to the commercial quota thereby increasing the likelihood that the target exploitation rate would be met. Achieving the target exploitation rates would allow for stock rebuilding to continue on schedule.

Distributing landings evenly throughout the year could reduce the negative impacts to the stocks of non-target species that may occur under the current system (described in section 4.1.1). Constraining landings to the commercial quota would increase the likelihood that the target exploitation rate would be met. This in turn, would allow for stock rebuilding to continue on schedule. As such this alternative is likely to result in positive biological impacts relative to Alternative 1 (status quo).

Economic Impacts

In a state-by-state system, quotas would be distributed to the states based on their percentage share of commercial landings for the different periods. State quotas based on the four different allocation formulas under this alternative can be found in Table 133. While, this set of alternatives would not result in an overall increase in quota, it would redistribute landings among states depending on the allocation formula, such that some states may receive a higher quota allocation than their current landings level. Depending on the allocation formula, an increase in quota for some states may come at the expense of landings in other states relative to current landings levels.

Under this set of alternatives states would have the responsibility of managing their quota. States could design allocation systems based on possession limits and seasons to ensure a continuous and steady supply of product over the season for producers and/or a fair an equitable distribution of black sea bass to all fishermen who have traditionally landed black sea bass in their state. Thus, this system may reduce the likelihood of derby-style fishing effort and the associated economic impacts as described in section 4.1.1. Additionally, there would be long-term economic gains associated with stock rebuilding.

The economic impact of these alternatives is further detailed in section 5.3, "Regulatory Impact Review (RIR) and Regulatory Flexibility Analysis (RFA)."

Overall, this alternative is likely to result in positive economic impacts relative to Alternative 1 (status quo).

Social and Community Impacts

A state-by-state quota system could allow for the most equitable distribution of the commercial quota to fishermen. Under the state quotas systems states could design management measures that allow their fisheries to operate in critical periods that occur because of the market or the availability of black sea bass to the state. States could design allocation systems based on possession limits and seasons to ensure a continuous and steady supply of product over the season for producers and/or a fair an equitable distribution of black sea bass to all fishermen who have traditionally landed black sea bass in their state. This set of alternatives may eliminate derby-style fishing, and promote safety at sea. Seasonal closures would be less likely, thus eliminating the social burdens associated with little or no income. This set of alternatives could make it possible to meet specific cultural and social needs of each states' black sea bass commercial fishery.

This set of alternatives may create confusion among fishermen that are in adjacent ports and have different regulations. The state-by-state allocations may also create difficulties in the monitoring of quota in states with small allocations.

Overall, this alternative is likely to result in positive social impacts relative to Alternative 1 (status quo).

Effects on Protected Species

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines (Table 9a). The Mid-Atlantic pot/trap and mixed trawl fisheries are Category III fisheries as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA. As discussed in the economics subsection (above) this alternative would not result in an overall increase in quota, or an increase in overall fishing effort. However, this alternative may result in changes in landings patterns along the coast. For example, if landings are decreased in the northern subregion and increased in southern subregion, it is possible that fishing effort could follow the same pattern. Since overall effort is not expected to change, this set of alternatives is not expected to have an adverse impact on protected species (section 5.4.3.1).

Effects on Essential Fish Habitat

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines. This set of alternatives is not expected to increase fishing effort or redistribute effort by gear type. This alternative is expected to have a greater probability of achieving the annual quota relative to the current system (Alternative 1: status quo). As such, this alternative is more likely to achieve the target mortality rates. As discussed in the economics subsection (above) this alternative would not result in an overall increase in quota, or an increase in overall fishing effort. However, this alternative may result in changes in landings patterns along the coast. For example, if landings are decreased in the northern subregion and increased in southern subregion, it is possible that fishing effort could follow the same pattern. This shift in landings could result in a shift in effort from a more complex and vulnerable habitat type in the northern subregion to a less vulnerable habitat type in the Mid-Atlantic subregion. Such a shift in effort may positively impact EFH.

4.1.5.2 *De minimus* specifications (Alternative 5e)

Biological Impacts

This alternative would allow for an allocation of 0.1% of the annual quota to states with minimal landings. Because the overall quota would constrain landings in the fishery, de minimus specifications would be of no conservation risk to the stock as a whole. Therefore, this alternative not expected to have any biological impacts on black sea bass or other species relative to the status quo.

Economic Impacts

This alternative may have some positive economic impacts to states qualifying for *de minimus* status. If a state qualifies for *de minimus* status and receives an allocation of 0.1% of the total coastwide quota, which is larger than that state's typical landings, there will be an increase in revenue for vessels in that state. *De minimus* status for states would allow states with very small quotas to not implement a full array of management measures for what is essentially a bycatch fishery. States with *de minimus* status have stated that their catch is so small that there is no conservation reason to incur the governmental costs associated with preparing and promulgating regulations. States with *de minimus* status would be required to monitor the fishery and close the fishery when their quota was reached. This action can be expected to provide positive benefits by avoiding government costs associated with preparing and promulgating regulations for these states. Table 6 indicates that Maine is the only state that landed less than 0.1% of the total coastwide black sea bass landings for any given year during the period 1988 to 1999.

This alternative could decrease landings in other states. The potential increase in landings for states qualifying for *de minimus* status will come at the expense of vessels operating in other states. For example, if two states qualify for *de minimus* status and receive an aggregate of 0.2% of the quota, then only 99.8% of the quota will be available for the other states. When this reduction is distributed among states and vessels, on average, it is not expected to have a significant impact.

The economic impact of this alternative is further detailed in section 5.3, "Regulatory Impact Review (RIR) and Regulatory Flexibility Analysis (RFA)."

Overall, this alternative is not likely to result in a change of economic impacts relative to the status quo.

Social and Community Impacts

This alternative is not expected to have any social or community-level impacts. This action would allow fishermen from states with small quotas (less than 1% of the coastwide quota) to continue landing black sea bass in what is predominantly a bycatch fishery. Rather than discarding black sea bass, it could be sold for income. Therefore, fishermen and their communities would benefit. This action would be viewed as a fair management alternative in those states that may qualify for *de minimus* status. Thus, confidence in the overall management program for black sea bass could be reinforced. Overall, this alternative is not likely to result in a change of social impacts relative to the status quo.

Effects on Protected Species

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines. The Mid-Atlantic pot/trap and mixed trawl fisheries are Category III fisheries as defined in the

NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA. Nonetheless, this alternative is not expected to change fishing effort or redistribute effort by gear type or habitat. Since overall effort is not expected to change, this set of alternatives is not expected to have an adverse impact on protected species (section 5.4.3.1).

Effects on Essential Fish Habitat

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines. This alternative is not expected to change fishing effort or redistribute effort by gear type, relative to the current system (Alternative 1: status quo). As such, this alternative is not expected to increase existing impacts on essential fish habitat.

4.1.5.3 Coastwide quota to facilitate state-by-state allocations implemented by the Commission (Alternative 5f: preferred alternative)

Biological Impacts

The preferred alternative is a coastwide quota implemented to facilitate a state-by-state quota allocated to each state by the Commission. This alternative was chosen as the preferred alternative, because a federal coastwide quota with a state-by-state allocation system managed by the Commission, could allow for the most equitable distribution of the commercial quota to fishermen without the additional burden of federal monitoring by NMFS. Because of the states' ability to tailor management measures to the needs of their fishery, this system could reduce the likelihood of derby-style fishing and the associated biological and ecological impacts as described in section 4.1.1. Additionally, this alternative may be more effective at constraining landings to the commercial quota thereby increasing the likelihood that the target exploitation rate would be met. Achieving the target exploitation rates would allow for stock rebuilding to continue on schedule. In addition, distributing landings evenly throughout the year could reduce the negative impacts to the stocks of non-target species that may occur under the current system (described in section 4.1.1). As such this alternative is likely to result in positive biological impacts relative to Alternative 1 (status quo).

Economic Impacts

This alternative was chosen as the preferred alternative, because a federal coastwide quota to facilitate a state-by-state allocation system managed by the Commission, could allow for the most equitable distribution of the commercial quota to fishermen without the additional burden of federal monitoring by NMFS. As such, it is expected that this alternative would benefit each state's fishery. A state-by-state quota system could allow for the most equitable distribution of the commercial quota to fishermen. Under this alternative, states would have the responsibility of managing their quota. States could design allocation systems based on possession limits and seasons to ensure a continuous and steady supply of product over the season for producers and/or a fair an equitable distribution of black sea bass to all fishermen who have traditionally landed black sea bass in their state. Thus, this system may reduce the likelihood of derby-style fishing effort and the associated economic impacts as described in section 4.1.1. Additionally, there would be long-term economic gains associated with stock rebuilding.

The economic impact of these alternatives is further detailed below in section 5.3, "Regulatory Impact Review (RIR) and Regulatory Flexibility Analysis (RFA)."

Overall, this alternative is likely to result in positive economic impacts relative to Alternative 1 (status quo).

Social and Community Impacts

This alternative was chosen as the preferred alternative, because a federal coastwide quota to facilitate a state-by-state allocation system managed by the Commission, could allow for the most equitable distribution of the commercial quota to fishermen without the additional burden of federal monitoring by NMFS. This system allows states to design management measures that allow their fisheries to operate in critical periods that occur because of market conditions or the availability of black sea bass to the state. States could design allocation systems based on possession limits and seasons to ensure a continuous and steady supply of product over the season for producers and/or a fair an equitable distribution of black sea bass to all fishermen who have traditionally landed black sea bass in their state. Thus, this alternative is likely eliminate derby-style fishing, and promote safety at sea. Seasonal closures would be less likely, thus eliminating the social burdens associated with little or no income. This set of alternatives could make it possible to meet specific cultural and social needs of each states' black sea bass commercial fishery.

This alternatives may create confusion among fishermen that are in adjacent ports and have different regulations. The state-by-state allocations may also create difficulties in the monitoring of quota in states with small allocations.

Overall, this alternative is likely to result in positive social impacts relative to Alternative 1 (status quo).

Effects on Protected Species

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines (Table 9a). The Mid-Atlantic pot/trap and mixed trawl fisheries are Category III fisheries as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA. Nonetheless, this alternative is not expected to change fishing effort or redistribute effort by gear type.

The percentages adopted by the states under this alternative for 2003 and 2004 represent a compromise between the non-preferred state-by-state alternatives and the landings that occurred in the black sea bass fishery in recent years (Table 5). It is unlikely that this alternative will result in changes in landings patterns along the coast, relative to the current system, i.e., 2001 landings. As such, this alternative is not expected to change overall commercial quota or fishing effort. This alternative is expected to be more effective at constraining landings to the annual commercial quota, than the current system. By constraining landings to the annual commercial quota, this alternative may result in an overall decrease in effort. As such, this alternative is not expected to change existing impacts on protected species (section 5.4.3.1) relative to Alternative 1 (status quo).

Effects on Essential Fish Habitat

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines. This alternative is not expected to increase fishing effort or redistribute effort by gear type. This alternative is expected to have a greater probability of achieving the annual quota relative to the current system (Alternative 1: status quo). As such, this alternative is more likely to achieve the target mortality rates. This alternative would not result in an overall increase in quota, or an increase in overall fishing effort. The percentages adopted by the states under this alternative for 2003 and 2004 represent a compromise between the non-preferred state-by-state alternatives and the landings that occurred in the black sea bass fishery in recent years (Table 5). It is unlikely that this alternative will result in changes in landings patterns along the coast, relative to the current system, i.e., 2001 landings. As such, this alternative is not expected to adversely impact EFH, relative to the status quo, since overall effort would not increase.

4.1.6 Hybrid Quota System: Coastwide Quota From January through April and State-by-State Quotas May through December (Alternatives 6a, 6b, and 6c)

Biological Impacts

Weighout data indicate that the black sea bass fishery is prosecuted by different types of gear throughout the year (Table 134). Under this set of hybrid alternatives, the year is split in two periods: 1) January through April, when most of the trawl landings occur; and 2) May through December, when most of the pot/trap landings occur. Due to the mobile nature of trawl gear, it may be more suitable to manage the quota in the first period on a coastwide basis. During this period, fishermen could land black sea bass in any port along the coast. The stationary nature of pot/trap gear would make state quotas more suitable from May through December. During this second period, states would have the responsibility of managing their quota for the greatest benefit of the commercial black sea bass industry in their state. The state-by-state quota system in the second period would operate the same as the state quotas detailed in section 4.1.5. Because this system recognizes that different gear operate throughout the year, the dual period system quota system could allow for the most equitable distribution of the commercial quota to fishermen throughout the year. It could also ensure a continuous and steady supply of product over the season for producers and/or a fair an equitable distribution of black sea bass to all fishermen who have traditionally landed black sea bass in their state. Thus, this system may reduce the likelihood of derby-style fishing effort and its associated biological impacts as described in section 4.1.1. This set of alternatives could be more effective at constraining landings to the commercial quota thereby increasing the likelihood that the target exploitation rate would be met. Achieving the target exploitation rates would allow for stock rebuilding to continue on schedule.

As such this alternative is likely to result in positive biological impacts relative to Alternative 1 (status quo).

Economic Impacts

As described above, hybrid management measures can meet the specific needs of stationary and mobile gear users, and allow for a continuous supply of product and equitable distribution of black sea bass throughout the year. As such, this set of alternatives could discourage derby-style fishing and help distribute landings throughout the year. This will reduce the likelihood of derby-style fishing and the associated economic impacts as described in section 4.1.1. During the May through December time period, each state would be responsible for not exceeding their quota. Additionally, there would be long-term economic gains associated with stock rebuilding.

While this set of alternatives would not result in an overall increase in quota, it could increase allocations in both periods, compared to 2000 landings (Table 135). Additionally, this set of alternatives could redistribute landings among states in the second period (Table 136).

Some states may have quotas that are too small to monitor. If a state quota is not sufficiently monitored, late reporting and inaccurate projections could lead to late closures and an overharvest of the quota.

The economic impact of these alternatives is further detailed in section 5.3, "Regulatory Impact Review (RIR) and Regulatory Flexibility Analysis (RFA)."

Overall, this alternative is likely to result in positive economic impacts relative to Alternative 1 (status quo).

Social and Community Impacts

By allowing continuous black sea bass landings throughout the year, this set of alternatives may reduce derby-style fishing and therefore discourage unsafe fishing practices, e.g., fishermen will not fish in unsafe weather in order to catch a fair share of the quota. It may eliminate early seasonal closures and the associated social burdens of little or no income, e.g., an increase in unemployment. This set of alternatives may also help to alleviate other inequities reviewed in section 4.1.1 related to the shift in landings to the north. Finally, long-term social gains would be realized by adhering to the rebuilding schedule.

However, this set of alternatives may create confusion among fishermen that are in adjacent ports in the second period as the result of different regulations in neighboring states.

Overall, this alternative is likely to result in positive social impacts relative to Alternative 1 (status quo).

Effects on Protected Species

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines (Table 9a). The Mid-Atlantic pot/trap and mixed trawl fisheries are Category III fisheries as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA. As discussed in the economics subsection (above) this alternative would not result in an overall increase in quota, or an increase in overall fishing effort. However, this alternative may result in changes in landings patterns throughout the year and along the coast. For example, if landings are decreased in the first quarter and increased in the second quarter, then it is possible that fishing effort could follow the same pattern. Since overall effort is not expected to change, this set of alternatives is not expected to have an adverse impact on protected species (section 5.4.3.1).

Effects on Essential Fish Habitat

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines. This set of alternatives is not expected to increase fishing effort or redistribute effort by gear type. This alternative is expected to have a greater probability of achieving the annual quota relative to the current system (Alternative 1: status quo). As such, this alternative is more likely to achieve the target mortality rates. As discussed in the economics subsection (above) this alternative would not result in an overall increase in quota, or an increase in overall fishing effort. However, this alternative may result in changes in landings patterns throughout the year and along the coast. For example, if landings are decreased in first quarter and increased in the second quarter, then it is possible that fishing effort could follow the same pattern. Such a shift in effort is not expected to adversely impact EFH, relative to the status quo, since overall effort would not increase. If this alternative resulted in a shift in effort from a more complex and vulnerable habitat type in the northern subregion to a less vulnerable habitat type in the Mid-Atlantic subregion, this set of alternatives could positively impact EFH.

4.1.7 Hybrid Quota System: Coastwide Quota From January Through April and Subregional Quotas May Through December (Alternatives 7a and 7b)

Biological Impacts

Weighout data indicate that the black sea bass fishery is prosecuted by different types of gear throughout the year (Table 134). Under this set of hybrid alternatives the year is split in two periods: 1) January through April, when most trawl landings of black sea bass occur; and 2) May through December, when most pot/trap landings of black sea bass occur. Due to the mobile nature of trawl gear, it may be more suitable to manage the quota in the first period on a coastwide basis. During this period, fishermen could land black sea bass in any port along the coast. The stationary nature of pot/trap gear may make subregional quotas more suitable from May through December. During this period pot/trap fishermen could land in any port in their subregion. Using subregional quotas in the second period the Council and Commission can create management measures that meet the specific geographic needs of each subregion. NMFS would have the responsibility of managing the quotas for each subregion. This system could eliminate the quota monitoring problem associated with state quotas in the second period.

This dual period system quota system could allow for a more equitable distribution of the commercial quota to fishermen throughout the year by ensuring a continuous and steady supply of product over the season for producers and/or a fair an equitable distribution of black sea bass to all fishermen who have traditionally landed black sea bass in their subregions. Thus, this system could reduce the likelihood of derby-style fishing and the associated biological and ecological impacts as described in section 4.1.1. Because this alternative could allow for a more equitable allocation of the quota , this set of alternatives could be more effective at constraining landings to the commercial quota. Thus, this set of alternatives is not expected to alter the rebuilding schedule and, as such, have any negative biological effects.

Distributing landings evenly throughout the year could reduce the negative impacts to the stocks of non-target species that occurs under the current system (described in section 4.1.1).

Economic Impacts

As described above, a hybrid management system could meet the specific needs of stationary and mobile gear users by allowing for a continuous supply of product and equitable distribution of black sea bass throughout the year. As such, this set of alternatives could discourage derby-style fishing and help distribute landings evenly throughout the year. This may reduce the likelihood of derby-style fishing and its associated economic impacts (described in section 4.1.1). Additionally, there would be long-term economic gains associated with stock rebuilding.

While, this set of alternatives would not result in an overall increase in quota, it could increase allocations in both time periods compared to 2000 landings (Table 137). However, the allocation under this set of alternatives may redistribute landings among subregions in the second period. Landings in the southern subregion could experience an increase in landings and revenues at the expense of the northern subregions.

The economic impact of these alternatives is further detailed in section 5.3, "Regulatory Impact Review (RIR) and Regulatory Flexibility Analysis (RFA)."

Overall, this alternative is likely to result in positive economic impacts relative to Alternative 1 (status quo).

Social and Community Impacts

This set of alternatives may discourage derby-style fishing by distributing landings equitably throughout the year. Distributing landings throughout the year could eliminate derby-style fishing and promote safety at sea. This set of alternatives could make it less likely that seasonal closures would occur, eliminating the social burdens of fishermen with little or no income. It could also make it possible to meet specific regional cultural and social needs of each subregion's black sea bass commercial fishery. Finally, long-term social gains would be realized by adhering to the rebuilding schedule.

However, this set of alternatives may create confusion among fishermen that are in adjacent ports in the second period as the result of different regulations in neighboring states.

Overall, this alternative is likely to result in positive social impacts relative to Alternative 1 (status quo).

Effects on Protected Species

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines. The Mid-Atlantic pot/trap and mixed trawl fisheries are Category III fisheries as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA. As discussed in the economics subsection (above) this alternative would not result in an overall increase in quota, or an increase in overall fishing effort. However, this alternative may result in changes in landings patterns throughout the year and along the coast. For example, if landings are decreased in the first quarter and increased in the second quarter, then it is possible that fishing effort could follow the same pattern. Since overall effort is not expected to change, this set of alternatives is not expected to have an adverse impact on protected species (section 5.4.3.1).

Effects on Essential Fish Habitat

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines. This set of alternatives is not expected to increase fishing effort or redistribute effort by gear type. This alternative is expected to have a greater probability of achieving the annual quota relative to the current system (Alternative 1: status quo). As such, this alternative is more likely to achieve the target mortality rates. As discussed in the economics subsection this alternative would not result in an overall increase in quota, or an increase in overall fishing effort. However, this alternative may result in changes in landings patterns throughout the year and along the coast. For example, if landings are decreased in first quarter and increased in the second quarter, then it is possible that fishing effort could follow the same pattern. Such a shift in effort is not expected to adversely impact EFH, relative to the status quo, since overall effort would not increase. If this alternative resulted in a shift in effort from a more complex and vulnerable habitat type in the northern subregion to a less vulnerable habitat type in the Mid-Atlantic subregion, this set of alternatives could positively impact EFH.

4.1.8 Allocation by Gear Type (Alternatives 8a and 8b)

Biological Impacts

Allocation by gear type would allow for possession limits that are unique to each gear type. This eliminates the negative biological impacts described in section 4.1.1. Individual possession limits by gear type may allow this alternative to be more effective at constraining landings to the commercial quota. Thus, this set of alternatives is not expected to alter the rebuilding schedule. As such, this alternative would have biological impacts, relative to the status quo.

While distributing landings evenly throughout the year could reduce the negative impacts to the stocks of non-target species that occurs under the current system (described in section 4.1.1), this alternative could redistribute effort among fishing gear. Such a change could result in a change in impact to non-target species, relative to the status quo. However, constraining landings to the commercial quota would increase the likelihood that the target exploitation rate would be met. This in turn, would allow for stock rebuilding to continue on schedule. As such this alternative is likely to result in positive biological impacts to the black sea bass stock, and unknown impacts to non-target species, relative to Alternative 1 (status quo).

Economic Impacts

Under this set of alternatives the quota would be allocated by gear type. As with the other systems the percentage allocations would be based on two different allocation formulas (Table 9a). The percentages by gear type would range from 0.40% for gillnets to 45.82% for bottom/midwater trawls. Possession limits would be tailored to each gear type to ensure that the landings were constrained to the allocation. Since the quota would apply throughout the management unit, including both state and federal waters, all commercial landings would count toward the quota for each respective gear. To allow for equitable distribution of landings to the northern and southern contingents of the fishery, further allocation could be required by period. For, example, the trawl gear allocation could be allocated by quarter and possession limits calculated to allow landings over the period. If this system could sufficiently constrain landings for each gear then this system may discourage derby-style fishing effort and its associated economic impacts as described in section 4.1.1.1. While this set of alternatives would not increase the overall quota, it could redistribute landings among the gear types relative to 2000 landings (Table 138). Additionally, there would be long-term economic gains associated with stock rebuilding.

This set of alternatives could have a positive impact on bottom/midwater trawls, relative to their 2000 landings under the quarterly quota system since bottom/midwater trawls could land up 75% more black sea bass relative to their 2000 landings. Pots/traps would only receive a relatively slight increase. The projected increase in landings by bottom/midwater trawls and pots/traps would come at the expense of gillnets, lines, and other gear. The projected landings for these gear is less than their 2000 landings (Table 9a). The current distribution of quota among gear types is an indication of the current regulations. For example, restrictive fishing limits, favor smaller fishing operations that fish closer to shore. These smaller operations would use gillnets, lines, and other gear.

There could be difficulty in administering the allocation by gear type if a significant number of fishermen use multiple gears. Additionally, the allocations could be difficult to monitor. Some gear types would receive very small portions of the quota. If the quota is further broken down into periods, there could be problems associated with monitoring small quotas. If a small quota is not sufficiently monitored, late reporting and inaccurate projections could lead to late closures and an overharvest of the quota.

The economic impact of this alternative is further detailed in section 5.3, "Regulatory Impact Review (RIR) and Regulatory Flexibility Analysis (RFA)."

Overall, this alternative is likely to result in positive economic impacts relative to Alternative 1 (status quo).

Social and Community Impacts

This set of alternatives could distribute landings equitably amongst the historic participants. This could result in a benefit to larger vessels and those ports and communities whose fisheries are farther from shore. This allocation may also help to distribute landings equitably along the coast and may discourage derby-style fishing by distributing landings equitably throughout the year.

Distributing landings throughout the year could eliminate derby-style fishing and promote safety at sea. This set of alternatives would make it less likely that seasonal closures would occur, eliminating the burdens associated with little or no income. Under this allocation it may be possible to meet specific needs of different sectors of the black sea bass commercial fishery. Finally, long-term social gains would be realized by adhering to the rebuilding schedule.

This alternative is expected to have a negative impact on smaller operations and those communities whose operations are closer to shore, for example operations in northern states. If the quota is also split by periods then the small quota allocations may be difficult to monitor possibly causing an overharvest of the quota.

Overall, this alternative is likely to result in positive social impacts relative to Alternative 1 (status quo).

Effects on Protected Species

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines. The Mid-Atlantic pot/trap and mixed trawl fisheries are Category III fisheries as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. This set of alternatives could change fishing effort or redistribute effort by gear type (Table 9a). However, all fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA. As such, this set of alternatives is not expected to impact protected species (section 5.4.3.1).

As discussed in the economics subsection (above) this alternative would not result in an overall increase in quota, or an increase in overall fishing effort. However, this alternative may result in changes in landings patterns among fishing gear type. For example, if landings increase for bottom otter trawls and pots/traps and decrease for gillnets, lines, and other gear, it is possible that fishing effort could follow the same pattern. Such a shift in effort may have a positive impact on protected resources, relative to the status quo, because the pot/trap and mixed trawl fisheries are category III fisheries while the gillnet fishery is a category II fishery, which means that it can cause occasional serious injuries and mortalities to marine mammals.

Effects on Essential Fish Habitat

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines. This alternative is expected to have a greater probability of achieving the annual quota relative to the current system (Alternative 1: status quo).

As discussed in the economics subsection (above) this alternative would not result in an overall increase in quota, or an increase in overall fishing effort. However, this alternative may result in changes in landings patterns among fishing gear type. For example, if landings increase for bottom otter trawls and pots/traps and decrease for gillnets, lines, and other gear, it is possible that fishing effort could follow the same pattern. Such a shift in effort may have a negative impact on EFH, relative to the status quo, because, as described in section 3.2.7.1, bottom tending mobile gear and may have a greater adverse impact on benthic habitat relative to gillnets.

4.1.9 Permit Requirements for Fishermen That Have Both a Northeast Black Sea Bass Commercial Permit and a Southeast Snapper/Grouper Permit (Alternatives 9a and 9b)

4.1.9.1 Status quo (Alternative 9a)

The status quo alternative requires a fishermen to surrender their NER BSB permit for 6 months if they wish to catch and land black sea bass south of Cape Hatteras, during a black sea bass closure in the northeast region.

Biological Impacts

Permit data from the Northeast and Southeast Region indicate that this requirement affects 5 vessels which held both a NER BSB permit and a SER S/G permit in 2000. Maintaining the 6 month requirement would not alter the rebuilding schedule and is not expected to have any biological impacts on black sea bass or non-target species.

Economic Impacts

Requiring 5 vessels to surrender their NER BSB permit for six months, in order to fish for black sea bass south of Cape Hatteras during a northeast black sea bass closure, places an unnecessary burden on these 5 vessels. Therefore, this alternative has economic impacts on these vessels. However, this alternative is not expected to have any economic impacts on other participants in the black sea bass fishery.

The economic impact of these alternatives is further detailed in section 5.3, "Regulatory Impact Review (RIR) and Regulatory Flexibility Analysis (RFA)."

Social Impacts

This alternative could affect the traditional fishing practices of the 5 vessels that are affected by this permit requirement and, as such, it could affect the communities in which they land black sea bass or to which they supply black sea bass. However, this alternative is not expected to cause any social impacts on the overall black sea bass fishery. It is not expected to have any impacts on the majority of the communities that are dependent on black sea bass.

Effects on Protected Species

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines. The Mid-Atlantic pot/trap and mixed trawl fisheries are Category III fisheries as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA. Nonetheless, this alternative is not expected to change fishing effort or redistribute effort by gear type. As such, this alternative is not expected to impact protected species (section 5.4.3.1).

Effects on Essential Fish Habitat

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines. This set of alternatives is not expected to change fishing effort or redistribute effort by gear type, relative to the current system. As such, this alternative is not expected to increase existing impacts on essential fish habitat.

4.1.9.2 Remove the permit restriction on fishermen with both a Northeast Black Sea Bass Commercial Permit and a Southeast Snapper/Grouper Permit (Alternative 9b: preferred alternative)

This alternative would remove the restriction on black sea bass fishermen with both a NER BSB permit and SER S/G permit. This restriction requires a fishermen to surrender the NER BSB permit for 6 months if they wish to catch and land black sea bass south of Cape Hatteras, during a black sea bass closure in the northeast region.

Biological Impacts

Permit data from the Northeast and Southeast Region indicate that this requirement only affects 5 vessels which held both a NER BSB and a SER S/G permit in 2000. Given this small number of vessels, it is highly unlikely that landings in excess of the quota could occur. Additionally, these vessels would be fishing on two separate stocks. Removing the permit requirement would not impact the status of either stock negatively. As such, this alternative will not alter the rebuilding schedule nor will it impact non-targeted species.

Overall, this alternative is not expected to cause any negative biological impacts relative to the status quo.

Economic Impacts

Data from the Northeast region permit database and Southeast region database indicate that 5 vessels held both a NER BSB permit and a SER S/G permit sometime in the calendar year 2000. These 5 vessels could experience an economic benefit by not having to give up a their NER BSB permit for six months during a closure, in order to fish for black sea bass south of Cape Hatteras. This may allow these vessels to continue to fish for black sea bass without an interruption in revenue.

This alternative is not expected to affect the overall revenue associated with the black sea bass fishery or the majority of the vessels with NER BSB permits.

Overall, this alternative is not expected to cause any negative economic impacts relative to the status quo.

The economic impact of these alternatives is further detailed in section 5.3, "Regulatory Impact Review (RIR) and Regulatory Flexibility Analysis (RFA)."

Social and Community Impacts

This alternative could allow the 5 vessels currently affected by the NER BSB permit restriction to continue their traditional fishing practices. As such, this alternative could have a positive impact on the communities in which these 5 vessels land black sea bass.

Fishermen (located in Virginia and North Carolina) indicate that this restriction creates undue hardship on those that possess both permits because they fish south of Cape Hatteras during northeast closures. These fishermen are fishing on two different stocks of fish, therefore the current regulations have no apparent benefit to the stock. It is not possible to ensure that these 5 vessels are fishing for "southern" black sea bass during closures in the northeast region. However, it seems that fishing for black sea bass in the northeast region when the fishery is closed and taking the fish to the southern region to be landed, would considerably reduce or eliminate profits due to steaming time. Therefore, this activity is not likely to occur (i.e., therefore, not affecting the recovery of the northern stock).

This alternative is not expected to impact the overall social components of the black sea bass fishery, nor is it expected to have an impact on the majority of the communities that are dependent upon black sea bass. Overall, this alternative is not expected to cause any negative social impacts relative to the status quo.

Effects on Protected Species

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines (Table 9a). The Mid-Atlantic pot/trap and mixed trawl fisheries are Category III fisheries as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA. This alternative only affects 5 fishing vessels and is not expected to increase fishing effort or redistribute effort by gear type. As such, alternative is not expected to impact protected species (section 5.4.3.1) relative to the status quo.

Effects on Essential Fish Habitat

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines. This alternative only affects 5 fishing vessels and is not expected to change fishing effort or redistribute effort by gear type, relative to the current system (Alternative 1: status quo). As such, this alternative is not expected to increase existing impacts on essential fish habitat.

4.1.10 Prohibit the Wet Storage of Black Sea Bass Pots/Traps During a Closure (Alternatives 10a, 10b, and 10c)

The following analyses are qualitative. The Council does not currently have the information to quantitatively analyze these alternatives.

4.1.10.1 Status quo (Alternative 10a: preferred alternative)

Biological Impacts

Currently there are no restrictions placed on black bass pots/traps during a closure. When the fishery closes fishermen can leave the pots/traps in the water allowing the pots/traps to continue to fish. Discards of black sea bass and non-target species could increase when fishermen leave their pots/traps in the water during a closure. An increase in black sea bass discards could have a negative impact on stock status. However, information received during the public hearing process indicates that fishermen tend their pots/traps regularly during black sea bass closures in order to land other species. Additionally, the coastwide quota with state-by-state allocations managed by the Commission and adopted in this amendment is expected to distribute landings evenly, keeping the black sea bass fishery open throughout the year. As such, the negative biological impacts associated with the current regulations are not expected to occur under the new management system.

Economic Impacts

Under current regulations, fishermen allow their pots/traps to continue to fish during a closure. If the fish survive the closure period, they are landed at the beginning of the next quarter, creating a market glut and increasing the likelihood of an early closure for that quarter. If fish do not survive the closure and are discarded the target mortalities may not be met and rebuilding would slow. However, the coastwide quota with state-by-state allocations managed by the Commission and adopted in this amendment is expected to distribute landings evenly, keeping the black sea bass fishery open throughout the year. As such, the negative economic impacts associated with the current regulations are not expected to occur under the new management system.

The economic impact of these alternatives is further detailed in section 5.3, "Regulatory Impact Review (RIR) and Regulatory Flexibility Analysis (RFA)."

Social and Community Impacts

Under current regulations, fishermen could allow their pots/traps to fish throughout a seasonal closure and land the black sea bass the following quarter. This practice could increase the likelihood on an early seasonal closure in the following quarter and the associated social impacts as described in section 4.1.1. However, information received during the public hearing process indicates that fishermen tend their pots/traps regularly during black sea bass closures, in order to land other species. Additionally, the coastwide quota with state-by-state allocations managed by the Commission and adopted in this amendment is expected to distribute landings evenly, keeping the black sea bass fishery open throughout the year. As such, the negative social impacts associated with the current regulations are not expected to occur under the new management system.

Effects on Protected Species

Fish pots/traps are one of the primary gear to land black sea bass in the Mid-Atlantic (Table 9a). The Mid-Atlantic pot/trap fishery is a Category III fishery as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP and the HPTRP, including the requirement that pots/traps in regulated waters must be hauled out of the water at least once every 30 days [50 CFR Part 229.32 (c)(2)]. As such, the current system is not expected to impact protected species (section 5.4.3.1).

Effects on Essential Fish Habitat

Section 3.2.7.1 states that pots/traps may result in impacts that are minimal. It is important to note that under the current system, all pots/traps must be hauled out of the water at least once every 30 days due to a LWTRP requirement. As such, the current system is expected to have minimal negative impacts on essential fish habitat.

4.1.10.2 Prohibit the wet storage of black sea bass pots/traps during a closure of longer than two weeks (Alternative 10b)

Biological Impacts

Under this alternative, fishermen would be required to remove their black sea pots/traps during a closure of longer than two weeks. This requirement could reduce the bycatch of black sea bass and non-target species. As such, this alternative could have positive biological impacts relative to the current system.

Economic Impacts

Under this alternative fishermen would be required to remove pots/traps during a closure of longer than two weeks. Anecdotal reports indicate that some fishermen fish up to 2500 pots/traps and that the removal of an average number of black sea bass pots/traps takes approximately two weeks. It also takes about two weeks to place black sea pots/traps in the ocean. Factors that constrain black sea bass pot/trap fishermen include the distance they have to travel to collect pots/traps and the number of pots/traps they can carry on their boat at any one time. Time and resources, such as gas, that would be required to remove and deploy pots/traps, as the result of a closure, may increase operating costs relative to the current regulations. Adverse economic impacts may also occur due to delay in pots/trap deployment due to bad weather once a closure ends. Furthermore, fishermen may lose valuable bycatch if forced to remove pots/traps during a closure. Additionally, this alternative may advantage smaller vessels, where the deployment and removal of gear is not as costly. As such, this alternative may cause short-term negative economic impacts to fishermen with larger operations.

The economic impact of this alternative is further detailed in section 5.3, "Regulatory Impact Review (RIR) and Regulatory Flexibility Analysis (RFA)."

Social and Community Impacts

Requiring that fishermen remove their black sea pots/traps during a closure of longer than two weeks may preclude fishermen from participating in other fisheries. Additionally, this alternative may advantage smaller operations and those fisheries that are located closer to shore. The deployment and removal of gear for such operations may not be as costly or timely as it would be for fishermen who fish further offshore. As such, this alternative may have short-term negative social and community-level impacts.

Effects on Protected Species

Fish pots/traps are one of the primary gear to land black sea bass in the Mid-Atlantic (Table 9a). The Mid-Atlantic pot/trap fishery is a Category III fishery as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA including the requirement that pots/traps in regulated waters must be hauled out of the water at least once every 30 days [50 CFR Part 229.32 (c)(2)]. A prohibition of wet storage of black sea bass pots/traps may further reduce the interactions between right whales, other marine mammals, and sea turtles. As such, this alternative may have positive impacts to protected species (section 5.4.3.1), relative to the current system.

Effects on Essential Fish Habitat

Section 3.2.7.1 states that pots/traps may result in impacts that are minimal. Additionally, if pots/traps were required to be hauled and deployed during closures it is unlikely that pots/traps will be returned to the exact same footprint from whence they came. Thus, for hard bottom habitats, lifting and deploying pots/traps multiple times may actually damage more habitat than if the pots/traps are left in the water. However, in sandy bottoms the effects of pots/traps may be minimal. It is important to note that under the current system, all pots/traps must be hauled out of the water at least once every 30 days due to a MMPA requirement. This alternative may have negative impacts to EFH relative to the current system.

4.1.10.3 Prohibit the wet storage of black sea bass pots/traps during a closure of longer than four weeks (Alternative 10c)

Biological Impacts

Under this alternative, fishermen would be required to remove their black sea pots/traps during a closure of longer than four weeks. This requirement could help to reduce the bycatch of black sea bass and non-target species. As such, this alternative could have positive biological impacts, relative to the status quo.

Economic Impacts

Under this alternative fishermen would be required to remove pots/traps during a closure of longer than four weeks. Anecdotal reports indicate that some fishermen fish up to 2500 pots/traps and that the removal of an average number of black sea bass pots/traps takes approximately two weeks. It also takes about two weeks to place black sea pots/traps in the ocean. Factors that constrain black sea bass pot/trap fishermen include the distance they have to travel to collect pots/traps and the number of pots/traps they can carry on their boat at any one time. Time and resources, such as gas, that would be required to remove and deploy pots/traps, as the result of a closure, may increase operating costs relative to the current regulations. Time and resources, such as gas, that would be required to remove and deploy traps may increase operating costs relative to the current regulations. Furthermore, fishermen could lose valuable bycatch if forced to remove pots/traps during a closure. Additionally, this alternative could advantage smaller vessels, where the deployment and removal of gear is not as costly. As such, this alternative could cause negative economic impacts to fishermen with larger operations.

The economic impact of this alternative is further detailed in section 5.3, "Regulatory Impact Review (RIR) and Regulatory Flexibility Analysis (RFA)."

Social and Community Impacts

Requiring that fishermen remove their black sea pots/traps during a closure of longer than four weeks could preclude fishermen from participating in other fisheries. Additionally, this alternative could advantage smaller operations and those fisheries that are located closer to shore. The deployment and removal of gear for such operations may not be as costly or timely as it would be for fishermen who fish further offshore. As such, this alternative could have a negative social and community-level impacts.

Effects on Protected Species

Fish pots/traps are one of the primary gear to land black sea bass in the Mid-Atlantic (Table 9a). The Mid-Atlantic pot/trap fishery is a Category III fishery defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA, including the requirement that pots/traps in regulated waters must be hauled out of the water at least once every 30 days [50 CFR Part 229.32 (c)(2)]. However, a prohibition of wet storage of black sea bass pots/traps may have positive impacts to protected species (section 5.4.3.1), relative to the status quo.

Effects on Essential Fish Habitat

Section 3.2.7.1 that pots/traps may result in impacts that are minimal. Additionally, if pots/traps were required to be hauled and deployed during closures it is unlikely that pots/traps will be returned to the exact same footprint from whence they came. Thus, for hard bottom habitats, lifting and deploying pots/traps multiple times may actually damage more habitat than if the pots/traps are left in the water. However, in sandy bottoms the effects of pots/traps may be minimal. It is important to note that under the current system, all pots/traps must be hauled out of the water at least once every 30 days due to a MMPA requirement. This alternative may have negative impacts relative to the current system.

4.1.11 Black Sea Bass Pot/Trap Tag Program (Alternatives 11a and 11b)

The following analyses are qualitative. The Council does not currently have the information to quantitatively analyze this alternative.

4.1.11.1 Status quo: no pot/trap tag program (Alternative 11a: preferred alternative)

Biological Impacts

The current FMP does not require a pot/trap tag program. The lack of a pot/trap tag program will not alter the rebuilding schedule nor will it increase the catch of non-target species. As such, the current system has no biological impacts.

Economic Impacts

The lack of a pot/trap tag program does not have any economic impacts.

Social and Community Impacts

The lack of a pot/trap tag program does not have any social or community-level impacts.

Effects on Protected Species

Fish pots/traps are one of the primary gear to land black sea bass in the Mid-Atlantic (Table 9a). The Mid-Atlantic pot/trap fishery is a Category III fishery as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA. As such, the current system does not impact protected species (section 5.4.3.1).

Effects on Essential Fish Habitat

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines. This alternative is not expected to change fishing effort or redistribute effort by gear type. As such, the current system does not impact essential fish habitat.

4.1.11.2 A tag requirement for black sea bass pots/traps (Alternative 11b)

Biological Impacts

By requiring trap tags, this alternative is not expected to have any biological impacts. It will not alter the rebuilding schedule, nor will it increase the catch of non-target species. As such, the current system may not have any biological impacts relative to the status quo.

Economic Impacts

This alternative will require NMFS to implement a pot/trap tag program. Costs of implementing the program will include the cost of tags and the administration of the program. Fishermen will be required to purchase tags. The cost of trap tags to fishermen would likely be close to that under the lobster FMP (i.e., $0.14/tag). In addition, there would be a cost to fishermen associated with application for tags. As such, this alternative may have economic impacts, relative to the status quo.

The economic impact of this alternative is further detailed in section 5.3, "Regulatory Impact Review (RIR) and Regulatory Flexibility Analysis (RFA)."

Social and Community Impacts

This alternative is not expected to have any social or community-level impacts, relative to the status quo.

Effects on Protected Species

Fish pots/traps are one of the primary gears that lands black sea in the Mid-Atlantic (Table 9a). The Mid-Atlantic pot/trap is a Category III fishery as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA. Nonetheless, this alternative is not expected to change fishing effort or redistribute effort by gear type. If fishing effort by gear type does not change then impact on habitat is also not expected to change. As such, this alternative is not expected to impact protected species (section 5.4.3.1), relative to the status quo.

Effects on Essential Fish Habitat

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines. This alternative is not expected to change fishing effort or redistribute effort by gear type. As such, this alternative is not expected to increase existing impacts on essential fish habitat, relative to the status quo.

4.1.12 Limit the Number of Pot/Traps Fished by Fishermen (Alternatives 12a, 12b, 12c)

The following analyses are qualitative. Anecdotal reports indicate that some fishermen may fish up to 2500 pots/traps in a season. However, the Council does not currently have the information to quantitatively analyze the following alternatives.

4.1.12.1 Status quo: no restriction on the number of pots/traps fished by fishermen (Alternative 12a: preferred alternative)

Biological Impacts

Currently there is no limit to the number of pots/traps that a fisherman can use. Although, it is difficult to predict the behavior of fishermen, the current system could result in increased fishing effort for black sea bass and an increase in the catch of nontarget species. Although possession limits would continue to constrain landings to the quota, increased effort could impede the rebuilding schedule, having an adverse impact on the stock. Without information on the number of pots/traps fished by fishermen, the biological impacts cannot be analyzed.

Economic Impacts

Currently there is no limit to the number of pots/traps that a fisherman can use. Although, it is difficult to predict the behavior of fishermen, the current system could result in increased fishing effort for black sea bass and an increase in the catch of nontarget species. Although possession limits would continue to constrain landings to the quota, increased effort could impede the rebuilding schedule, having an adverse impact on the stock. Increased fishing effort by pots/traps could also redistribute landings among gear types. Without information on the number of pots/traps fished by fishermen, the economic impacts cannot be analyzed.

The economic impact of this alternative is further detailed in section 5.3, "Regulatory Impact Review (RIR) and Regulatory Flexibility Analysis (RFA)."

Social and Community Impacts

Currently there is no limit to the number of pots/traps that a fisherman can use. Although, it is difficult to predict the behavior of fishermen, the current system could result in increased fishing effort for black sea bass and an increase in the catch of nontarget species. Increased effort could impede the rebuilding schedule having an adverse impact on the stock. Adverse impacts on the stock could result in long-term negative social impacts. Although possession limits would continue to constrain landings to the quota, increased fishing effort by pots/traps could also redistribute landings among gear types. Without information on the number of pots/traps fished by fishermen, the social impacts cannot be analyzed.

Effects on Protected Species

Fish pots/traps are one of the primary gear to land black sea bass in the Mid-Atlantic (Table 9a). The Mid-Atlantic pot/trap fishery is Category III fishery as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA. Currently there is no limit to the number of pots/traps that a fisherman can use. Although, it is difficult to predict the behavior of fishermen, the current system could result in increased fishing effort or by this gear type. As such, this alternative may have negative impacts on protected species (section 5.4.3.1).

Effects on Essential Fish Habitat

Currently there is no limit to the number of pots/traps that a fisherman can use. This gear is currently not expected to negatively impact EFH. Although, it is difficult to predict the behavior of fishermen, there is lack of control on pot/trap effort. Without information on the number of pots/traps fished by fishermen, the EFH impacts cannot be analyzed.

4.1.12.2 Limit fishermen to no more than 400 black sea bass pots/traps (Alternative 12b)

This alternative would limit black sea bass fishermen to no more than 400 black sea bass pots/traps. It is difficult to predict the change in fishing behavior as a result of this alternative, i.e.,, fishermen that currently use less than 400 traps may increase their effort by using more traps and/or fishermen with more than 400 traps may increase their effort by fishing more frequently. Analyses are complicated by the lack of information on the number of traps currently fished by fishermen. However, anecdotal reports indicate that some fishermen fish up to 2,500 pots/traps.

Biological Impacts

Without being able to predict fishing behavior as a result of the trap limit, it is difficult to assess the affect that this alternative would have on fishing effort. Although possession limits would continue to constrain landings to the quota, an increase in fishing effort as a result of this alternative could result in increased discards of black sea bass and non-targeted species. As such, this alternative could have a negative impact on the rebuilding schedule and the status of the black sea bass stock, as well as the status of non-target species. If fishing effort decreases as a result of this alternative then discards of black sea bass and non-targeted species could decrease, resulting in a greater chance of achieving the target fishing mortalities. As such, this alternative could have positive or negative biological impacts, relative to the status quo.

Economic Impacts

Without being able to predict fishing behavior as a result of the trap limit, it is difficult to assess the effect that this alternative would have on the economic components of the environment. This alternative is not expected to increase or decrease landings because possession limits would continue to constrain landings to the quota. As such, this alternative is not expected to have negative economic impacts, relative to the status quo.

The economic impact of this alternative is further detailed in section 5.3, "Regulatory Impact Review (RIR) and Regulatory Flexibility Analysis (RFA)."

Social and Community Impacts

Without being able to predict fishing behavior as a result of the trap limit, it is difficult to assess the social or community-level impacts of this alternative, relative to the status quo.

Effects on Protected Species

Fish pots/traps are one of the primary gear to land black sea bass in the Mid-Atlantic (Table 9a). The Mid-Atlantic pot/trap fishery is a Category III fishery as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA. Without being able to predict fishing behavior as a result of the trap limit, it is difficult to assess if this alternative will result in an increase or a decrease of fishing effort. If fishing effort does not change then this alternative is not expected to impact protected species (section 5.4.3.1). If fishing effort increases as a result of this alternative than there may be a negative impact on protected species (section 5.4.3.1), because the number of vertical lines in the water could increase. If fishing effort decreases relative to this alternative there may be a positive impacts on protected species because the number of vertical lines in the water could decrease.

Effects on Essential Fish Habitat

Fish pots/traps can damage structured habitat, which is essential fish habitat for scup and black sea bass. If fishing effort increases as a result of this alternative, there may be an increase negative impact of traps on essential fish habitat. If fishing effort decreases as a result of this alternative, this alternative may be a decrease of negative impacts on essential fish habitat, e.g., enhanced availability of undisturbed habitat, and a reduction in "ghost gear." Without being able to predict fishing behavior as a result of the trap limit, it is difficult to assess the impact of this alternative on essential fish habitat, relative to the status quo.

4.1.12.3 Limit fishermen to no more than 800 black sea bass pots/traps (Alternative 12c)

This alternative would limit black sea bass fishermen to no more than 800 black sea bass pots/traps. It is difficult to predict the change in fishing behavior as a result of this alternative, i.e,, fishermen with less than 800 traps may increase their effort by using more traps and/or fishermen with more than 800 traps may increase their effort by fishing more frequently. Analyses are complicated by the lack of information on the number of traps currently fished by fishermen. However, anecdotal reports indicate that some fishermen fish up to 2,500 pots/traps.

Biological Impacts

Without being able to predict fishing behavior as a result of the trap limit, it is difficult to assess the affect that this alternative would have on fishing effort. Although possession limits would continue to constrain landings to the quota, an increase in fishing effort as a result of this alternative could result in increased discards of black sea bass and non-targeted species. As such, this alternative could have a negative impact on the rebuilding schedule and the status of the black sea bass stock, as well as the status of non-target species. If fishing effort decreases as a result of this alternative then discards of black sea bass and non-targeted species could decrease, resulting in a greater chance of achieving the target fishing mortalities. As such, this alternative could have positive or negative biological impacts, relative to the status quo.

Economic Impacts

Without being able to predict fishing behavior as a result of the trap limit, it is difficult to assess the effect that this alternative would have on the economic components of the environment. This alternative is not expected to increase or decrease landings because possession limits would continue to constrain landings to the quota. As such, this alternative is not expected to have negative economic impacts, relative to the status quo.

The economic impact of this alternative is further detailed in section 5.3, "Regulatory Impact Review (RIR) and Regulatory Flexibility Analysis (RFA)."

Social and Community Impacts

Without being able to predict fishing behavior as a result of the trap limit, it is difficult to assess the social or community-level impacts of this alternative, relative to the status quo.

Effects on Protected Species

Fish pots/traps are one of the primary gear to land black sea bass in the Mid-Atlantic (Table 9a). The Mid-Atlantic pot/trap fishery is a Category III fishery as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA. Without being able to predict fishing behavior as a result of the trap limit, it is difficult to assess if this alternative will result in an increase or a decrease of fishing effort. If fishing effort does not change then this alternative is not expected to impact protected species of (section 5.4.3.1). If fishing effort increases as a result of this alternative than there may be a negative impact on protected species, because the number of vertical lines in the water could increase. If fishing effort decreases relative to this alternative there may be a positive impact on protected species because the number of vertical lines in the water could decrease.

Effects on Essential Fish Habitat

Fish pots/traps can damage structured habitat, which is essential fish habitat for scup and black sea bass. If fishing effort increases as a result of this alternative, there may be an increase negative impact of traps on essential fish habitat. If fishing effort decreases as a result of this alternative, this alternative may be a decrease of negative impacts on essential fish habitat, e.g., enhanced availability of undisturbed habitat, and a reduction in "ghost gear." Without being able to predict fishing behavior as a result of the trap limit, it is difficult to assess the impact of this alternative on essential fish habitat, relative to the status quo.

4.2 OPTIONS FOR MANAGING ADVERSE EFFECTS FROM FISHING

According to the Final Rule [50 CFR Section 600.815 (2)(ii)], "...FMPs should identify a range of potential new actions that could be taken to address adverse effects on EFH, include an analysis of the practicability of potential new actions, and adopt any new measures that are necessary and practicable..." Thus, a "Practicability Analysis" was added as a subsection to each section of "Impacts on EFH" for each EFH alternative.

Section 600.815(2)(iii) states that "In determining whether it is practicable to minimize and adverse effect from fishing, Councils should consider the nature and extent of the adverse effect on EFH and long-term and short-term costs and benefits of potential management measures to EFH, associated fisheries, and the nation, consistent with National Standard 7..."

4.2.1 Status Quo: Current Management Measures (EFH Alternative 1: Preferred Alternative)

Biological Impacts

The Council has implemented many regulations, that have indirectly acted to reduce fishing gear impacts on EFH. Many of the current regulations have restricted fishing effort and thus reduced gear impact on bottom habitat. A reduction of fishing effort occurs when the target mortalities under the rebuilding schedule in the FMPs are achieved. Higher quotas can be established because stock is rebuilding, but as long as the target mortalities are achieved a reduction of fishing effort can still occur. Such regulations include restrictive harvest limits, gear restricted areas, the ability to establish SMZs (sections 2.2.6.8 and 4.2.2), and restriction on roller rig gear to 18" for scup and black sea bass. These measures helped to improve the status of the stocks while conserving marine habitat.

Currently, the MAFMC manages summer flounder, scup, and black sea by setting commercial quotas and recreational harvest limits based on the total allowable catch (TAC) for each species. These management systems include rebuilding schedules which are mandated by National Standard 1. The rebuilding schedules establish annual fishing mortality targets in order to rebuild the stocks. While the stocks are in the process of rebuilding (i.e., the biomass is increasing), the management measures used to lower fishing mortality should translate into lower fishing effort. A reduction in fishing effort should translate into a reduction in fishing intensity. Once the stocks are rebuilt, fishing effort should remain at a low level due to an increase in catchability at higher stock levels. Thus retaining status quo measures should result in an overall reduction of fishing effort and would likely have a positive impact on essential fish habitat.

Currently, 40 out of 51 stocks managed by in NMFS Northeast Region are designated as overexploited (NEFSC 1998a). These designations have resulted in a general reduction of fishing effort in order to rebuild these stocks. This reduction of effort translates into less of a strain or impact on habitat throughout the western Atlantic ocean.

NMFS weighout data indicate that bottom trawls accounted for 41% of the landings for MAFMC-managed species, from Maine through North Carolina, in 2000. In 2000, bottom otter trawls from Maine to North Carolina accounted for 18% of bluefish, 91% of butterfish, 91% of summer flounder, 81% of Atlantic mackerel, 64% of scup, 30% of black sea bass, 33% of spiny dogfish, 9% of tilefish, 98% of *Loligo*, and almost 100% of *Illex*. Of these species, summer flounder, scup, black sea bass, bluefish, *Loligo* and dogfish are overfished and fishing effort has been reduced through the implementation of restrictive harvest limits in the FMPs. In fact, the new restrictive *Loligo* quota resulted in an early closure, thus reducing fishing effort. Reductions in landings of summer flounder, scup, and black sea bass over the last 10 years may be attributed in part to reductions in fishing effort (Table 139). These reductions in summer flounder, scup, and black sea landings are a result of restrictive quotas set to achieve target exploitation rates. However, landings for spiny dogfish over the last 10 years have increased. However, implementation of the dogfish FMP has recently resulted in a drastic reduction of fishing effort for this species.

Weighout data indicate that dredges accounted for 47% of the MAFMC species commercial landings from Maine through North Carolina in 1997. These data indicate that dredges harvested 100% of the surfclam and ocean quahog landings in 2000. The surfclam and ocean quahog fisheries are ITQ fisheries. ITQ's instill a sense of ownership of the resource. Fishermen in these fisheries understand that they are not time driven to deplete the resource and that by protecting the resource and the surrounding habitat they are protecting their long term livelihoods. In addition to the indirect benefits of ITQs, the numbers of surfclam and ocean quahog fishermen have also decreased significantly with the implementation of ITQs. In 1979 there were 162 permitted vessels in the surfclam fishery that totaled 108,000 hours at sea. By 1995 that number had fallen to 37 vessels with 37,000 hours at sea. In 2000, there were 31 surfclam vessels with 35,000 hours at sea. The ocean quahog fishery was a developing fishery during the eighties therefore fishing effort increased from 1979 to 1995. The number of ocean quahog vessels decreased from 59 vessels with 46,000 hours at sea in 1979 to 36 vessels with 72,000 hours at sea in 1995. Fishing effort has decreased since, with 29 ocean quahog vessels with 56,000 hours at sea, in 2000.

Scallop dredges are also a major gear that could have a significant impact to EFH of various species. The sea scallop fishery is managed by the NEFMC and while it does not have management measures specifically for EFH, the effort reduction in the fishery, in order to allow rebuilding of that resource, is significant.

Ghost fishing gear by lost stationary gear such as gillnets, pots/traps may also impact on summer flounder, scup, and black sea bass EFH. Therefore, stationery gear is characterized as having a potential impact to these species' EFH (Table 32). According to NMFS weighout data 48% of black sea bass and 7% of scup, landed from Maine through North Carolina were caught by fish pots/traps, in 2000. Amendment 9 of the summer flounder, scup and black sea bass FMP, requires black sea bass pots/traps to include degradable fasteners and escape vents (MAFMC 1996b).

According to NMFS weighout data 7% of all MAFMC managed species were caught in gillnets, from Maine through North Carolina in 2000. Gillnets caught 47% of dogfish landings, 69% of bluefish landings, and 4% of butterfish landings, from Maine through North Carolina, in 2000. All MAFMC regulations on gillnets, and pots/traps are also consistent with MMPA.

The lack of information on the extent of adverse impacts by fishing gear and the relation of habitat to the ability of species to spawn, breed, feed, and grow to maturity makes it impossible to do a quantitative analysis on the benefits to habitat or the stock by implementing any of the habitat alternatives. However, areas that have been closed by NEFMC, for the protection of groundfish stocks have resulted in habitat recovery and are believed to correspond to dramatic sea scallop stock recovery.

Economic Impacts

Retaining status quo measures to protect habitat is not likely to cause additional economic impacts.

Social and Community Impacts

If status quo regulations are retained to protect habitat, industry can maintain their current fishing practices. Retaining current measures to achieve the EFH objectives of the SFA would incur no additional burden on the fishing community. In addition, protection of habitat could enhance non-consumptive human activities such as diving. Once the stock is rebuilt long-term social benefits will be realized through a sustainable fishery.

Effects on Protected Species

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines (Table 9a). The Mid-Atlantic pot/trap and mixed trawl fisheries are Category III fisheries as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA .

The current management systems for summer flounder, scup, and black sea bass include rebuilding schedules which establish annual fishing mortality needed to rebuild the stocks. While the stock is in the process of rebuilding a lower fishing mortality will translate into lower fishing effort. A reduction in fishing effort should translate into a reduction in fishing intensity. Once the stock is rebuilt fishing effort will remain at a low level because the catchability at higher stock levels will increase. Thus retaining status quo measures should result in an overall reduction of fishing effort. Thus, retaining status quo measures to protect habitat is not likely to impact protected species (section 5.4.3.1).

Effects on Essential Fish Habitat

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines. In general, bottom tending mobile gear can reduce habitat complexity and change benthic communities. *As stated in sections 3.2.7.2 and 3.2.8,* available research indicates that the effects of mobile gear are cumulative and are a function of the frequency and intensity with which an area is fished, the complexity of the benthic habitat (structure), energy of the environment (high energy and variable or low energy and stable), and ecology of the community (long-lived versus short lived). As such, one can postulate that the extent of an adverse impacts cannot be determined because there are no high resolution data on the location of fishing effort by gear and the location of specific seafloor habitats. Coarse resolution data on fishing effort by fishing gear and habitat type are represented in Figures 10-29 and Figures 3-7, respectively, of Appendix C. The limitations of effort data are described in section 3.2.7.2.1. In general Figure 3 indicates that the surficial sediments in the Northeast Region are composed predominantly of gravel and sand. Without higher resolution data on these two pieces of the puzzle (type of habitat in an area and the type of fishing gear used in that area) it is impossible to predict the extent of adverse impact. Studies provide some basic information regarding impacts but they are limited to discrete areas, and the results are not necessarily applicable to all similar habitats, since the impact of the gear depends on the gear configuration, towing speed, and water depth, just to name a few factors.

Even less understood is the relationship between the adverse impacts from trawling and dredging on habitat and the impact on any species ability to spawn, breed, feed, and grow to maturity, i.e., the sustainability of a fishery. Currently, growth and productivity data as relates to specific habitat type are not available for most stock in the Northeast Region. For most stocks, there are no indications that poor habitat conditions caused by fishing gear contribute to overfishing or to the overfished status of the stock. In cases where these data do exist, area closures have been implemented, e.g., New England groundfish.

The current management systems for summer flounder, scup, and black sea bass include rebuilding schedules which establish annual fishing mortality needed to rebuild the stocks (see Biological Impacts). While the stock is in the process of rebuilding a lower fishing mortality will translate into lower fishing effort. A reduction in fishing effort should translate into a reduction in fishing intensity. Once the stock is rebuilt fishing effort will remain at a low level because the catchability at higher stock levels will increase. A reduction of fishing effort occurs when the target mortalities under the rebuilding schedule in the FMPs are achieved. Target mortalities are set in the rebuilding schedules under every MAFMC FMP. Thus retaining status quo measures should result in an overall reduction of fishing effort. A reduction in fishing effort would mean that fishing intensity should decrease, thus this alternative would likely benefit essential fish habitat.

Practicability Analysis

In general, bottom tending mobile gear can reduce habitat complexity and change benthic communities. Available research indicates that the effects of mobile gear are cumulative and are a function of the frequency and intensity with which an area is fished, the complexity of the benthic habitat (structure), energy of the environment (high energy and variable or low energy and stable), and ecology of the community (long-lived versus short lived). As such, one can postulate that the extent of an adverse impacts cannot be determined because there are no high resolution data on the location of fishing effort by gear and the location of specific seafloor habitats. Coarse resolution data on fishing effort by fishing gear and habitat type are represented in Figures 10-29 and Figures 3-7, respectively, of Appendix C. The limitations of effort data are described in section 3.2.7.2.1. In general Figure 3 indicates that the surficial sediments in the Northeast Region are composed predominantly of gravel and sand. Without higher resolution data on these two pieces of the puzzle (type of habitat in an area and the type of fishing gear used in that area) it is impossible to predict the extent of adverse impact. Studies provide some basic information regarding impacts but they are limited to discrete areas, and the results are not necessarily applicable to all similar habitats, since the impact of the gear depends on the gear configuration, towing speed, and water depth, just to name a few factors.

Even less understood is the relationship between the adverse impacts from trawling and dredging on habitat and the impact on any species ability to spawn, breed, feed, and grow to maturity, i.e., the sustainability of a fishery. Currently, growth and productivity data as relates to specific habitat type are not available for most stock in the Northeast Region. For most stocks, there are no indications that poor habitat conditions caused by fishing gear contribute to overfishing or to the overfished status of the stock. In cases where these data do exist, area closures have been implemented, e.g., New England groundfish.

Under the current management regime, summer flounder, scup, and black sea bass biomass is increasing. This indicates that a sustainable fishery is possible without creating additional measures to protect EFH, i.e., the measures that are currently in place are sufficient to achieve a sustainable fishery. For example, the summer flounder, scup, and black sea bass stocks are rebuilding under current management measures imposed to achieve the rebuilding plans. This rebuilding is taking place under the current level of fishing. The summer flounder stock has rebounded from a near crash in 1989 to a stock level that is no longer considered overfished. The age structure has been greatly expanded from a couple of year classes to several in most recent years. The fishery is on its way to being rebuilt (section 3.1.1.2). Recent increases in scup stock abundance were reported in 1999 and 2000 based on NEFSC spring and autumn survey results, and commercial and recreational catch data. These data indicate a strong 1997 year class and a moderate to strong 1999 year class (section 3.1.2.2). NEFSC survey results indicate that black sea bass biomass has increased in recent years (section 3.1.3.2). The NEFSC spring survey indicates a general increase in exploitable biomass since 1993. The spring survey index of recruitment also indicates strong year classes in 1999 and 2000.

The status quo alternative includes rebuilding plans that govern the management of 26 out of 42 stocks managed in the Northeast (NMFS 2002). National Standard 1 requires that the Councils "specify a time period to rebuild" overfished stocks or stock complexes. In cases where overfishing is occurring the Councils are required to "end overfishing." National Standard 1 indicates that "a stock or stock complex that is below the size that would produce MSY should be harvested at a lower rate or level of fishing mortality that if the stock or stock complex were above the size that would produce MSY." As such, reductions in fishing mortality have been and will continue to be implemented throughout the rebuilding periods for these 26 stocks. Reductions in fishing mortality are apparent in the summer flounder, scup, and black sea bass fisheries. SAW 31 indicates that fishing mortality of summer flounder decreased substantially, from 1.31 in 1994 to 0.32 in 1999 (section 3.1.1.2). Relative exploitation rate for scup decreased by almost half from 1997 to 1999 (section 3.1.2.2). Finally, relative exploitation for black sea bass indicates a significant reduction in mortality in 1998 and 1999, relative to the pre-management levels of 1996 and 1997 (section 3.1.3.2). Reductions in fishing mortality result in decreases in fishing effort, which translate in an overall reduction in impacts of fishing gear on the EFH of the managed species, as well as other species' EFH.

Once a stock is rebuilt, the fishing mortality will remain at F_{msy} (or a proxy such as F_{max}). As stock size increases, quotas will increase under this fishing mortality. However, catch per unit effort (CPUE) will also increase. For example, MRFSS data indicate an increase in scup recreational CPUE in 1999 (section 3.1.2.2). While increases in participation in the fishery due to latent effort may accompany higher quotas, a higher CPUE and a constant or decreasing target fishing mortality should mean that overall fishing effort will likely continue to decline.

The majority of the stocks managed in the Northeast Region have experienced and/or will continue to experience declines in fish mortality while being managed under rebuilding plans. Overall reductions in fishing mortality, and thus, fishing effort, have had the beneficial impact of improving stock status and protecting EFH. In addition to reductions in fishing mortality, the two Northeast Regional Councils have implemented many other measures that have more directly acted to reduce fishing gear impacts on EFH. Such regulations include gear restricted areas, area closures, and restrictions on roller rig gear. These measures also help to improve the status of the stocks while conserving marine habitat. To date, improving stock status for summer flounder, scup, and black sea bass and other stocks in the Northeast Region is evidence of positive cumulative biological impacts resulting from the current management system.

Maintaining the status quo will not require the industry to incur any additional short or long-term costs. The short-term benefit of current regulations is that stock biomass is increasing which will allow quotas to increase. The long-term benefit of maintaining the current regulations will allow the stock to rebuild with additional protection to habitat. This management alternative is consistent with National Standard 7 which requires that management measures "minimize costs and avoid unnecessary duplication." It is the determination of the Council that this management measure is practicable, relative to the criteria set forth in the Final Rule [50 CFR Section 600.815 (2) (iii)].

4.2.2 Prohibit Bottom Tending Mobile Gear From the Nearshore Areas Surrounding Estuaries (EFH Alternative 2)

Biological Impacts

Closing nearshore areas to bottom otter trawls, scallop dredges, and clam dredges would protect areas that include EFH for summer flounder, scup, and black sea bass. Figures 8-10 give some idea of the reduction of fishing effort (in trips) that might be expected from such a closure. Hicks *et al.* (2001) indicate that 2,687 otter trawl and 151 scallop dredge trips occurred in the nearshore areas proposed under this alternative. The landings of the species that were taken from these areas by bottom otter trawls, scallop dredges, or clam dredges are presented in Table 3 in Appendix E. The types of impacts to the marine environment that could potentially be avoided include short-term disruptions of sediments, increased turbidity, hypoxic events, reduction in epifaunal and invertebrate communities, and long-term loss of SAV and seagrass and structured habitat. Also, these areas are important summer flounder spawning grounds and areas where all three species congregate during warmer months. This alternative may add some protection to the nursery habitat near the entrance of the estuaries. These areas will also include reef habitat which is EFH for black sea bass and scup. Such structured habitat is more complex and thus more vulnerable to fishing gear than the typical flat sandy bottom which characterizes much of the Mid-Atlantic Bight. Providing a refuge to summer flounder, scup, and black sea bass may help to improve the status of the stocks and possibly hasten the recovery of the stock, while conserving marine habitat. Additionally, it may act as a regional buffer against unanticipated environmental damages and uncertainty in the status of the stock.

This alternative was proposed because it seems that it may add protection to the types of habitat that are important to summer flounder, scup, and black sea bass data. In addition to a lack of productivity data, there is very little quantitative data on actual fishing impacts to habitat (as stated in section 3.2.7.2).

Closed areas may be an effective means of reducing impacts to habitat that is important to summer flounder, scup, and black sea bass. However, effort could be redirected elsewhere in the region. The redirection of effort could be to areas that are less important habitat for summer flounder, scup, and black sea bass stocks, but important to other species. As such, this alternative could have both positive and negative biological impacts, relative to the status quo.

Economic Impacts

The Council contracted with the Virginia Institute of Marine Science to determine the economic impacts of EFH Alternatives 2 and 3 (identified as Alternatives 4 and 5 in the final report Hicks *et al.* (2001) entitled "Economic Impacts and Protecting Essential Fish Habitat: Amendment 13 to the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan" - attachment). In their economic evaluation of the alternatives Hicks *et al.* (2001) used inverse demand (or price-dependent) models to estimate changes in prices, ex-vessel revenues, and consumer surplus. Area selection or choice models were used to determine areas that would maximize a vessels revenue in response to the closed areas, i.e., a redirection of effort to recoup landings and revenue. For example, according to the model, monkfish landings and revenue increased through a redirection of effort in response to the closed areas. The models assume that operators would not have time to make gear changes to mitigate the negative impacts of the EFH alternatives, nor do they consider changes in crew sizes or relocation of homeport. The analysis also did not consider the potential effects of the area closures on future harvest levels, recruitment, or growth. At the present time data are not available to estimate how the closures will affect future stock abundance, reproductive and spawning activities, growth, mortality, and recruitment. Thus, the net benefit that society derives from protecting EFH cannot be estimated. Finally, potential changes in the economic value to recreational anglers were not estimated.

Hicks *et al.* (2001) indicates that scallop dredge vessels made an average 151 trips per year into areas defined by Alternative 4 and vessels using a fish otter trawl made an average 2,656 trips per year between 1996 and 2000. "Vessels fishing with other otter trawl gear averaged 31 trips per year into the areas associated with Alternative 4." "Approximately 68 vessels, on average, exploited the areas associated with Alternative 4 between 1996 and 2000. The major gear type was fish otter trawl; approximately 47 fish otter trawl vessels, on average, derived a portion of their total vessel earnings from areas associated with Alternative 4. In general, the 68 vessels realized, on average per year, approximately 11 percent of their total earnings and 12 percent of their total quantity landed (in the proposed closed areas)." Scallop dredge vessels "realized 4.0 and 3.0 percent of their total revenue and landings" from the areas characterized under this alternative. "Both fish and other otter trawl had relatively high dependencies on the areas delineated by this alternative. Fish otter trawls vessels, on average, received approximately 12.0 percent of their total annual income from areas associated with Alternative 4; other otter trawl vessels received approximately 17.1 percent of their average annual revenue from the areas associated with Alternative 4."

Hicks *et al.* (2001) indicate that substantial reductions in revenues and consumer surplus from adoption of this alternative (Table 1 in Appendix E). Considering vessels operating between Maine and North Carolina (the logbook data), the overall loss in ex-vessel revenue from the adoption of Alternative 4 is between $2.32 and $2.55 million per year; total landings of all species are projected to decline by 3.91 million pounds. Similarly, consumer surplus for all species is projected to decline by $789.0 thousand.

The lower bound projected revenue losses (i.e., $2.32 million) assume prices change in response to changes in landings; the higher projected revenue loss assumes no change in ex-vessel prices. It is important to remember that projected ex-vessel values, assuming no price changes, are lower than what would be expected when the projected landings are less than the status quo landings. A decrease in landings normally increases ex-vessel prices, and thus, projected revenues should actually be higher projected using the assumption that ex-vessel prices do not change. Similarly, projected losses in revenues, allowing prices to change in response to changes in landings, would be lower than revenues projected assuming no change in ex-vessel prices. Similar conclusions apply to the case of projected increases in landings. That is, the projected revenues, assuming no price changes, are higher than would be projected if price changes were considered. Higher landings would normally decrease ex-vessel prices. Projected gains, assuming no change in ex-vessel prices, would thus be higher than the gains that would occur if prices were allowed to change in the normal manner (i.e., prices would decline as landings increased). Alternatively, when landings are projected to increase, the projected revenues, assuming no change in prices, understates the ex-vessel value. The projected gains, assuming no changes in prices, therefore, overstate the potential increases in ex-vessel value. The converse applies to the case of landings decreasing relative to the status quo.

Losses in landings are expected for: the all other species category (3.0 million pounds), summer flounder (526.1thousand pounds), squid (286.7 thousand pounds), scup (62.8 thousand pounds), sea scallops (41.1 thousand pounds), and black sea bass (15.3 thousand pounds). Goosefish or monkfish landings are expected to increase by 49.3 thousand pounds. Losses in revenue are estimated for: the all other species category ($1.5 to $1.7 million), summer flounder ($559.8 to $570.3 thousand), sea scallops ($187.8 to $207.5 thousand), squid ($122.5 thousand), scup ($41.0 to $53.5 thousand), and black sea bass ($13.3 to $14.0 thousand). Monkfish revenues are expected to increase approximately $80.7 to $81.1 thousand.

The bulk of the loss is imposed on fishermen using fish otter trawls and scallop dredges. The estimated loss in revenue to other gear type is less than $200.0 thousand. Projected losses in revenues to fish otter trawl gear, assuming no changes in ex-vessel prices, under this alternative, equal $2.27 million. Projected losses to scallop dredge gear, assuming no changes in ex-vessel prices, under this alternative, equal $163.3 thousand. Actual losses, however, would be less because of price increases relative to decreased landings. No attempt was made to calculate changes in ex-vessel prices by gear type or consumer surplus losses or changes by gear type. In terms of landings and revenue loss, the primary species affected by this closed area is summer flounder. Summer flounder revenue is projected to decline from $559.8.6 to $570.3 thousand. Large reductions in landings and revenue also occur for the all other species category. Ex-vessel revenue for all other species are projected to decline between $1.5 and $1.7 million.

On a per vessel basis, the potential losses are quite large. On an annual basis, an average of sixty-eight vessels fished the areas defined under this alternatives. The average annual loss per vessel equals between $34.1 and $37.9 thousand. On a per gear basis, assuming no change in ex-vessel prices, the potential loss in revenue per scallop dredge vessel equals $10.9 thousand. Revenues to fish otter trawl vessels, assuming no changes in ex-vessel prices, decrease by $48.3 thousand. Revenues to other otter trawl vessels, also assuming no changes in ex-vessel prices, are projected to decline by $19.4 thousand per year.

If we consider potential changes in ex-vessel revenues on a per trip basis and assume no changes in ex-vessel prices, revenues are projected to decline by $898.3. Projected average losses per trip for affected vessels for the three major gear types are as follows: (1) fish otter trawl--$854.37; (2) sea scallop dredge--$1,081.26; (3) other otter trawl--$3,761.29.

Excluding the all other species category, consumers are most affected by the loss in the sea scallop harvest. Note that estimated revenue losses are underestimates of total loss to the fishermen because they do not include increased costs from having to fish further offshore. Consumer surplus declines by $52.8 thousand, but the largest reductions in consumer surplus occur for the all other species category ($572.9 thousand). Consumer surplus is estimated to decrease for: the all other species category ($572.9 thousand), summer flounder ($178.7 thousand, sea scallops ($52.8 thousand), scup ($13.5 thousand), and black sea bass ($3.3 thousand). Consumer surplus for monkfish is estimated to increase by $31.5 thousand, under this alternative. Considering the national level and only the three regulated species, total consumer surplus declines by $195.6 thousand.

The above evidence presented by Hicks *et al.* (2001) indicates that this alternative may have substantial economic impacts, relative to the status quo.

Social and Community Impacts

Closing areas to mobile gear could increase scientific information on gear impacts, by providing information on habitat recovery and baseline data once the habitat is recovered. Protection of habitat could enhance non-consumptive human activities such as diving. Once the stock is rebuilt long-term social benefits will be realized through a sustainable fishery. As indicated above, this alternative may have a inequitable impact on different user groups. It will also increase the cost of the product to the consumer. Additionally, multiple small closed areas may be difficult to enforce. As such, this alternative may cause both positive and negative social impacts relative to the preferred alternative.

Effects on Protected Species

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines (Table 9a). The Mid-Atlantic pot/trap and mixed trawl fisheries are Category III fisheries as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA. .

Hicks *et al.* (2001) indicate that 2,687 otter trawl and 151 scallop dredge trips occurred in the nearshore areas proposed under this alternative. The landings of the species that were taken from these areas by bottom otter trawls, scallop dredges, or clam dredges are presented in Table 3 in Appendix E. Prohibiting mobile gear in the nearshore areas in this alternative may add additional protection to species of marine mammals, sea turtles, and sea birds. As such, this alternative may to have a positive impact on protected species (section 5.4.3.1), relative to the preferred alternative.

Effects on Essential Fish Habitat

Hicks *et al.* (2001) indicate that 2,687 otter trawl and 151 scallop dredge trips occurred in the nearshore areas proposed under this alternative. Closed areas may be an effective means of reducing impacts to habitat that is important to summer flounder, scup, and black sea bass (see Biological Impacts). The redirection of effort could be to areas that are less important habitat for summer flounder, scup, and black sea bass, however this could be at the expense of important habitat for another species. Overall, this alternative may have a positive or negative impact on essential fish habitat for summer flounder, scup, and black sea bass or other species, relative to the status quo.

Practicability Analysis

The nature of the impacts of bottom tending mobile gear on habitat are described in available gear research (section 4.2.1). The nearshore shallow water area encompassed by this alternative is predominantly a high energy sand environment, indicative of disturbance tolerant species (section 3.2.7.2.1). Gear impact/habitat research indicate that such habitats and species are less susceptible to gear impacts with quicker recovery rates than more stable deep water or live bottom habitats. Although the above inferences to habitat impacts can be made, there are no data on the functional value of this habitat on the density, growth and productivity of various species of fish in the

Northeast Region. Thus, while this alternative may avoid the gear impacts identified in section 4.2.1, there is no demonstrable link between preventing the impacts on habitat and any quantifiable benefit to the majority species of fish resident in the area. Rebuilding is occurring for summer flounder, scup, black sea bass, and for other stocks of fish managed by the MAFMC and NEFMC. This indicates that a sustainable fisheries can be attained without the imposition of additional measures to protect EFH i.e., the management measures currently in place are sufficient to prevent overfishing, rebuild the fishery and achieve optimum yield consistent with National Standard 1. There is no basis to conclude that adopting this alternative would accelerate the rebuilding process that is taking place under the existing management program.

Counterbalanced against the speculative benefits of this alternative for the density, growth and productivity of the fish species concerned is a cost to the industry of more than $2 million in lost revenue. This revenue is associated with species historically landed by bottom tending mobile gear in this area. (Economic Analysis section 4.2.2). Specifically, detailed economic analysis indicates landings of commercial species could be reduced if bottom tending mobile gear was prohibited from these area. As stated in section 4.2.1, available information indicates that the current management measures are sufficient to attain sustainable fisheries. Thus, it is reasonable to conclude that EFH is making significant contributions to the density, growth and productivity of the species of fish concerned at the current level of fishing effort. Consequently, given the speculative benefits of adopting this alternative, the cost to the industry of closing these areas to bottom tending mobile gear and the contribution of EFH to rebuilding these fisheries under current levels of fishing effort, it is the determination of the Council that the adoption of this alternative is not necessary or practicable according to the criteria set forth in 50 CFR Section 600.815(2)(iii).

4.2.3 Prohibit Bottom Tending Mobile Gear in the Area Surrounding the Hudson Canyon (EFH Alternative 3)

Biological Impacts

Closing the area that is surrounding the Hudson Canyon to bottom otter trawls, scallop dredges, and clam dredges, would protect an area that has been identified as an important overwintering area for summer flounder, scup, and black sea bass in NRDC (2001). Figures 8-10 give some idea of the reduction of fishing effort (in trips) that might be expected from such a closure. The types of impacts that could potentially be avoided include short-term disruptions of sediments, increased turbidity, hypoxic events, reduction in epifaunal and invertebrate communities, and long-term loss of structured habitat. It is uncertain if these types of impacts would have a negative impact, either directly or indirectly (from an ecosystem standpoint), on the health of the summer flounder stock.

It is unclear if Hudson Canyon is a more important overwintering area than other canyons. It is also unclear if these areas provide a thermal refuge for these species or if there are specific habitat associations. As such, it is unknown if closing this area will protect summer flounder, scup, or black sea bass EFH even though it includes EFH for summer flounder, scup, and black sea bass. Providing a refuge to these species may help to improve the status of the stocks, leading to recovery, while conserving marine habitat. Additionally, it may act as a regional buffer against unanticipated environmental damages and uncertainty in the status of the stock.

Closed areas may be an effective means of reducing impacts to habitat that is important to summer flounder, scup, and black sea bass. However, effort could be redirected elsewhere in the region. The redirection of effort could be to areas that are less important habitat for summer flounder, scup, and black sea bass stocks, but important to other species. As such, this alternative is could have positive and negative biological impacts, relative to the status quo.

Economic Impacts

The Council contracted with the Virginia Institute of Marine Science to determine the economic impacts of EFH Alternatives 2 and 3 (identified as Alternatives 4 and 5 in Hicks *et al.* (2001) entitled "Economic Impacts and Protecting Essential Fish Habitat: Amendment 13 to the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan" - attachment). In their economic evaluation of the alternatives Hicks *et al.* (2001) used inverse demand (or price-dependent) models to estimate changes in prices, ex-vessel revenues, and consumer surplus. Area selection or choice models were used to determine areas that would maximize a vessels revenue in response to the closed areas, i.e., a redirection of effort to recoup landings and revenue. For example, according to the model, monkfish landings and revenue increased through a redirection of effort in response to the closed areas. The models assume that operators would not have time to make gear changes to mitigate the negative impacts of the EFH alternatives, nor do they consider changes in crew sizes or relocation of homeport. The analysis also did not consider the potential effects of the area closures on future harvest levels, recruitment, or growth. At the present time data are not available to estimate how the closures will affect future stock abundance, reproductive and spawning activities, growth, mortality, and recruitment. Thus, the net benefit that society derives from protecting EFH cannot be estimated. Finally, potential changes in the economic value to recreational anglers were not estimated.

Hicks *et al.* (2001) indicate that substantial reductions in revenues and consumer surplus from adoption of this alternative (Table 1 in Appendix E). Ex-vessel revenues are projected to decline between \$2.16 (prices of all species are allowed to change in response in changes in landings) and \$2.4 million per year (price is assumed to remain constant); landings are projected to decline by 2.33 million pounds per year, and consumer surplus is expected to decline (\$758 thousand).

The lower bound projected revenue losses (i.e., \$2.40 and \$2.16 million) assume prices change in response to changes in landings; the higher projected revenue loss assumes no change in ex-vessel prices. It is important to remember that projected ex-vessel values, assuming no price changes, are lower than what would be expected when the projected landings are less than the status quo landings. A decrease in landings normally increases ex-vessel prices, and thus, projected revenues should actually be higher projected using the assumption that ex-vessel prices do not change. Similarly, projected losses in revenues, allowing prices to change in response to changes in landings, would be lower than revenues projected assuming no change in ex-vessel prices. Similar conclusions apply to the case of projected increases in landings. That is, the projected revenues, assuming no price changes, are higher than would be projected if price changes were considered. Higher landings would normally decrease ex-vessel prices. Projected gains, assuming no change in ex-vessel prices, would thus be higher than the gains that would occur if prices were allowed to change in the normal manner (i.e., prices would decline as landings increased). Alternatively, when landings are projected to increase, the projected revenues, assuming no change in prices, understates the ex-vessel value. The projected gains, assuming no changes in prices, therefore, overstate the potential increases in ex-vessel value. The converse applies to the case of landings decreasing relative to the status quo.

Losses in landings are expected for: the all other species category (1.47 million pounds), sea scallops (255.6 thousand pounds), scup (323.2 thousand pounds), summer flounder (137.6 thousand pounds), squid (152.6 thousand pounds), and black sea bass (8.9 thousand pounds). Goosefish or monkfish landings are expected to increase by 25.7 thousand pounds. Losses in revenue are estimated for: sea scallops ($1.18 to $1.28 million), the all other species category ($562.0 to $633.2 thousand), scup ($218.6 to $260.1 thousand), summer flounder ($129.5 to $158.2 thousand), squid ($133 thousand), and black sea bass ($7.4 to $8.1 thousand). Monkfish revenues are expected to increase approximately $68.9 to $69.2 thousand.

The bulk of the loss is imposed on fishermen using fish otter trawls and scallop dredges. The estimated loss in revenue to other gear type is less than $200.0 thousand. Projected losses in revenues to fish otter trawl gear, assuming no changes in ex-vessel prices, equal $1.15 million under this alternative. Projected losses to scallop dredge gear, assuming no changes in ex-vessel prices, $1.07 million. Actual losses, however, would be less because of price increases relative to decreased landings. No attempt was made to calculate changes in ex-vessel prices by gear type or consumer surplus losses or changes by gear type. In terms of landings, the primary species affected by this closed area is scup. In terms of revenue losses, however, the primary species affected is sea scallops. Large reductions in revenues also occur for the all other species category.

On a per vessel basis, the potential losses are quite large. On an annual basis, an average of sixty-eight vessels fished this area. The potential average annual loss is between $31.7 and $35.3 thousand. On a per gear basis, assuming no change in ex-vessel prices, the potential loss in revenue per scallop dredge vessel equals $39.7 thousand. Revenues to fish otter trawl vessels, assuming no changes in ex-vessel prices, decrease by $32.9 under Alternative 5. Revenues to other otter trawl vessels, also assuming no changes in ex-vessel prices, are projected to decline by $29.4 thousand.

If we consider potential changes in ex-vessel revenues on a per trip basis and assume no changes in ex-vessel prices, revenues are projected to decline by $6,204.5. Projected average losses per trip for affected vessels for the three major gear types are as follows: (1) fish otter trawl--$4,069.56; (2) sea scallop dredge--$12,771.62; (3) other otter trawl--$8,831.40.

Excluding the all other species category, consumers are most affected by the loss in the sea scallop harvest. Note that these revenue losses are underestimates of total loss to the fishermen because they do not include increased costs from having to fish further offshore, as such consumer surplus declines by nearly $300.0 thousand. The largest reductions in consumer surplus occur for the all other species category at $361.5 thousand. Consumer surplus is estimated to decrease for: the all other species category ($361.5 thousand), sea scallops ($291.7 thousand), summer flounder ($64.9 thousand, scup ($64.7 thousand), and black sea bass ($2.2 thousand). Consumer surplus for monkfish is estimated to increase by $26.9 thousand, under this alternative. If we consider the national level and only the three regulated species, total consumer surplus declines by $131.7 thousand.

The above evidence presented by Hicks *et al.* (2001) indicates that this alternative may have substantial economic impacts, relative to the status quo.

Social and Community Impacts

Closing areas to mobile gear could increase scientific information on gear impacts, by providing information on habitat recovery and baseline data once the habitat is recovered. Once the stock is rebuilt long-term social benefits will be realized through a sustainable fishery. Effort could be redirected elsewhere in the region and as such an area closures may result in a smaller reductions in landings of targeted species than estimated.

As indicated above, this alternative may have a inequitable impact on different user groups. It will also increase the cost of the product to the consumer. Additionally, multiple small closed areas may be difficult to enforce. As such, this alternative may cause both positive and negative social impacts relative to the preferred alternative.

Effects on Protected Species

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines (Table 9a). The Mid-Atlantic pot/trap and mixed trawl fisheries are Category III fisheries as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA.

Hicks *et al.* (2001) indicate that 283 otter trawl and 84 scallop dredge trips occurred in the area proposed under this alternative, from 1996-2000. The landings of the species that were taken from this area by bottom otter trawls, scallop dredges, or clam dredges are presented in Table 4 in Appendix E. Prohibiting mobile gear in the area surrounding the Hudson Canyon may add additional protection to species of marine mammals, sea turtles, and sea birds. As such, this alternative may to have a low positive impact on protected species (section 5.4.3.1), relative to the preferred alternative.

Effects on Essential Fish Habitat

Hicks *et al.* (2001) indicate that trips by bottom tending mobile gear in the proposed closed area from 1996 to 2000 included 283 otter trawl and 84 scallop dredge trips. This alternative would obviously eliminate these trips from the proposed closed area. Speculation was that tilefish burrows are more vulnerable to disturbance by bottom tending mobile gear than shallower, less complex habitats. However, Council funded research by Rutgers University to evaluate the impact of mobile fishing gear on tilefish habitat indicates otherwise (Able and Muzeni 2002). Able and Muzeni (2002) examined data from submersible dives (archived videotapes, bridge logs, and dive log) on 365 tilefish burrows and concluded that there is no direct evidence of tilefish habitat being adversely impacted by otter trawls, or other gear types. Additionally, the report concluded that the "most important impact on tilefish habitat has been the fishery (primarily longline) for this species [tilefish]...the impacts occur when fishing mortality removes the tilefish...individual burrows are not maintained..." Thus, it is unlikely that this alternative would have positive impacts to the EFH. Additionally, the redirection of effort could be to shallower areas that are important habitat for these and other species. Overall, this alternative may have a negative impact on essential fish habitat for summer flounder, scup, and black sea bass and other species, relative to the status quo.

Practicability Analysis

The Hudson Canyon area is identified as HAPC for tilefish as well as EFH for one or more life stages of 17 managed species, including, summer flounder, scup, black sea bass, offshore hake, butterfish, squid, and Atlantic mackerel. Tilefish are a long-lived species that are dependent upon complex burrow structures. Tilefish burrows are maintained by tilefish and believed to be important to the surrounding demersal community. However, for many species with EFH in this area, it is unclear if specific habitat associations exist or if the area simply provides thermal refuge, i.e., there are no data on the functional value of tilefish habitat on the density, growth and productivity.

The nature of the impacts of bottom tending mobile gear on habitat are described in available gear research (section 4.2.1). Speculation was that tilefish burrows are more vulnerable to disturbance than shallower, less complex habitats. However, Council funded research by Rutgers University to evaluate the impact of mobile fishing gear on tilefish habitat indicates otherwise (Able and Muzeni 2002). Able and Muzeni (2002) concluded that there is no direct evidence of tilefish habitat being adversely impacted by otter trawls, or other gear types. Additionally, the report concluded that the "most important impact on tilefish habitat has been the fishery (primarily longline) for this species [tilefish]...the impacts occur when fishing mortality removes the tilefish...individual burrows are not maintained..."

Current information indicates that rebuilding at the current level of fishing effort is taking place for some of the species with EFH in the Hudson Canyon area, e.g., summer flounder, scup, black sea bass (section 4.2.1). Other species with EFH in this area are not considered overfished, e.g., squid, mackerel, and butterfish. The status of these stocks indicates that sustainable fisheries are possible without creating additional measures to protect EFH. Even if there was evidence that indicated that this alternative would reduce gear impacts to habitat, there is no basis to conclude that adopting this alternative would accelerate the rebuilding process that is taking place under the existing management program.

Adopting this seemingly ineffective alternative would cost the commercial fishing industry more than $2 million in lost revenue. This revenue is associated with species historically landed by bottom tending mobile gear in this area. (Economic Analysis section 4.2.2). Specifically, detailed economic analysis indicates landings of commercial species could be reduced if bottom tending mobile gear was prohibited from these area. As stated above, available information indicates that the current management measures are sufficient to attain sustainable fisheries. Thus, it is reasonable to conclude that tilefish EFH is making significant contributions to the density, growth and productivity of the species of fish concerned, at the current level of fishing effort. Consequently, given the speculative benefits of adopting this alternative, the cost to the industry of closing these areas to bottom tending mobile gear, and the contribution of EFH to rebuilding these fisheries under current levels of fishing effort, it is the determination of the Council that the adoption of this alternative is not necessary or practicable according to the criteria set forth in 50 CFR Section 600.815(2)(iii).

4.2.4 Roller rig and Rock Hopper Gear Restrictions (EFH Alternative 4)

Biological Impacts

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 800-900 hp is required to tow a net with 18 inch to 24 inch rollers, whereas 10 inch to 12 inch rollers can be pulled by a boat using a 175 to 200 hp engine (Simpson pers. comm.). In general, 10-12 inch diameter rollers can be used for fishing over rough bottom that can include ledges and cliffs (MAFMC 1996a, b).

Limitations on roller size could make some areas of the ocean inaccessible to trawls by preventing fishermen from trawling in the harder, rough bottom areas (MAFMC 1996a, b). Such structured habitat is more complex and thus more vulnerable to fishing gear. Restricting these gear may help to improve the status of the stocks, leading to recovery, while conserving marine habitat. Gear modifications/restrictions offer the possibility of reducing impacts to EFH throughout the entire region, rather than just in closed areas.

Detailed information as to the relationship between roller diameter and the size of the obstruction that it can clear is unavailable. Anecdotal reports indicate that smaller rollers could be more damaging in some areas of the ocean because smaller rollers result in less of a "bouncing" motion off of structured habitat and cause more of a shearing or crushing effect. As such, it is unknown whether restrictions on roller rig and rock hopper gear would result in positive biological impacts, relative to the status quo.

Economic Impacts

The economic impact of roller rig and rockhopper gear restrictions is unknown. In order to judge the overall cost of these gear restrictions to the fishery, more information is needed on the current use of roller rig and rockhopper gear. These data are not available in weighout or VTR data. These gear restrictions would make hard and structured bottoms inaccessible by trawlers. This could mean a reduction in landings and revenue of targeted species. This could be offset by the positive benefit of protecting the hard bottom and structured habitats, which are EFH for scup and black sea bass. However, effort could be redirected to less vulnerable habitats to recoup lost landings. The cost of complying with this alternative is also unknown. Thus, the economic impact of this alternative relative to status quo is unknown.

Social and Community Impacts

The summer flounder, scup, and black sea bass FMP currently restricts vessels issued moratorium permits for scup and/or black sea bass to roller rig trawl gear with rollers less than 18 inch diameters. An 18 inch diameter corresponded to the maximum roller diameter limitation imposed by the states of Massachusetts and North Carolina to regulate this gear in state waters. In the Gulf of Maine rock hopper gear is restricted to a maximum 12 inch diameter. If restrictions regarding roller size were implemented by the MAFMC then the rules could be made consistent from Maine to North Carolina. This gear restriction may reduce gear conflicts between trawlers and potters. Hard bottom would not as accessible to trawlers because of the reduction in roller size. Potters could continue to fish these areas that were traditionally only accessible by black sea bass pots. Enhancement of structured habitat could enhance non-consumptive human activities such as scuba diving. Once the stock is rebuilt long-term social benefits will be realized through a sustainable fishery, however.

Effects on Protected Species

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, gillnets, and lines (Table 9a). The Mid-Atlantic pot/trap and mixed trawl fisheries are Category III fisheries as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA. Nonetheless, restricting the size of roller rig and rock hopper gear, to protect habitat is not expected to impact protected species (section 5.4.3.1), relative to the status quo.

Effects on Essential Fish Habitat

The restrictions proposed under this alternative may be an effective means of reducing impacts to habitat that is important to summer flounder, scup, and black sea bass. This alternative would make some vulnerable areas inaccessible to trawling. However, some anecdotal reports indicate a small roller size could result in a negative impact to EFH. Additionally, the scup and black sea bass fishery are currently restricted to rock hopper gear that is 18 inches or less, in diameter. As such, it is unknown whether or not this alternative would have a positive impact on essential fish habitat, relative to the status quo.

Practicability Analysis

While the adverse nature of the impacts of roller rig and rock hopper gear on habitat is not clearly understood, it is reasonable to infer that some negative impact on habitat results from the intrusion of trawl nets into areas that were previously inaccessible due to the bottom topography. While restrictions on this gear (e.g., smaller roller size) may render some areas inaccessible to trawl gear and thereby eliminate the impact of this gear on habitat in these areas, there is some information that the use of smaller rollers may cause more damage to habitat through shearing or crushing forces. Consequently, the nature and extent of the impacts on habitat from the use of this gear cannot be assessed. This assessment is also frustrated by the fact that the incidence of the use of this gear in the EFH for summer flounder, scup and black sea bass is unknown. Thus, while the reduction in fishable areas by this alternative may avoid certain gear impacts in certain area, these positive effects may be offset or even overcome by the negative impacts on habitat caused by the use of smaller rollers in other areas or there may be virtually no impact from this alternative at all if the incidence of the use of this gear is minimal.

Additionally, there is no data on the affect of varying habitats on the density, growth and productivity of various species of fish in the Northeast Region. Thus, even assuming for the purpose of discussion that this alternative would prevent some negative impact on habitat from the use of this gear, there is no demonstrable link between preventing the impacts on habitat and any quantifiable benefit to the various species of fish resident in the area. Rebuilding is occurring for summer flounder scup and black sea bass and for other stocks of fish managed by the

MAFMC and NEFMC. This indicates that a sustainable fishery can be attained without the imposition of additional measures to protect EFH i.e., the management measures currently in place are sufficient to prevent overfishing, rebuild the fishery and achieve optimum yield consistent with National Standard 1. This rebuilding is taking place at the current level of fishing effort that exists throughout the EFH for all fisheries involved in the area defined as the EFH for summer flounder, scup and black sea bass. There is no basis to conclude that adopting this alternative would accelerate the rebuilding process that is taking place under the existing management program.

Counterbalanced against the questionable benefits of this alternative for the density, growth and productivity of the fish species concerned is an unquantifiable cost to the industry. Assuming that some fishermen are using this gear, there would be a cost to them of complying with the new roller requirements. Further, since the use of smaller rollers would result in less fishable areas, the revenue of fishermen using this gear would be reduced. Available information indicates that the current management measures are sufficient to attain sustainable fisheries. Thus, it is reasonable to conclude that EFH is making significant contributions to the density, growth and productivity of the species of fish concerned at the current level of fishing effort. Consequently, given the questionable benefits and possible negative consequences of adopting this alternative, the potential yet unquantifiable cost to the industry in terms of lost revenues and the cost of rerigging their nets to comply with a smaller roller requirement, the lack of a reasonable administrative record upon which to base a restriction on roller rig and rock hopper gear and the contribution of EFH to rebuilding these fisheries under current levels of fishing effort, it is the determination of the Council that the adoption of this alternative is not necessary or practicable according to the criteria set forth in 50 CFR Section 600.815(2)(iii).

4.2.5 Prohibit Street-Sweeper Gear (EFH Alternative 5)

Biological Impacts

New England Fishery Management Council prohibited street sweeper gear as a precautionary measure. They prohibited this type of gear because they received testimony from the public that this gear was more effective at catching flat fish than a typical trawl. In addition, there has been some concern over this gear's impact to habitat. Preliminary evidence suggests that this prohibition may make some areas of the ocean inaccessible to trawls by preventing fishermen from trawling in the harder, rough bottom areas. Prohibiting this gear would afford additional protection to structured habitat. Such structured habitat is more complex and thus more vulnerable to fishing gear. Restricting this gear may help to improve the status of the stocks, leading to recovery, while conserving marine habitat. Gear modifications/restrictions offers the possibility of reducing impacts to EFH throughout the entire region, rather than just in closed areas.

More information needs to be collected on the relative use, if any, of this gear and its effect on habitat. There is the possibility that this gear is not currently in use, thus the implementation of this alternative may not result in any benefit to EFH. Information on the use of this gear was requested during the public hearing process, but no additional information was received. As such, the biological impacts of this alternative relative to the status quo are unknown.

Economic Impacts

The economic impact of a streetsweeper gear prohibition is unknown. In order to judge the overall cost of this gear restriction to the fishery, more information is needed on the current use of streetsweeper gear. These data are not available in weighout or VTR data. It is thought that this gear restriction would make hard and structured bottoms inaccessible by trawlers. This could mean a reduction in landings and revenue of targeted species, however, this could be offset by the positive benefit of protecting the hard bottom and structured habitats, which are EFH for scup and black sea bass. Effort could also be redirected to less vulnerable habitats to recoup lost landings. Thus, this alternative is expected to have a low economic negative impact relative to status quo. The cost of complying with this alternative is also unknown. Thus, the economic impact of this alternative relative to status quo is unknown.

Social and Community Impacts

The New England Fishery Management Council currently has a ban on street sweeper gear. This action was preventative or cautionary. Additionally, these regulations related more to the gear efficiency, rather than habitat impact, although the regulation is expected to benefit habitat. The NEFMC is currently trying to acquire facts as to the interaction and impact of the gear (Carr pers. comm.). Restricting these gear may help to improve the status of the stocks while conserving marine habitat.

Since the New England Fishery Management Council currently has a ban on street sweeper gear, implementing this prohibition in the Mid-Atlantic would make regulations consistent along the coast. This gear restriction may work to reduce gear conflicts between trawlers and potters. Hard bottom may be less accessible to trawlers, thus potters could continue to fish these areas that were traditionally only accessible by black sea bass pots. Enhancement of structured habitat could enhance non-consumptive human activities such as scuba diving. Once the stock is rebuilt long-term social benefits will be realized through a sustainable fishery.

Effects on Protected Species

Black sea bass are primarily landed by fish pots/traps, bottom and midwater trawls, and lines (Table 9a). The Mid-Atlantic pot/trap and mixed trawl fisheries are Category III fisheries as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA . Nonetheless, prohibiting the use of streetsweeper gear is not expected to impact protected species (section 5.4.3.1), relative to the status quo.

Effects on Essential Fish Habitat

The restrictions proposed under this alternative may be an effective means of reducing impacts to habitat that is important to summer flounder, scup, and black sea bass. This alternative would make some vulnerable areas inaccessible to trawling. As such, this alternative is expected to have a positive impact on essential fish habitat, relative to the status quo.

Practicability Analysis

While the adverse nature of the impacts of street sweeper gear on habitat is not clearly understood, it is reasonable to infer that some negative impact on habitat results from the intrusion of trawl nets into areas of rough bottom that were previously inaccessible due to the bottom topography. Though prohibiting the use of this gear may render some areas inaccessible to trawl gear and thereby eliminate whatever impact this gear has on habitat in these areas, the nature and extent of the impacts on habitat from the use of this gear cannot be assessed. This assessment is also frustrated by the fact that the incidence of the use of this gear in the EFH for summer flounder, scup and black sea bass is unknown. Public comment on the use of this gear in the Mid-Atlantic area was solicited at public hearing. However, no information was forthcoming from the public. Anecdotal information suggests that this gear is not used in the Mid-Atlantic area.

Additionally, there is no data on the affect of varying habitats on the density, growth and productivity of various species of fish in the Northeast Region. Thus, even assuming for the purpose of discussion that this alternative would prevent some negative impact on habitat from the use of this gear, there is no demonstrable link between preventing the impacts on habitat and any quantifiable benefit to the various species of fish resident in the area. Rebuilding is occurring for summer flounder scup and black sea bass and for other stocks of fish managed by the MAFMC and NEFMC. This indicates that a sustainable fishery can be attained without the imposition of additional measures to protect EFH i.e., the management measures currently in place are sufficient to prevent overfishing, rebuild the fishery and achieve optimum yield consistent with National Standard 1. This rebuilding is taking place at the current level of fishing effort that exists throughout the EFH for all fisheries involved in the area defined as the EFH for summer flounder, scup and black sea bass. There is no basis to conclude that adopting this alternative would accelerate the rebuilding process that is taking place under the existing management program.

Counterbalanced against the unknown benefits of this alternative for the density, growth and productivity of the fish species concerned is an unquantifiable cost to the industry. Assuming that some fishermen are using this gear, there would be a cost to them of modifying their gear to comply with the prohibition on the use of street sweeper gear. Further, since this prohibition would ostensibly result in less fishable areas, the revenue of fishermen using this gear would be reduced. Available information indicates that the current management measures are sufficient to attain sustainable fisheries. Thus, it is reasonable to conclude that EFH is making significant contributions to the density, growth and productivity of the species of fish concerned at the current level of fishing effort. Consequently, since there is virtually no information on the impact of this gear on habitat and the incidence of the use of this gear in the Mid-Atlantic area there does not exist a reasonable basis upon which to prohibit the use of this gear. Given the lack of a reasonable administrative record upon which to found a prohibition on street sweeper gear and the contribution of EFH to rebuilding these fisheries under current levels of fishing effort, it is the determination of the Council that the adoption of this alternative is not necessary or practicable according to the criteria set forth in 50 CFR Section 600.815(2)(iii).

4.3 CUMULATIVE IMPACTS

A cumulative impact analysis is required as specified by the Council on Environmental Quality's (CEQ) regulation for implementing the NEPA. Cumulative effects are defined under NEPA as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other action (40 CFR § 1508.7)."

Past actions under this FMP are described in section 1.2, "History of FMP Development." Overall, actions implemented by the FMP were to address the management objectives described in section 1.3. Amendments 2, 8, and 9 implemented the annual process for summer flounder, scup, and black sea bass, respectively, which includes the implementation of commercial quotas and recreational harvest limits. Commercial gear requirements and permit and reporting requirements were also implemented. Amendment 12 addressed the new and revised National Standard requirements including summer flounder, scup, and black sea bass overfishing definitions (National Standard 1), the effects on fishing communities (National Standard 8), bycatch reduction (National Standard 9), and safety at sea (National Standard 10). The amendment also identified essential fish habitat (EFH) for summer flounder, scup and black sea bass. Finally, Amendment 12 added a framework adjustment procedure that allowed the Council to add or modify management measures through a streamlined public review process.

The purpose of this amendment is to address the problems identified in section 1.1 of this amendment. This amendment proposes eight alternatives to modify the current system of allocating the commercial quota for black sea bass, which was originally implemented under Amendment 9. It also proposes two alternatives relating to requirements for fishermen who have both a NER BSB permit and a SER S/G permit, two alternatives related to the wet storage of black sea bass pots, two alternatives regarding the implementation of a trap tag program for black sea bass, three alternatives regarding a limit on the number of traps fished by one fisherman for black sea bass, and five alternatives for summer flounder, scup, and black sea bass to prevent, mitigate or minimize adverse effects on EFH from fishing to bring the FMP into compliance with Section 303(a)(7) of SFA. The Council chose the following preferred management alternatives: a) a federal coastwide quota to facilitate the state-by-state allocation system implemented by the Commission (Alternative 5f; section 2.1.5.6); b) removal of the permit requirement that restricts fishermen from using a SER S/G Permit during a northern closure (Alternative 9b; section 2.1.9.2); c) no additional regulations regarding the wet storage of black sea bass pots/traps during a closure (Alternative 10a: status quo; section 2.1.10.1); d) no initiation of a pot/trap tag program (Alternative 11a: status quo; section 2.1.11.1); e) no restrictions on the numbers of pots/traps used by fishermen (Alternative 12a: status quo; section 2.1.12.1); and f) rely on current management measures to minimize adverse effects of fishing on EFH (EFH Alternative 1: Status Quo; section 2.2.1).

Actions in the reasonable foreseeable future include the annual process establishing the commercial quota and recreational harvest limit and the establishment of state allocations by the Commission in 2005 and beyond. The specification setting process includes the implementation of commercial and recreational management measures that allow the target exploitation rate to be achieved on an annual basis. The annual quota setting process ensures that the rebuilding schedule for black sea bass is maintained so the FMP remains in compliance with the MSFMCA as amended by the SFA. The process that the Commission will use to establish the state allocations of the coastwide quota in 2005 and beyond is outlined in Appendix B. The cumulative impacts of a coastwide quota with the allocation to states in 2005 and beyond are also expected to ensure that the black sea bass rebuilding schedule is maintained, so that the plan will remain in compliance with the MSFMCA as amended by the SFA.

The current state allocations chosen by the Board represent a compromise between historical landings under the non-preferred state-by-state alternatives and the most recent state landings (Table 5). It is unlikely that this alternative will result in changes in landings patterns or fishing effort along the coast. Thus, the preferred alternative is not expected to have cumulative negative impacts to protected resources or EFH, relative to past or future act. Additionally, the Mid-Atlantic pot/trap and mixed trawl fisheries are Category III fisheries as defined in the NMFS 2001 List of Fisheries. This means that these fisheries have a remote likelihood or no known serious injuries or mortalities of marine mammals. All fishing gear are required to meet gear restrictions under the LWTRP, HPTRP, MMPA, and ESA.

The affected environment is described in other sections of this amendment. The biological and physical environment, including a description of the stock, habitat, and protected species are described in sections 3.1, 3.2, and 5.4.3.1, respectively. A description of the human environment is found in section 3.3 "Description of Fishing Activities," section 3.4 "Ports and Communities," and section 3.5 "Analysis of Permit Data."

There will be positive impacts to the stock the fishery from the commercial management and EFH alternatives proposed in this amendment. Individual physical, biological, social, economic impacts are discussed in sections 4.1, 4.2, and 5.3. However, the purpose of past, proposed, and future actions is to address the management objectives outlined in section 1.3. All present and future actions must meet the requirements of the ten National Standards outlined in section 5.1 and the other MSFCMA requirements addressed in section 5.0.

None of the proposed commercial management alternatives would change the manner in which the annual black sea bass quota is derived. Therefore, a change in the overall amount of black sea bass landings is not anticipated. The bulk of the commercial management alternatives deal with quota allocations across time and/or space. These proposed actions could result in a higher probability of achieving the target exploitation or mortality rate and should result in a more rapid rebuilding of the stock with the associated positive long-term impact of a sustainable fishery.

To achieve rebuilding, the Council recommends annual specifications that are intended to have a reasonable likelihood of not exceeding the specified target F's for the coming fishing year. Because each year's measures build upon the previous year's measures, the cumulative effects of the management program on the health of the stocks and the fishery are assessed from year to year. The extent of any cumulative impacts from measures established in previous years is largely dependent on how effective those measures were in meeting their intended objectives and the extent to which mitigating measures compensated for any quota overages. On the other hand, other sectors of the fishery (e.g., certain states, in the case of summer flounder) may under-achieve their allowable harvest levels in a given year.

To compensate for any over-harvests, and to preserve the conservation intent of the management regime, the FMP includes provisions that require that any commercial landings that exceed the specifications in one year or quota period be deducted from the commercial quota that would otherwise have been allowed for that portion of the fishery in the following year. Similarly, overages in the recreational fishery are addressed by way of changes in management measures to reduce the harvest the following year to the specified level. Thus, the FMP and the annual specifications anticipate the possibility that landings may exceed targets in any given year and provide a remedy that at least partially compensates for such occurrences in terms of maintaining the conservation goals of the FMP and the rebuilding programs, thus mitigating the impacts of those overages. The annual nature of the management measures is intended to provide the opportunity for the Council and NMFS to assess regularly the status of the fisheries and to make necessary adjustments to ensure that there is a reasonable expectation of meeting the objectives of the FMP and the targets associated with any rebuilding programs under the FMP.

To date, improving stock status for summer flounder, scup, and black sea bass is evidence of positive cumulative biological impacts resulting from the current management system. In addition, the Council has implemented many regulations, that have indirectly acted to reduce fishing gear impacts on EFH. Cumulatively, many of the current regulations have restricted fishing effort and thus reduced gear impact on bottom habitat. Such regulations include restrictive harvest limits, gear restricted areas, and restriction on roller rig gear to 18" for scup and black sea bass. These measures helped to improve the status of the stocks while conserving marine habitat. The addition of any specific EFH actions could add protection to the physical aspects of the environment. Some of the EFH alternatives will result in economic losses, although these losses may be offset by benefits to the stock by protecting habitat. However, it may be impracticable to implement a habitat protection alternative that has costs to the fishing industry for some unknown or unquantified habitat benefit. As such, the cumulative impact of the EFH alternatives should also be minimal.

All FMP actions are implemented for the purpose of meeting the requirements of the MSFMCA as amended by the SFA. The human aspect of the environment are protected under National Standard 8 (ports and communities) and National Standard 10 (safety at sea). The biological aspects of the environment are protected under National Standard 1 (overfishing definition) and National Standard 4 (bycatch), and MMPA. The physical aspects of the environment are protected under the EFH requirements of the MSFCMA.

The proposed actions, together with past and future actions are not expected to result in any negative cumulative impacts on the biological, physical, and human components of the environment. The commercial management and EFH measures for summer flounder, scup, and black sea bass as adopted by the Council represent the best compromise between the probability that the stock will recover and the minimization of costs to the fishing industry.

4.4 SUMMARY

Clearly, there will be impacts from the measures proposed in this amendment. However, if overfishing is to be eliminated, fishing mortality must be reduced. The real test of impacts is whether the commercial management and EFH measures adopted by the Council represent the best compromise between the probability that the stock will recover and the minimization of costs to the fishing industry. The proposed management alternatives are considered the most reasonable to achieve the fishing mortality rate reduction target and protect EFH.

4.5 AREAS OF CONTROVERSY

Two controversial issues in this FMP include the commercial quota re-allocation and the options to manage adverse effects from fishing. While it is generally recognized that there are problems with current commercial quarterly quota allocation, designing an alternative allocation system has been controversial due to the diversity of the different user groups. Different sectors of the commercial fishery have widely varied needs, i.e., northern versus southern fisheries, large versus small operations, or differences among gear types. The EFH regulations have been controversial since the implementation of the Interim Final Rule in December, 1997. Amendment 12 was partially disapproved by the Regional Administrator because of the inadequacy associated with options for managing adverse effects from fishing.

4.6 MITIGATION

There are no issues in the proposed management measures for this amendment that require mitigation.

4.7 SOCIAL IMPACT ASSESSMENT

The discussion presented in this section focuses on social and cultural impacts of the amendment on communities and individuals. Since economic impacts also have social ramifications, they are also included. However, economic impacts are presented in a form different than as seen in the economic impact sections of the amendment.

A detailed study and characterization of the black sea bass and scup fisheries was conducted by Finlayson and McCay (1994). That study was conducted in order to assess the economic impacts of the draft management FMP for the scup and black sea bass fisheries (Amendments 8 and 9, respectively). This report indicates that black sea bass pot specialization is found from Cape May, New Jersey through Virginia. The Montauk and Hampton Roads black sea bass pot fishery really only developed beginning in 1992 and 1993. Nonetheless, already in 1994 Hampton Roads, Cape May, and Ocean City pot fishers and Ocean City handline fishermen were heavily dependent on black sea bass. Given the variety of other fishing activities, and in some cases other industries, while individuals may be heavily affected, fishing communities in the region will be minimally impacted. A distinction needs to be made, however, between impacts to individuals and impacts to communities. Where the number of affected individuals in a community is large, the types and degree of impacts are likely to be the same at each level. Where the numbers of individuals are small, however, they may not be.

More recently, McCay and Cieri (2000) reported a small pot fishery in Wildwood, New Jersey, that mainly targets black sea bass. In Sea Isle City, New Jersey, there is an offshore pot fishery for lobster, conch, and fish (mostly black sea bass). The value of fish trapped within the pot fishery accounted for 12% of the total value landed by the pot fishery in Sea Isle City in 1998. In 1999, the contribution of black sea bass to the total landings of fish and shellfish in Sea Isle City was estimated to be 10.38% in 1999. In Delaware, fishermen (predominantly "bayman" or "watermen") use a wide array of gear types when working the estuary, bay, and tributaries of the Delaware Bay and River, bordering New Jersey. Pots/traps are an important type of gear for these fishermen. For fish traps, the most important species is black sea bass. A more detailed description of several ports important to the summer flounder, scup, and black sea bass fisheries is presented in section 3.4 of the EIS (Port and Community Description).

Quota allocation system

A major goal of this FMP was to revise the quarterly commercial quota system for black sea bass implemented in Amendment 9 of the Summer Flounder, Scup, and Black Sea Bass Fisheries Management Plan. Specifically, the quarterly quota system implemented in Amendment 9 was designed to allow for black sea bass to be landed during the entire 3 months in each quarter. However, the black sea bass fishery experienced early closures during the last three quarters in 1999 and 2000. In fact, in quarters 3 and 4 of 2000 the quarterly allocation was harvested within one month leaving the fishery closed for the remaining two months of those quarters. In 2001, the quarters 1 through 4, also experienced early closures. Quarter 3 of 2001 was closed in less than three weeks.

In addition to early closures, the quota in the first quarter was not taken in 1998, 1999, and 2000. This relates to the fact that the allocation percentages are based on historic landings during a period of time when the mesh size for summer flounder was smaller and the fishery was mixed, i.e., fishermen targeting summer flounder with 4" mesh landed significant quantities of black sea bass as bycatch from January through March. As a result of the quota system and minimum mesh sizes for summer flounder, the flounder fishery is now very direct and fewer sea bass were landed in the winter fishery in 1999 and 2000.

The changes in social structure and cultural fabric that may have occurred under implementation of limited access are already largely in place. While new quotas alone have relatively limited social impacts, distributive effects of a new quota allocation system may impact profitability. Only where there is a significant reduction in net revenues or in the ability to meet costs and make a living are substantial social impacts likely. However, it is important to clarify that the implementation of the preferred quota allocation system will not affect the overall black sea bass landings.

The Council and Commission met on May 1, 2002 to adopt a preferred alternative for the black sea bass commercial quota system and other commercial management measures. They considered the material in the public hearing draft, the supplement that was drafted in response to comments from the Regional Administrator, the public hearing summaries, and all the public comments received on the draft Amendment/EIS. After considerable discussion, they voted to adopt an allocation system that would allocate the annual quota on a coastwide basis each year (Alternative 5f). This would replace the quarterly quota system that is currently in place. In addition, the states adopted a state-by-state allocation system that would allocate the coastwide quota to each state. After considerable debate, the Commission adopted allocation percentages that represented a compromise between the allocation percentages associated with the various base periods presented in Amendment 13.

A coastwide quota system without quarterly or seasonal breakdowns, would not remedy the problems identified in section 1.0 (Purpose and Need for Action). A coastwide quota system without quarterly or seasonal breakdowns, would likely exacerbate the current problems that the fishery is experiencing because controls to regulate landings throughout the year would be lacking. A coastwide quota system would likely increase derby-style fishing and amplify the "use it or lose it" mentality which could lead to harvesting the quota quickly, thus creating early fishery closures, market gluts, and inequities among owners of different sized vessels and in different geographic locations. Long closures have obvious economic consequences to fishermen and processors. A market glut at the beginning of the year allows for a drop in prices as a large number of fish flood the market. After a short landings period, the fishery is closed and fishermen, especially those that fish primarily for black sea bass, are faced with the economic concerns of decreased annual revenues. However, this management measure along with a state-by-state allocation of the quota would benefit fishermen throughout the region. In fact, the Commission has decided to allocate the black sea bass quota to states taking into consideration historical landings and current fishing trends.

This alternative was chosen as the preferred alternative, because a federal coastwide quota with a state-by-state allocation system could allow for the most equitable distribution of the commercial quota to fishermen without the additional burden of federal monitoring by NMFS. Specifically, under this alternative, states 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 state specific landing patterns using possession limits and seasons to ensure a continuous and steady supply of product over the season for producers and/or a fair an equitable distribution of black sea bass to all fishermen who have traditionally landed black sea bass in their state. 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.

In general terms, the impacts of the preferred alternative on vessels is likely to be similar to those presented in Alternative 5c (State-by-state allocations based on the best five landing years for each state during the period 1988 to 1997; see threshold analysis for participating vessels in section 5.3.5.3.1.5.3 of the RFA). More specifically, the economic impacts for the 727 vessels participating in this fishery range from expected revenue losses on the order of <5 percent for a total of 137 vessels (relative to 2000) to losses in revenues of ≥50 percent for 12 vessels and increase revenue for 564 vessels (Table 160). The number of vessels with revenue reduction >5% by home state ranged from none in Delaware, Maryland, North Carolina, New Jersey, New York, Pennsylvania, Rhode Island and Virginia to one in Maine and 19 in Massachusetts.

Other non-preferred quota allocation measures had associated impacts greater than those associated with the preferred alternative. For example, other quota allocations had larger associated negative economic impacts on participants and possibly communities. In addition, monitoring costs under the preferred management measure is lower than those associated with the non-preferred quota allocation alternatives.

Permit restriction measures

Preferred Alternative 9b will implement the removal of the permit requirement that restricts fishermen from using a SER S/G Permit during a northern closure. Only 5 vessels held a NER BSB permit for black sea bass and a SER S/G commercial limited access permit at some time in the calender year 2000. These vessels would benefit from not giving up their NER BSB permit if decided to fish for black sea bass south of Cape Hatteras during a northeast black sea bass closure. That is, there would be no disruption on their fishing activities and thus will not interrupt their business cycle. The implementation of this alternative is not expected to affect the overall fishing landings of other vessels holding NER BSB permit. This alternative is not expected to impact the overall social components of the black sea bass fishery, nor is it expected to have an impact on the majority of the communities that are dependent upon black sea bass. Overall, this alternative is not expected to cause any negative social impacts relative to the status quo.

Other management measures

Under current regulations, fishermen could allow their pots/traps to fish throughout a seasonal closure and land the black sea bass the following quarter. The Council has no information on the number pots/traps and areas fished by individual fishermen, nor how long it takes for fishermen to deploy and haul back their pots/traps. The Council decided to adopt the status quo alternative (Alternative 10a) which allows pots/traps to remain fishing during a closure. Pots/traps are fished for other species during black sea bass closures and it may take more than four weeks to retrieve and deploy pots/traps for some fishermen. While this practice could increase the likelihood on an early seasonal closure in the following quarter (e.g., under the current quarterly allocation system) and the associated social impacts as described in section 4.1.1 of the EIS, the Council feels that the management measures adopted to reallocate the quota should keep the black sea bass fishery open throughout the year.

Alternative 11a (status quo) will not initiate a pot/trap tag program. The lack of a pot/trap tag program does not have any social or community-level impacts. The Council does not feel that a pot/trap tag program is necessary at this time because a pot/trap tag program is only necessary if pot/trap tag limit is implemented. The Council is not implementing a pot limit because of the lack of information on the number of pots fished by individual fishermen. Without this information, economic, biological, EFH, and protected resources impacts cannot be analyzed. Additionally, pot/trap limits are not necessary because trip limits constrain landings. Under the preferred alternative adopted by the Council and Commission, individual states can implement pot/trap tag programs and limits, if necessary.

Currently there is no limit to the number of pots/traps that a fisherman can use. Alternative 12a (status quo) will not implement a restriction on the number of pots/traps used. Although, it is difficult to predict the behavior of fishermen, the current system could result in increased fishing effort for black sea bass and an increase in the catch of nontarget species. Increased effort could impede the rebuilding schedule having an adverse impact on the stock. Adverse impacts on the stock could result in long-term negative social impacts. Although possession limits would continue to constrain landings to the quota, increased fishing effort by pots/traps could also redistribute landings among gear types. Without information on the number of pots/traps fished by fishermen the social impacts cannot be analyzed.

EFH measures

Retaining status quo measures to protect habitat (EFH measures) is not likely to cause additional economic impacts. This will allow industry to maintain current fishing practices. Retaining current measures to achieve the EFH objectives of the SFA would incur no additional burden on the fishing community (section 4.2.1). Other non-preferred measures to protect habitat had associated substantial impacts to participants and communities. Various alternatives for instance would close the fishery to specific gear types and areas, thus producing considerable adverse economic impacts to fishery participants.

5.0 CONSISTENCY WITH APPLICABLE LAWS

5.1 THE AMENDMENT RELATIVE TO THE NATIONAL STANDARDS

Section 301(a) of the MSFCMA 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 amendment meets them:

5.1.1 National Standard 1 - Overfishing Definition

"Conservation and management measures shall prevent overfishing while achieving, on a continuous basis, the optimum yield from each fishery for the United States fishing industry."

Amendment 13 does not make any changes to the existing overfishing definitions or rebuilding schedules. Therefore, the amendment is consistent with National Standard 1. The management measures adopted by the Council and Commission will allow for the target exploitation rates to be met each year. As such, overfishing will cease. In addition, the stock will continue to rebuild such that the stock are no longer overfished and will rebuild to the biomass targets. The overfishing definitions for summer flounder, scup, and black sea bass were addressed in Amendment 12, as follows:

Summer Flounder

Overfishing for summer flounder is defined to occur when the fishing mortality rate exceeds the threshold fishing mortality rate of F_{msy}. Since F_{msy} cannot be reliably estimated, F_{max} is used as a proxy for F_{msy}. When an estimate of F_{msy} is available, it will replace the proxy. F_{max} is 0.26 under current stock conditions. The target fishing mortality rate is also equal to 0.26. The summer flounder stock is over fished when the biomass falls below the minimum biomass threshold of ½ B_{msy}. The biomass target is specified to equal B_{msy}. Since B_{msy} cannot be reliably estimated, the maximum biomass based on YPR analysis and average recruitment is used a proxy. As such, the threshold and target biomass would be 118 million pounds (53,200 mt) and 236 million pounds (106,400 mt), respectively.

Scup

Overfishing for scup is defined to occur when the fishing mortality rate exceeds the threshold fishing mortality rate of F_{msy}. Since F_{msy} cannot be reliably estimated, F_{max} is used as a proxy for F_{msy} . When an estimate of F_{msy} is available, it will replace the proxy. F_{max} is 0.26 under current stock conditions. The maximum value of the spring survey index based on a three year moving average (2.77 kg/tow), would serve as a biomass threshold. B_{msy} cannot be reliably estimated for scup.

Black Sea Bass

Overfishing for black sea bass is defined to occur when the fishing mortality rate exceeds the threshold fishing mortality rate of F_{msy}. Because F_{msy} cannot be reasonably estimated, F_{max} is used as a proxy for F_{msy}. F_{max} is 0.32 under current stock conditions. The maximum value of the spring survey index based on a three year moving average (0.9 kg/tow), would serve as a biomass threshold. B_{msy} cannot be reliably estimated for black sea bass.

5.1.2 National Standard 2 - Scientific Information

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

The best scientific information available for summer flounder, scup, and black sea bass was used in the development of this amendment. This information includes commercial and recreational catch and landings data, data from state and federal surveys, and specific economic and social information as detailed in the plan document. In addition, stock assessments are conducted each year for summer flounder. As such, this amendment is consistent with National Standard 2.

5.1.3 National Standard 3 - Management Units

"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."

Summer flounder, scup, and black sea bass are each managed as a single unit, from Maine through North Carolina. Amendment 13 does not alter the management units. Therefore this amendment is consistent with National Standard 3.

5.1.4 National Standard 4 - Allocations

"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."

This amendment was adopted to remedy problems with the current commercial black sea bass quarterly quota system. In addition to early closures, possible inequities have also been created by the current management system as landings have shifted to the north. The preferred black sea bass quota management alternative chosen by the Council is a coastwide quota to facilitate state-by-state allocations adopted and implemented by the Commission.

This alternative was chosen as the preferred alternative, because a federal coastwide quota would facilitate state-by-state allocation system, and would allow for the most equitable distribution of the commercial quota to fishermen. In fact, the Commission has decided to allocate the black sea bass quota to states taking into consideration historical landings and current fishing trends. Under this alternative, each state 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 state specific landing patterns using possession limits and seasons to ensure a continuous and steady supply of product over the season for producers and/or a fair an equitable distribution of black sea bass to all fishermen who have traditionally landed black sea bass in their state. 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.

Additionally, the Council adopted the alternative to remove the permit restriction that requires fishermen to relinquish their black sea bass permit for six months, if they use their snapper/ grouper permit to fish for black sea bass south of Cape Hatteras during a Northeast closure. The Council sees this restriction as an unnecessary burden on those fishermen that possess both permits. There are only 5 vessels that possess both permits and as such the Council does not foresee any biological, economic, social, EFH, or protected resources impacts as a result of adopting this alternative. Thus, the FMP no longer discriminates against these 5 vessels and ensures that they receive their fair and equitable share of the northeast region black sea bass quota.

As such, this amendment is consistent with National Standard 4.

5.1.5 National Standard 5 - Efficiency

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

The preferred black sea bass quota management alternative chosen by the Council is a coastwide quota to facilitate state-by-state allocations adopted and implemented by the Commission. Since black sea bass is a shared resource between the states and federal governments, a federal system that does not compete with the system implemented by the Commission is needed. The fishery is a multi-jurisdictional fishery that demands cooperation between the Council and Commission. The coastwide quota is a system that recognizes and facilitates the state-by-state allocation system implemented by the Commission. This system would result in less conflicts between the management bodies than any other system. Thus, the Council and Commission would adopt an annual coastwide quota, and the Commission would allocate the quota to each state on an annual basis.

Additionally, the Council adopted the alternative to remove the permit restriction that requires fishermen to relinquish their black sea bass permit for six months, if they use their snapper/grouper permit to fish for black sea bass south of Cape Hatteras during a Northeast closure. The Council sees this restriction as an unnecessary burden on those fishermen that possess both permits. There are only 5 vessels that possess both permits and as such the Council does not foresee any biological, economic, social, EFH, or protected resources impacts as a result of adopting this alternative. Thus, the adoption of this alternative improves efficiency for these 5 vessels and improves compatibility with the Southeast Snapper/Grouper FMP.

The preferred alternatives adopted in this amendment 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 issues 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 management measures proposed in this amendment place no restrictions on processing, or marketing and no unnecessary restrictions on the use of efficient techniques of harvesting. Therefore the proposed action is consistent with National Standard 5.

5.1.6 National Standard 6 - Variations and Contingencies

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

The preferred alternative in this amendment, a federal coastwide quota to facilitate the state-by-state allocation system adopted by the Commission, was chosen because it could allow for the most equitable distribution of the commercial quota to fishermen without the additional burden of federal monitoring by NMFS. Under this alternative, states could design allocation systems based on state specific landing patterns using possession limits and seasons to ensure a continuous and steady supply of product over the season for producers and/or a fair an equitable distribution of black sea bass to all fishermen who have traditionally landed black sea bass in their state. 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. Thus, this alternative takes into account and allows for variations among, and contingencies in, fisheries, fishery resources, and catches.

The Council adopted the alternative to remove the permit restriction that requires fishermen to relinquish their black sea bass permit for six months, if they use their snapper/grouper permit to fish for black sea bass south of Cape Hatteras during a Northeast closure. The Council sees this restriction as an unnecessary burden on those fishermen that possess both permits. There are only 5 vessels that possess both permits and as such the Council does not foresee any biological, economic, social, EFH, or protected resources impacts as a result of adopting this alternative. Thus, the adoption of this alternative takes into account this variation of the black sea bass fishery.

As such, this amendment is consistent with National Standard 6.

5.1.7 National Standard 7 - Cost and Benefits

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

The preferred alternatives were adopted in conjunction with the Commission, and developed to be compatible with, and reinforce the management efforts of the states and the Commission. The preferred black sea bass quota management system was adopted to allow for the most equitable distribution of the commercial quota to fishermen without the additional burden of federal monitoring by NMFS. Thus, this alternative minimizes monitoring and enforcement costs to NMFS.

The Council adopted the alternative to remove the permit restriction that requires fishermen to relinquish their black sea bass permit for six months, if they use their snapper/grouper permit to fish for black sea bass south of Cape Hatteras during a Northeast closure. The Council sees this restriction as an unnecessary burden on those fishermen that possess both permits. There are only 5 vessels that possess both permits and as such the Council does not foresee any biological, economic, social, EFH, or protected resources impacts as a result of adopting this alternative. Thus, the adoption of this alternative minimizes costs and avoids unnecessary duplication for these vessels.

The status quo EFH alternative was adopted because the other EFH alternatives were deemed not to be practicable (section 4.2 practicability analyses), i.e., the costs outweigh the expected benefits. The Council feels that many actions adopted by this Council and NEFMC, and implemented by NMFS over the past ten years have indirectly and directly acted to protect EFH. While the Council does agree that the literature indicates that certain types of mobile gear can have an adverse impact on EFH, the Council also agrees that bottom tending mobile gear can also have a positive impact on EFH. While the nature of these impacts can be inferred from literature, the extent of the impacts remains largely unknown. This is confounded by the fact that true value of habitat to different species' productivity is also largely unknown. The two closed area alternatives may avoid gear impacts but at a very high cost to the commercial fishing industry. Since there is no demonstrable link between preventing the impacts on habitat and any quantifiable benefit to the various species of fish using these areas, the Council did not feel it was practicable to adopt those alternatives.

As such, this amendment is consistent with National Standard 7.

5.1.8 National Standard 8 - Communities

"Conservation and management measures shall, consistent with the conservation requirements of the Magnuson-Stevens Act (including the prevention of overfishing and rebuilding of over fished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities."

Ports and communities that depend on summer flounder, scup, and black sea bass are described in section 3.4.2. One of the purposes of this amendment is to revise the currently quarterly quota system which fails to allow black sea bass to be landed during the entire three months in each quarter. As such, the black sea bass fishery experienced early closures during the last three quarters in 1999 and 2000, and all four quarters in 2001. In fact, in quarters 3 and 4 of 2000 the quarterly allocation was harvested within one month, leaving the fishery closed for the remaining two months of those quarters. In 2001, the quarters 1 through 4, also experienced early closures. Quarter 3 of 2001 was closed in less than three weeks.

Long closures have obvious economic consequences to fishermen and processors, and the ports and communities that are dependent upon them. A market glut at the beginning of the quarter allows for a drop in prices as a large number of fish flood the market. After a short landings period, the fishery is closed and fishermen, especially those that fish primarily for black sea bass, are faced with the additional economic concerns of no or reduced income.

In addition to early closures, possible inequities have been created by the current management system as landings have shifted to the north. In fact, preliminary data for quarter 4 in 2000 indicate that 41% of the landings for that quarter occurred in one state, Massachusetts. A shift in abundance of black sea bass to the north may account for these higher landings. However, some fishermen have also indicated that more restrictive possession limits have favored fishing operations in the north where black sea bass are caught closer to shore.

The preferred alternative in this amendment, a federal coastwide quota to facilitate the state-by-state allocation system adopted and implemented by the Commission, was chosen because it could allow for the most equitable distribution of the commercial quota to fishermen. Specifically, this preferred alternative should minimize economic burdens on communities created by the current quarterly quota system. Additionally, states could design allocation systems based on state specific landing patterns using possession limits and seasons to ensure a continuous and steady supply of product over the season for producers and/or a fair an equitable distribution of black sea bass to all fishermen who have traditionally landed black sea bass in their state. States are more familiar with the needs of their local constituents and communities. 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. As such, this amendment is consistent with National Standard 8.

5.1.9 National Standard 9 - Bycatch

"Conservation and management measures shall, to the extend practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch."

This National Standard requires Councils to consider the bycatch effects of existing and planned conservation and management measures. Bycatch can, in two ways, impede efforts to protect marine ecosystems and achieve sustainable fisheries and the full benefits they can provide to the Nation. Bycatch can increase substantially the uncertainty concerning total fishing-related mortality, which makes it more difficult to assess the status of stocks, to set the appropriate optimal yield, define overfishing levels, and ensure that OYs are attained and overfishing levels are not exceeded. Bycatch may also preclude other more productive uses of fishery resources.

The term "bycatch" means fish that are harvested in a fishery, but that are not sold or kept for personal use. Bycatch includes the discard of whole fish at sea or elsewhere, including economic discards and regulatory discards, and fishing mortality due to an encounter with fishing gear that does not result in capture of fish (i.e., unobserved fishing mortality). Bycatch does not include fish released alive under a recreational catch-and-release fishery management program. A catch-and-release fishery management program is one in which the retention of a particular species is prohibited. In such a program, those fish released alive would not be considered bycatch.

Recent stock assessments for summer flounder, scup and black sea bass indicate that the stocks are overexploited. As a result, the summer flounder, scup and black sea bass FMP and subsequent amendments have focused on reducing fishing mortality and rebuilding these stocks. The regulations are necessary to meet the conservation objectives of the FMP. Many of these management measures have associated discards. However, these regulations are necessary to achieve the principal goal of the MSFCMA - to halt overfishing and to rebuild over fished stocks.

The commercial fisheries for summer flounder, scup, and black sea bass are primarily prosecuted with otter trawls, otter trawls and floating traps, and otter trawls and pots/traps, respectively. These fisheries are managed principally through the specification of annual quotas. In addition, there are other management measures in place which would affect discard rates in the summer flounder, scup, and black sea bass fisheries (e.g., minimum size regulation, mesh size/mesh thresholds, and possession limits).

An analysis of NMFS 1999 VTR data indicates that vessels which land summer flounder, scup, and black sea bass also harvest other species throughout the year. These fisheries are mixed fisheries, where squid, Atlantic mackerel, silver hake, skates, and other species are harvested with summer flounder, scup, and/or black sea bass. The contribution to total landings made by summer flounder, scup, and black sea bass (in addition to all other species landed) on trips targeting summer flounder, scup, or black sea bass are shown in Tables 140 through 142, respectively. For trips that landed 100 or more pounds of summer flounder, summer flounder contributed 18.1% of the total landings (weight; Table 140). For trips that landed 100 or more pounds of scup, scup contributed 33.1% of the total landings (weight; Table 141). For trips that landed 100 or more pounds of black sea bass, black sea bass contributed 18.5% of the total landings (weight; Table 142). In the commercial fishery this data is collected from commercial vessels that have permits to operate in federal waters as required by the FMPs or amendments for Summer Flounder, Scup, Black Sea Bass, Northeast Multispecies, Atlantic Mackerel, Butterfish, Squids, Dogfish, Bluefish, and Tilefish. Commercial vessels with a federal permit are required to report their activities when they engage in a fishery for one or more of the species mentioned above. Further characterization of catch, composition, and disposition in the directed summer flounder, scup, and black sea bass fisheries follow.

Based on further analysis of VTR data of trips keeping 100 pounds or more of summer flounder, 98.2% of the summer flounder were landed (Table 140). A total of 107 species were harvested in addition to summer flounder in these trips. The top ten species landed (by weight) had discard rates of approximately 1% or less with the exception of skates (6.5%) and butterfish (2.0%). Discard rates of over 10% were evident for several species, e.g., horseshoe crab (28.0%), crab unknown species (41.3%), striped bass (12.7%), bonito (11.9%), cancer crab (34.1%), other shellfish (82.1%), and starfish (99.2%). However, total catch for some of these species ranged from a few hundred pounds to more than ten thousand pounds. As such, the total quantity discarded by weight for some of these species was small. Overall, 2% of the total weight harvested on these trips was reported as discarded.

Based on further analysis of VTR data of trips keeping 100 pounds or more of scup, 98.4% of the scup were landed (Table 141). In these trips a total of 68 species were harvested in addition to scup. The top ten species landed (by weight) had discard rates of approximately 2% or less with the exception of summer flounder (9.0%), black sea bass (7.9%), and skates (4.5%). Discard rates of over 10% were evident for several species, e.g., American shad (15.0%), Bonito (25.4%), cunner (82.8%), and crab-unknown (100%). However, total catch for some of these species ranged from a few pounds to a few thousand pounds. As such, the total quantity discarded by weight for some of these species was small. Less than 2% of the total weight harvested on these trips was reported as discarded.

Based on further analysis of VTR data of trips keeping 100 pounds or more of black sea bass, 98% of the black sea bass were landed (Table 142). In these trips a total of 90 species were harvested in addition to black sea bass. The top ten species landed (by weight) had discard rates of approximately 3% or less with the exception of black sea bass (7.7%). Discard rates of over 10% were evident for several species, e.g., tautog (14.4%), sea robins (12.2%), blueback herring (33.3%), cunner (40.1%), and crab-unknown (96.2%). However, total catch for some of these species ranged from a few pounds to a few thousand pounds. As such, the total quantity discarded by weight for some of these species was small. Overall, 2% of the total weight harvested on these trips was reported as discarded.

Given the mixed fishery nature of the summer flounder, scup, and black sea bass fisheries, discards of targeted species and/or incidental species will occur. Catch disposition from NMFS sea sampling data for these species for 1999 are shown on Tables 144 through 146. This sea sampling data is the most complete at-sea observation data available to characterize commercial catch and discards in the summer flounder, scup, and black sea bass fisheries.

Analysis of sea sampling data for summer flounder based on a definition of a directed trip at 100 pounds, indicates that 80.4% of the summer flounder were landed (Table 144). A total of 76 species were harvested in addition to summer flounder in these trips. However, discard rates of over 50% were evident for most species. However, total catch for some of these species was a few thousand pounds and, as such, the total quantity discarded by weight for some of these species was small. Approximately 60.8% of the total weight of all species caught in these trips was discarded.

Analysis of sea sampling data for scup based on a definition of a directed trip at 100 pounds, indicates that about 20.9% of the scup were landed (Table 145). The predominant species caught in these trips was Atlantic mackerel accounting for 40% of the catch. A total of 29 species were harvested in addition to scup in these trips. Discard rates of over 50% were evident for most species. However, total catch for some of these species was a few thousand pounds and, as such, the total quantity discarded by weight for some of these species was small. Approximately 46.5% of the total weight of all fish caught in these trips was discarded.

Analysis of sea sampling data for black sea bass based on a definition of a directed trip at 100 pounds indicated that about 45.3% of the black sea bass were landed (Table 146). The predominant species caught for these trips was Atlantic mackerel, accounting for 23.7 of the catch. A total of 23 species were harvested in addition to black sea bass in these trips. Approximately 55.9% of the total weight caught in these trips was discarded. Discard rates of over 50% were evident for most species. However, total catch for these species ranged from a few pounds to a few thousand pounds and, as such, the total quantity discarded by weight for some of these species was small.

The VTR and sea sampling discard data for summer flounder, scup, and black sea bass are limited and/or contradictory. VTR data indicate discard estimates are minimal for all three species, i.e., less than 3%. Estimates from sea sample data indicate that nearly 20% of summer flounder, 79% of scup, and 55% of black sea bass were discarded. However, these estimates are based on samples that are limited in their temporal or geographical scope.

The nature of the data make it difficult to develop any definitive or reliable conclusions about discards for these fisheries especially during the periods or in areas where sea sampling has not occurred. As such, it is difficult for the Council and Commission to modify or add management measures to further minimize discards if the data are not available to define the nature and scope of the discard problem or the data indicate that a discard problem does not exist.

The Council recognizes the need for improved estimates of discards for all of the fisheries managed under this FMP. The Council has requested increased at-sea sampling intensity over a broader temporal and geographical scope than is currently available.

The lack of discard data, for summer flounder, scup and black sea bass has hampered the ability of the Council and Commission to respond to potential discard problems in the commercial fisheries. In fact, the lack of this data has been the primary reason cited by the SARC as to why an age based assessment cannot be developed for either scup or black sea bass. The collection of additional data by NMFS will allow the Council and Commission to more effectively respond to discard problems by changes in mesh, threshold and minimum size regulations or by implementing season and area closures in response to changes in fishermen behavior or an increased level of discards.

There are also a significant recreational fisheries for summer flounder, scup, and black sea bass. A high portion of the summer flounder, scup, and black sea bass that are caught are released after capture. It is estimated that 10%, 15%, and 25% of the summer flounder, scup, and black sea bass that are caught and released by anglers die after release, i.e, the majority of the fish are released alive and are expected to survive after release. The fish that survive are not defined as bycatch under the SFA. The Council and Commission believe that information and education programs relative to proper catch and release techniques for summer flounder, scup, black sea bass and other species caught by recreational fishermen should help to maximize the number of these species released alive.

Current recreational management measures could effect the discards of summer flounder, scup, and black sea bass. These measures include a possession limit, size limit, and season. The effects of the possession limit would be greatest at small limits and be progressively less at higher limits. The size limit would have similar effects but the level of discarding will be dependent upon the levels of incoming recruitment and subsequent abundance of small fish. Seasonal effects would differ depending on the length of the season and the amount of summer flounder, scup, and black sea bass caught while targeting other species.

Minimum size limits, bag limits and seasons have proven to be effective management tools in controlling fishing mortality in the recreational fishery. A notable example is the recent success in the management of the Atlantic coast striped bass fishery. The recreational striped bass fishery is managed principally through the use of minimum size limits, bag limits and seasons. When these measures were first implemented, release rates in the recreational striped bass fishery exceeded 90%. However, the quick and sustained recovery of the striped bass stock after implementation of these measures provides evidence of their effectiveness in controlling fishing mortality in recreational fisheries.

The Council and Commission can currently implement annual changes in commercial and recreational management measures in response to changes in fishermen behavior or an increased level of discards, through the annual specifications process. Currently, the Council and Commission have implemented gear restricted areas through their annual specification process to minimize scup discards in the small mesh fisheries. The Council also funded research to identify gear modifications that reduce the bycatch of scup in small mesh fisheries. In addition, the framework adjustment procedure implemented in Amendment 12 can be used to allow the Council and Commission to respond quickly to changes in the fishery through the implementation of new management measures or the modification of existing measures.

The management system proposed in this FMP represents the most effective tool for managing the black sea bass fishery. It is intended to distribute black sea bass landings throughout the year. In distributing black sea bass landings throughout the year, it is less likely that seasonal closures will occur in the commercial black sea bass fishery. Therefore, when black sea bass are caught in the directed and mixed trawl fisheries, they will not have to be discarded. Therefore the amendment is consistent with National Standard 9.

5.1.10 National Standard 10 - Safety at Sea

"Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea."

The black sea bass fishery management system proposed in this amendment was designed to eliminate derby style fishing for black sea bass. Landings will be controlled by the states and allocated over the year.

The Council did not adopt any measures that require black sea bass fishermen to remove pots/traps during a closure. Some comments were received during the public hearing process stating that it was not practical to remove pots during a two or four week closure since some fishermen have large numbers of pots deployed long distances offshore. As such, if inclement weather were to occur during a closure, a requirement to remove pot/traps could prove to be unsafe.

The measures proposed in this amendment should not affect the vessel operating environment or gear loading requirements. The Council developed this amendment with the consultation of industry advisors to help ensure that this was the case. In summary, the Council has concluded that the proposed amendment will not impact or affect the safety of human life at sea. Therefore the amendment is consistent with National Standard 10.

5.2 OTHER MAGNUSON-STEVENS FISHERY CONSERVATION ACT REQUIREMENTS

Section 303(a)(12) of the MSFCMA requires the Councils to assess the type and amount of fish caught and released alive during recreational fishing under catch and release fishery management programs and the mortality of such fish, and include conservation and management measures that, to the extent practicable, minimize mortality and ensure the extended survival of such fish. This requirement has been addressed under section 5.1.9 of this Amendment.

Section 303(a)(13) of the MSFCMA requires the Councils to include a description of the commercial, recreational, and charter fishing sectors which participate in the fishery and, to the extent practicable, quantify trends in landings of the managed fishery resources by the commercial, recreational, and charter fishing sectors. The description of fishing activities for the summer flounder fishery was presented in section 3.3.1 of this amendment. Additional information pertaining to the recreational and charter fishing sectors is presented section 5.2.1 (Additional Characterization of the Recreational and Party/Charter Fisheries).

Section 303(a)(14) of the MSFCMA requires that to the extent that rebuilding plans or other conservation and management measures which reduce the overall harvest in a fishery are necessary, any harvest restrictions or recovery benefits are allocated fairly and equitably among commercial, recreational, and charter fishing sectors in the fishery. This amendment would not change the allocations of the TAL for the recreational and commercial summer flounder, scup, and black sea bass fisheries. These allocations are based on historical percentages and are detailed in Amendments 2, 8, and 9, respectively. As such, harvest restrictions and recovery benefits are allocated fairly and equitably among the commercial and recreational sectors. As the stocks rebuild and the TALs increase, the commercial and recreational user groups will benefit, i.e., the allocations will increase in direct proportion to the increase in overall TAL. Conversely, if the stock size decreases or the target exploitation rate drops, the overall TAL would decrease and the allocation to each sector would decrease in direct proportion.

5.2.1 Additional Characterization of the Recreational and Party/Charter Fisheries

5.2.1.1 Marine recreational descriptive statistics

In 1994, sportfishing surveys were conducted by NMFS in the Northeast Region (Maine to Virginia) to obtain demographic and economic information on marine recreational fishing participants from Maine to Virginia (this is in addition to the information in section 3.3.4.2.4 on the 1990 survey of charter and party boats). Data from the surveys were then used to access socio-economic characteristics of these participants, as well as to identify their marine recreational fishing preferences and their perceptions of current and prospective fishery management regulations. This information will be used in future stages of the research to estimate statistical models of the demand for marine recreational fishing for eight important recreational species. The information that follows is excepted and paraphrased from a preliminary report by Steinback *et. al.* (1999).

"Marine recreational fishing is one of the most popular outdoor recreational activities in America. In 1992, the lowest level of participation during the last ten years, approximately 2.57 million residents of coastal states in the Northeast Region participated in marine recreational fishing in their own state. Participation increased approximately 5% in 1993 (2.7 million) and increased another 14% in 1994 (3.1 million), exceeding the ten-year average of 2.9 million. Although the total number of finfish caught in the Northeast Region has declined over the past ten years effort (trips) has remained relatively stable. An estimated 22.4 million fishing trips were taken in 1994, up from 19.3 million in 1993."

The following discussion contains demographic and socio-economic characteristics of anglers, as well as their preferences, attitudes, and opinions, toward recreational fishing activities and regulations. There was little or no difference in mean age across subregions. "The largest proportion of anglers in both subregions were 36-45 years old (NE=28%, MA=25%). However, comparatively, New England anglers were younger than Mid-Atlantic anglers. Results show that participation in marine recreational fishing increased with age, peaked between ages of 36 to 45, and subsequently declined thereafter. The resultant age distribution is similar to the findings of other marine recreational studies. However, the distribution is not reflective of the general population in these subregions. Bureau of the Census estimates indicate population peaks between the ages of 25 to 34 in both subregions, declines until the age of 64 and then increases substantially." The complete distribution of recreational anglers by age for both subregions is as follows: between the ages of 16-25, 8% in NE and 7% in Massachusetts; between 26-35, 24% in NE and 20% in Massachusetts; between 36-45, 28% in NE and 25% in Massachusetts; between 56-65, 12% in NE and 15% in Massachusetts; and 65 and over, 8% in NE and 11% in Massachusetts. In this survey anglers under the age of 16 were not interviewed and are not included in the analysis.

In both subregions at least 88% of the anglers (age 25 and over) had obtained at least a high school degree (NE=91%, MA=88%). "While the educational background is similar across subregions, a greater portion of the anglers in New England earned college or post graduate/professional degrees (NE=29%, MA=23%). The shape of the educational distribution essentially mirrored the general population in both subregions. However, the average number of anglers without a high school degree was considerably lower than Bureau of the Census estimates (age 25 and over) for the general population. On the other hand, it appears that anglers in new England and the Mid-Atlantic earned less post graduate/professional degrees than Bureau of Census estimates."

When anglers were asked to describe their racial or ethnic origin, almost all of the anglers interviewed in both subregions considered themselves to be white (NE=95%, MA=90%). "In the Mid-Atlantic, most of the remaining individuals were black (7%), leaving 3% to be of other ethnic origins. In New England, the remaining anglers were evenly distributed across other ethnic origins. The high occurrence of white fishermen is representative of the general population of the coastal states in New England, Approximately 94% of the population in 1993 was estimated to be white. However, in the Mid-Atlantic, the percentage of white anglers was considerable higher than Bureau of Census populations estimates, and the percentage of black fishermen was 12 percent lower."

When anglers were asked to indicate from a range of categories what their total annual household income was, only minor differences between subregions were found. "The largest percentage of household incomes fell between $30,001 and $45,000 for both subregions (NE=27%, MA=26%). In comparison to the general population, anglers' annual household incomes are relatively higher in both subregions. Results are consistent with previous studies which showed that angler household incomes are generally higher than the population estimates."

If it is assumed that "years fished" is a proxy for "experience," the survey data shows that anglers in New England are relatively less experienced than anglers in the Mid-Atlantic. The distribution of recreational anglers years of experience is as follows: 0-5 years of experience, 22% in NE and 16% in Massachusetts; 6-10 years of experience, 10% in NE and 10% in Massachusetts; 11-15 years of experience, 13% in NE and 14% in Massachusetts; 16-20 years of experience, 9% in NE and 9% in Massachusetts; 21-25 years of experience, 12% in NE and 12% in Massachusetts; 26-30 years of experience, 13% in NE and 12% in Massachusetts; and 30 or more years of experience, 21% NE and 26% in Massachusetts.

On average, it was found that New England anglers spent more on boat fees, lodging, and travel expenses than Mid-Atlantic anglers (due to budget and interview time constraints, expenditure information pertaining to bait, tackle, ice, or meals was not collected). "During the follow-up telephone portion of the survey, anglers that fished from a party/charter boat or a private/rental boat were asked how much they personally spent on boat fees for the trip in which they were interviewed. Boat fees averaged $61.00 per trip in New England and $51.00 in the Mid-Atlantic. Two categories of lodging expenses were obtained. The first category (Lodging (>0)) is an estimate of the mean lodging expense per night for those anglers who indicated they spent at least one night away from their residence and personally incurred lodging costs. Subsequently, the second category (Lodging (all)) is an estimate of mean lodging expenses across all overnight anglers, regardless of whether an angler incurred a lodging expense. Per night costs were estimated by dividing total lodging costs for the trip by the number of days the angler was away from his/her residence on the trip. Anglers that personally incurred lodging expenses spent $58.00 on average per night in New England and $47.00 per night in the Mid-Atlantic. Across all overnight anglers, per night lodging expenses in New England averaged $29.00 and in the Mid-Atlantic, $21.00. Anglers expenditures also included money spent on gas, travel fares, tolls, and ferry and parking fees. One-way travel expenditures averaged $11.00 in new England and $8.00 in the Mid-Atlantic per trip. Therefore, if arrival costs are tantamount to departure costs, average round-trip travel expenses would approximate $22.00 in New England and $16.00 in the Mid-Atlantic." Since certain expenditures such as parking, tolls, and other travel fares may be incurred only once, the estimated round-trip travel expense should be considered an upper bound estimate.

Survey results show that over 50% of the anglers in both subregions indicated boat ownership (NE=51%, MA=53%). These results were obtained when anglers were asked if anyone living in their household owns a boat that is used for recreational saltwater fishing.

Regarding the duration of the interviewed trip length, "at least 80 percent of the anglers in both subregions indicated they were on a one-day fishing trip (NE=80%, MA=84%). One-day fishing trips were defined to be trips in which an angler departs and returns on the same day. Less than one fourth of the respondents indicated the day fishing was part of a longer trip which they spent at least one night away from their residence (NE=20%, MA=16%)."

"Respondents were asked why they chose to fish at the site they were interviewed. "Convenience" and "better catch rates" were the main reasons why anglers chose fishing sites in both subregions. Forty-nine percent of the anglers in New England and 57 percent of the anglers in the Mid-Atlantic indicated "convenience" as either first or second reason for site choice. "Better catch rates" was the first or second stated reason for site choice by 51 percent of the anglers in New England and 50 percent of the anglers in the Mid-Atlantic. Other notable responses were "always go there," "boat ramp," "access to pier," and "scenic beauty." Results indicate that although anglers chose fishing sites for many different reasons, sites that offered good catch rates and were convenient attracted the most anglers."

Recreational anglers were asked to rate recreational fishing against their other outdoor activities during the last two months. Specifically, they were asked if fishing was their most important outdoor activity, their second most important outdoor activity, or only one of many outdoor activities? "Over 60% of the respondents in both subregions (NE=61%, MA=68%) reported marine recreational fishing was their most important outdoor activity during the past two months. Less than 30 percent in both subregions (NE=27%, MA=20%) said recreational fishing was only one of many outdoor activities. These results were consistent with national outdoor recreation surveys carried over the past three decades indicating that fishing is consistently one of the top outdoor recreational activities in terms of number of people who participate.

Recreational anglers ratings of reasons (7 preestablished reasons for fishing) for marine fishing are presented in Table 146. More than 66% of the anglers in both subregions said that it was very important to go marine fishing because it allowed them to: spend quality time with friends and family (NE=81%, MA=85%); enjoy nature and the outdoors (NE=89%, MA=87%); experience or challenge of sport fishing (NE=69%, MA=66%); and relax and escape from my daily routine (NE=83%, MA=86%). "The reasons that were rated as not important by the largest proportion of anglers consisted of: fish to eat (NE=42%), to be alone (NE=55%, MA=58%), and to fish in a tournament or when citations were available (NE=79%, MA=73%). In the Mid-Atlantic, although to catch fish to eat was rated as being somewhat important by the largest proportion of anglers (40%), approximately 31 percent felt that catching fish to eat was very important. Whereas, in New England, only 20 percent concurred. It is clear from these responses that marine recreational fishing offers much more than just catching fish to anglers. Over 80 percent of the respondents in both subregions perceived recreational fishing as a time to spend with friends and family, a time to escape from their daily routine, and time to enjoy nature and outdoors. While catching fish to eat is somewhat important to anglers, findings of this survey generally concur with previous studies that found non-catch reasons are rated highly by almost all respondents while catch is very important for about a third and catching to eat fish is moderately important for about another third."

"The economic survey sought to solicit anglers opinions regarding four widely applied regulatory methods used to restrict total recreational catch of the species of fish for which they typically fish: (1) limits on the minimum size of the fish they can keep; (2) limits on the number of fish they can keep; (3) limits on the times of the year when they can keep the fish they catch; and (4) limits on the areas they fish. Anglers were asked whether or not they support or opposed the regulations." As indicated in Table 147, strong support existed for all regulatory methods in both subregions. Limits on the minimum size of fish anglers could keep generated the highest support in both regions (NE=93%, MA=93%), while limits on the area anglers can fish, although still high, generated relatively lower support (NE=68%, MA=66%).

Regulations which limit the number of fish anglers can keep ranked second (NE=91%, MA=88%). The results from this solicitation indicate that recreational anglers in the Northeast Region appear to be conservation oriented and generally support regulations employed to restrict total catch. Not surprisingly, when analyzing anglers opinions regarding the four widely applied regulatory methods, it was found that anglers in all modes indicated strong support for the regulatory measures. With minimum size limits generating the strongest support, followed by catch limits, seasonal closures, and lastly, area closures. "Although party/charter, private/rental, and shore respondents did offer varying degrees of support for each of a selection of regulatory measures, similar support existed across all modes. Support was highest for common regulatory methods currently being implemented in New England and the Mid-Atlantic (e.g., size and bag limits), than for area and seasonal closures."

5.2.2 Essential Fish Habitat Assessment

An EFH assessment is required under 50 CFR Section 600.920 (e) "for any Federal action that may adversely affect EFH." The assessment may be incorporated into documents prepared for ESA or NEPA requirements. Additionally, the level of detail of the EFH assessment is required to be "commensurate with the complexity and the magnitude of the potential adverse effects of the action." Mandatory requirements of the EFH assessment include: "(i) A description of the action. (ii) An analysis of the potential adverse effects of the action on EFH and the managed species. (iii) The Federal agency's conclusions regarding the effects of the action on EFH. (iv) Proposed mitigation, if applicable." The mandatory requirements are as follows:

(i) A complete description of the actions proposed in this amendment can be found in sections 2.1 and 2.2. The preferred alternatives adopted in this amendment include: a) a federal coastwide quota with a state-by-state allocation system managed by the Commission (Alternative 5f; section 2.1.5.6); b) removal of the permit requirement that restricts fishermen from using a SER S/G Permit during a northern closure (Alternative 9b; section 2.1.9.2); c) no additional regulations regarding wet storage of black sea bass pots/traps during a closure (Alternative 10a; section 2.1.10.1); d) no initiation of a pot/trap tag program (Alternative 11a; section 2.1.11.1); e) no restrictions on the numbers of pots/traps used (Alternative 12a; section 2.1.12.1); and f) rely on current management measures to minimize adverse effects of fishing on EFH (EFH Alternative 1; section 2.2.1).

(ii) An analysis of the potential adverse effects of the actions on EFH, can be found in sections 4.1.5.6, 4.1.9.2, 4.1.10.1 4.1.11.1, 4.1.12.1, and 4.2.1. A complete description of EFH for summer flounder, scup, and black sea bass, summer flounder HAPC, and EFH for other species can be found in sections 3.2.4, 3.2.5, and 3.2.6, respectively. A general description of the impact of fishing gear on EFH can be found in section 3.2.7.2.

As described in sections 4.1.5.6, 4.1.9.2, 4.1.10.1, 4.1.11.1, 4.1.12.1, and 4.2.1, the alternatives adopted by the Council and Commission, separately or cumulatively (section 4.2), are not expected to adversely impact EFH. In all cases, the preferred alternatives are not expected to result in an overall increase in fishing effort. Furthermore, the black sea bass commercial quota management alternative is expected to have a greater probability of achieving the annual quota, relative to the current system. As described in section 4.1.5.6, this alternative is more likely to achieve annual target mortality rates, resulting in an overall decrease in fishing effort in the black sea bass fishery. A complete description of the combined impact of all the management measures in this amendment can be found under the Practicability Analysis in section 4.2.1.

(iii) The Council concludes that the actions proposed in this amendment are not expected to adversely impact EFH of summer flounder, scup, black sea bass, or any other species. Based upon the practicability analysis provided for the EFH management alternatives (section 4.2) the Council has determined that this FMP amendment minimizes, to the extent practicable, any potential adverse effects of fishing on EFH, as required by Section 303(a)(7) of the MSFCMA. An EFH consultation is required.

(iv) Since no adverse impacts of EFH are identified, mitigation is not applicable.

5.3 Regulatory Impact Review (RIR) and Regulatory Flexibility Analysis (RFA)

This section provides the analysis to address the requirements of EO 12866 and the RFA. Since many of the requirements of these mandates duplicate those required under the MSFCMA and NEPA, this section contains references to other appropriate sections of this document. The effects of actions were analyzed by employing quantitative approaches to the extent possible. Where quantitative data were not available, qualitative analyses were conducted.

5.3.1 Introduction

The National Marine Fisheries Service (NMFS) requires the preparation of a Regulatory Impact Review (RIR) for all regulatory actions that either implement a new FMP or significantly amend an existing plan. This 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. This 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 this 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. This RIR addresses many items in the regulatory philosophy and principles of Executive Order (EO) 12866.

Also included is a Regulatory Flexibility Analysis (RFA). A complete description of the need for, and objectives of, this rule can be found in the Introduction of the EIS. In addition, a description of fisheries, description of ports and communities, and an analysis of permit data are presented in sections 3.3, 3.4, and 3.5 of the EIS, respectively. The legal basis of this rule can be found in section 1.0 of the EIS.

5.3.2 Evaluation of EO 12866 Significance

None of the black sea bass commercial fishery alternatives evaluated in this document will result in a significant regulatory action under EO 12866 for the following reasons. First, it will not have an annual effect on the economy of more than $100 million. The measures considered in this document will not affect total revenues, landings, or consumer surplus to the extent that a $100 million annual economic impact will occur.

Based on NMFS landings data, the total black sea bass commercial value (Maine to Cape Hatteras, North Carolina) was estimated at $5.0 million in 1999. In addition, preliminary landings statistics indicate that in 2000 that value was $4.8 million. On average, for the 1996 to 2000 period the commercial value of black sea bass landed from Maine to Cape Hatteras, North Carolina was approximately $4.4 million. The proposed black sea bass measures will not change the total amount of black sea bass fishermen are allowed to land. However, quota allocations across time and/or space are assessed in order to establish a new system to allocate the quota throughout the year.

The actions are necessary to develop a new allocation system and advance the recovery of the black sea bass stock. The action benefits in a material way the economy, productivity, competition and jobs. The action will not adversely affect, in the long-term, competition, jobs, the environment, public health or safety, or state, local, or tribal government communities. Second, the action will not create a serious inconsistency or otherwise interfere with an action taken or planned by another agency. No other agency has indicated that it plans an action that will affect the black sea bass fishery in the EEZ. Third, the actions will not materially alter the budgetary impact of entitlement, grants, user fees, or loan programs or the rights and obligations of their participants. And, fourth, the actions do not raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in EO 12866.

The economic benefits of the summer flounder, scup and black sea bass FMP have been evaluated periodically as amendments to the FMP have been implemented to either change the effort reduction schedule or as new species have been added. These analyses have been conducted at the time a major amendment and/or interim actions (framework adjustments or quota specifications) are developed and may be presumed to leave the conclusions reached in the initial benefit-cost analyses unchanged provided the original conservation and economic objectives of the plan are being met.

The economic effects of the black sea bass effort reductions were evaluated at the time black sea bass was added to the FMP through Amendment 9. The economic analysis presented at that time were largely qualitative in nature. Assessment of the black sea bass quota indicates that overall landings have been within the quota specifications in 1998 and 1999. In 1998 and 1999 commercial landings were below the commercial quota. Assessment of the 2000 fishing season indicate that landings were slightly above the overall quota. This is the first time since the black sea bass quota was implemented that overall landings exceeded the established commercial quota. Since quota adjustments will be made to the 2001 quota in order to account for the overages in 2000, there is a reasonable expectation that the management objectives will be met and the expected overall economic benefits will not be compromised.

Although the quarterly quota system was designed to allow for landings over each period, early closures have occurred in the second, third and fourth quarters in 1999 and 2000. In fact, last year, federally permitted fishermen could only fish for about 2 months during a six month period from July through December. The evaluated alternatives described below are intended to remedy the problems associated with the current commercial management system for black sea bass.

Long closures have obvious economic consequences to fishermen and processors. A market glut at the beginning of the quarter allows for a drop in prices as a large number of fish flood the market. After a short landings period, the fishery is closed and fishermen, especially those that fish primarily for black sea bass, are faced with the additional economic concerns of no or reduced income. As indicated in section 3.3.4.1.2 (processing, marketing, and consumption), NMFS unpublished processing survey data indicates that in 1999, two plants reported handling black sea bass. Information regarding production for these plants is confidential. However, the overall amount contribution of black sea bass to the total poundage processed and total value of the products processed of these plants was minimal, i.e., less than 0.5%. Most black sea bass are sold fresh (Bergman and 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 frozen, processing is minimal, mainly consisting of handling and freezing. Therefore, the overall impact of long closures to the few processors that handle black sea bass is likely to be minimal.

Also, over the last several years, the quota in the first quarter has not been taken. In fact, from 1998-2000, on average, over 33% of the first quarter quota has not been taken. This relates to the fact that the allocation percentages were based on historic landings during a period of time when the mesh size for summer flounder was smaller and the fishery was mixed, i.e., fishermen targeting summer flounder with 4" mesh landed significant quantities of black sea bass as bycatch from January through March. As the result of the quota system and minimum mesh sizes for summer flounder, the flounder fishery is now very direct and fewer sea bass are landed in the winter fishery.

Possible inequities have also been created by the current management system as landings have shifted to the north as larger fish have increased in abundance. Some fishermen have also indicated that more restrictive trip limits have favored fishing operations in the north where black sea bass are caught closer to shore. In fact, preliminary data for quarter 4 in 2000 indicate that 41% of the landings for that quarter occurred in one state, Massachusetts.

For each scenario potential impacts on several areas of interest are discussed. The objective of this analysis is to describe clearly and concisely the economic effects of the various alternatives. The types of effects that should be considered include the following: changes in landings, prices, consumer and producer benefits, harvesting costs, enforcement costs, and distributional effects. Due to the lack of an empirical model for these fisheries and knowledge of elasticities of supply and demand, a qualitative approach to the economic assessment was adopted. Nevertheless, quantitative measures are provided whenever possible.

A more detailed description of the economic concepts involved can be found in "Guidelines for Economic Analysis of Fishery Management Actions" (NMFS 2000), as only a brief summary of key concepts will be presented here.

Benefit-cost analysis is conducted to evaluate the net social benefit arising from changes in consumer and producer surpluses that are expected to occur upon implementation of a regulatory action. Total Consumer Surplus (CS) is the difference between the amounts consumers are willing to pay for products or services and the amounts they actually pay. Thus CS represents net benefits to consumers. When the information necessary to plot the supply and demand curves for a particular commodity is available, consumer surplus is represented by the area that is below the demand curve and above the market clearing price where the two curves intersect. Since an empirical model describing the elasticities of supply and demand for black sea bass is not available, it was assumed that the price for these species was determine by the market clearance price or the interaction of the supply and demand curves. These prices were the base prices used to determine potential changes in prices due to changes in landings.

Net benefit to producers is producer surplus (PS). Total PS is the difference between the amounts producers actually receive for providing goods and services and the economic cost producers bear to do so. Graphically, it is the area above the supply curve and below the market clearing price where supply and demand intersect. Economic costs are measured by the opportunity cost of all resources including the raw materials, physical and human capital used in the process of supplying these goods and services to consumers.

One of the more visible costs to society of fisheries regulation is that of enforcement. From a budgetary perspective, the cost of enforcement is equivalent to the total public expenditure devoted to enforcement. However, the economic cost of enforcement is measured by the opportunity cost of devoting resources to enforcement vis à vis some other public or private use and/or by the opportunity cost of diverting enforcement resources from one fishery to another.

Methodology

For purposes of this analysis, all the alternatives discussing quota allocations, will be evaluated under the assumption that the primary measure for achieving the Amendment's objectives will be to establish a system that allows for black sea bass landings to occur throughout the fishing season. When necessary and/or possible, the alternatives will be evaluated against a base line. The base line condition provides the standard against which all other alternative actions are compared. In this analysis, the base line condition is the 2000 landings. This comparison will allow for the evaluation of the potential fishing opportunities associated with each alternative versus the fishing opportunities that were in place in 2000. Aggregate changes in fishing opportunities in 2002 employing a hypothetical quota (the same commercial quota level that has been in place since the development of the Black Sea Bass FMP is assumed) and proposed allocation systems versus landings in 2000 will be shown when possible.

5.3.3 Alternatives Evaluated

5.3.3.1 Black sea bass commercial fishery alternatives

5.3.3.1.1 Status quo: quarterly quota system currently in effect (Alternative 1)

This alternative would allow the current system to continue in effect. That is, the annual commercial quota would be allocated to four quarters based on landings data for the 1988-1992 period. The allocation periods and associated percent of the total quota is shown in Table 1. Landings limits would be implemented for each period. Any landings in excess of the quota that occurred during the previous quarter would be subtracted from the following year's quota. Quarter allocations based on a hypothetical commercial quota of 3,024,742 lb are shown on Table 1. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

Landings - The continuation of this quota allocation system will not affect the overall black sea bass landings.

Prices - Given that this allocation would not affect the amount of black sea bass landings, then it is assumed that it will not change the price of black sea bass.

Consumer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in consumer surplus associated with this fishery.

Harvest Costs - Since is it not anticipated that the number of gear employed to harvest black sea bass will change as a consequence of this alternative, then it would be expected that the harvest cost would remain relatively constant.

Producer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in producer surplus associated with this fishery.

Enforcement Costs - Properly defined, enforcement costs are not equivalent to the budgetary expense of dockside or at-sea inspection of vessels. Rather, enforcement costs from an economic perspective, are measured by opportunity cost in terms of foregone enforcement services that must be diverted to enforcing black sea bass regulations. The status quo alternative would allow the current system to continue in effect and no new enforcement burdens will be introduced.

Distributive Effects - No distributive effects are identified under this alternative.

5.3.3.1.2 A quarterly quota system with a rollover provision (Alternative 2)

5.3.3.1.2.1 A quarterly quota system with a change in the allocation formula based on 1988-1997 landings data and a rollover provision (Alternative 2a)

This alternative would allow the current system to continue in effect with a slight modification to the quota allocation formula and the addition of a provision to allow for a rollover in quota between quarters. That is, the annual commercial quota would be allocated to four quarters based on landings data for the 1988-1997 period. The allocation periods and associated percent of the total quota is shown in Table 1. In addition, a rollover provision would be implemented with this alternative. That is, unused quota from the previous quarters could be added to the next quarter allocation within a year. (i.e., unused quota from quarter 4 could not be added to the quarter 1 allocation the following year.) Landings limits would be implemented for each period. Any landings in excess of the quota that occurred during the previous quarter would be subtracted from the following year's quota. Quarter allocations based on a hypothetical commercial quota of 3,024,742 lb are shown on Table 1. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

Landings - The implementation of this quota allocation system will not affect the overall black sea bass landings.

Prices - Given that this allocation would not affect the amount of black sea bass landings, then it is assumed that it will not change the price of black sea bass.

Consumer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in consumer surplus associated with this fishery.

Harvest Costs - Since is it not anticipated that the number of gear employed to harvest black sea bass will change as a consequence of this alternative, then it would be expected that the harvest cost would remain relatively constant.

Producer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in producer surplus associated with this fishery.

Enforcement Costs - Under this quarterly quota allocation system enforcement costs are expected to be similar to those under the current system (Alternative 1: status quo).

Distributive Effects - The implementation of this alternative would sightly alter the quarterly quota allocation compared to the status quo (Table 1). As an example, the quarter 1 allocation would change from 38.64% to 36.16%. As such, vessels that participate in the black sea bass fishery during that period only would experience a slight decrease in landings and revenues. The decrease in revenue for vessels landing in quarter one only will come at the benefit of vessels operating in quarters that are projected to have increase in landings. As indicated in section 2.0 of the RIR, from 1998-2000, on average, over 33% of the first quarter quota has not been taken. However, during the first quarter of 2001, the commercial black sea bass quota was taking and the fishery closed early. Therefore, it is expected that landings by participating vessels would remain relatively unchanged if current fishing practices continue.

5.3.3.1.2.2 A quarterly quota system with a change in the allocation formula based on 1993-1997 landings data and a rollover provision (Alternative 2b)

This alternative would allow the current system to continue in effect with a slight modification to the quota allocation formula and the addition of a provision to allow for a rollover in quota between quarters. The annual commercial Quota would be allocated to four quarters based on landings data for the 1993-1997 period. The allocation periods and associated percent of the total quota is shown in Table 1. In addition, a rollover provision would be implemented with this alternative. That is, unused quota from the previous quarters could be added to the next quarter allocation within a year. (i.e., unused quota from quarter 4 could not be added to the quarter 1 allocation the following year.) Landings limits would be implemented for each period. Any landings in excess of the quota that occurred during the previous quarter would be subtracted from the following year's quota. Quarter allocations based on a hypothetical commercial quota of 3,024,742 lb are shown on Table 1. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

Impacts are expected to be similar to those described under Alternative 2a (5.3.3.1.2.1), except for different distributive effects.

Distributive Effects - The implementation of this alternative would sightly alter the quarterly quota allocation compared to the status quo (Table 1). As an example, the quarter 1 allocation would change from 38.64% to 34.13%. As such, vessels that participate in the black sea bass fishery during that period only would experience a slight decrease in landings and revenues. In addition, given the migratory pattern of black sea bass (section 3.1.3 of the EIS), it is possible that a proportionately larger impact would occur in northern states as larger quantities of black sea bass could be landed in southern states (e.g., Virginia, North Carolina) early during the first quarter before black sea bass starts migrating northward or fishermen in northern states start targeting black sea bass.

The decrease in revenue for vessels landing in quarter 1 only will come at the benefit of vessels operating in quarters that are projected to have increase in landings. As indicated in section 2.0 of the RIR, from 1998-2000, on average, over 33% of the first quarter quota has not been taken. However, during the first quarter of 2001, the commercial black sea bass quota was taking and the fishery closed early. Overall, it is expected that landings by participating vessels would remain relatively unchanged if current fishing practices continue.

5.3.3.1.3 Quota allocation by permit category (Alternative 3)

5.3.3.1.3.1 Quota allocation by permit category - 3 separate categories allocate based on landings data from 1988-1997 (Alternative 3a)

This alternative would create three permit categories or sectors based upon documented landings from 1988 to June 5, 2001 by any vessel with a NER BSB permit. Vessels qualifying for each sector would be required to meet the following criteria:

1) A1 permits - documented landings were >= 10,000 pounds per 12 month period (June 6 to June 5) for at least 3 annual periods;
2) A2 permits - documented landings were >= 2,000 pounds but < 10,000 pounds per 12 month period (June 6 to June 5) for at least 3 annual periods;
3) A3 permits - documented landings of black sea bass in a 12 month period (June 6 to June 5) for 3 annual periods, but did not meet A1 or A2 permit criteria.

Each sector would be allocated a share of the Quota based on average annual landings from 1988-1997 for each permit category. Based on 1988-1997 data, 81.7% of the annual Quota would be allocated to A1 permit holders, 12.8% to A2 permit holders, and 5.5% to A3 permit holders (Table 2a).

Possession limits for each permit category would be implemented to distribute the landings throughout the year. It would be the responsibility of the states to cooperate with NMFS to monitor each sector's performance to ensure that the quota for each sector is not exceeded. If it is projected that a sector will reach its quota it will be the responsibility of NMFS and the states to close the fishery. If, in any given year, a sector does exceed its quota, the overage would be deducted from the following year's quota for that sector.

Permit category allocations based on a hypothetical commercial quota of 3,024,742 lb would be 2,470,307 for A1 permit holders, 388,074 for A2 permit holders, 166,361 for A3 permit holders. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

Landings - The implementation of this quota allocation system will not affect the overall black sea bass landings.

Prices - Given that this allocation would not affect the amount of black sea bass landings, then it is assumed that it will not change the price of black sea bass.

Consumer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in consumer surplus associated with this fishery.

Harvest Costs - Since is it not anticipated that the number of gear employed to harvest black sea bass will change as a consequence of this alternative, then it would be expected that the harvest cost would remain relatively constant.

Producer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in producer surplus associated with this fishery.

Enforcement Costs - This alternative will introduce the additional burden of enforcing individual permit allocations and preventing vessels that do not qualify for permits from fishing for black sea bass. From a budgetary perspective, enforcement expense may not change. However, the opportunity cost of diverting enforcement services to these added quota allocation by permit category will increase.

Distributive Effects - Since the permit categories to distribute the quota allocation is based on historical participation, it is not expected that significant distributive impacts will occur if this alternative is implemented.

5.3.3.1.3.2 Quota allocation by permit category - 3 separate categories allocate based on landings data from 1993-1997 (Alternative 3b)

The same as Alternative 3a (5.3.3.1.3.1) except the base years used in the allocation formula would be 1993-1997 (Table 2b). Each sector would be allocated a share of the Quota based on average annual landings from 1993-1997 for each permit category. Based on 1988-1997 data, 80.7% of the annual Quota would be allocated to A1 permit holders, 13.5% to A2 permit holders, and 6.1% to A3 permit holders (Table 2b). Permit category allocations based on a hypothetical commercial quota of 3,024,742 lb would be 2,442,479 for A1 permit holders, 397,754 for A2 permit holders, 148,207 for A3 permit holders. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

Impacts are expected to be similar to those described under Alternative 3a (5.3.3.1.3.1).

5.3.3.1.3.3 Quota allocation by permit category - 2 separate categories allocate based on landings data from 1988-1997 (Alternative 3c)

This alternative would create two permit categories or sectors based upon documented landings from 1988 to June 5, 2001 by any vessel with a NER BSB permit. Vessels qualifying for each sector would be required to meet the following criteria:

1) B1 permit - documented landings were >= 4,000 pounds per 12 month period (June 6 to June 5) for at least 3 annual periods;
2) B2 permit - documented landings of black sea bass per 12 month period (June 6 to June 5) for at least 3 annual periods but did not meet B1 permit criteria.

Each sector would be allocated a share of the Quota based on average annual landings from 1988-1997 for each permit category. Based on 1988-1997 data, 89.8% of the annual Quota would be allocated to B1 permit holders and 10.2% to B2 permit holders (Table 3a).

Possession limits for each permit category would be implemented to distribute the landings throughout the year. It would be the responsibility of the states to cooperate with NMFS to monitor each sector's performance to ensure that the quota for each sector is not exceeded. If it is projected that a sector will reach its quota it will be the responsibility of NMFS and the states to close the fishery. If, in any given year, a sector does exceed its quota, the overage would be deducted from the following year's quota for that sector.

Permit category allocations based on a hypothetical commercial quota of 3,024,742 lb would be 2,716,521lb for B1 permit holders and 308,221 lb for B2 permit holders. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

Impacts are expected to be similar to those described under Alternative 3a (5.3.3.1.3.1).

5.3.3.1.3.4 Quota allocation by permit category - 2 separate categories allocate based on landings data from 1993-1997 (Alternative 3d)

The same as Alternative 3d (5.3.3.1.3.3) except the base years used in the allocation formula would be 1993-1997 (Table 3b). Each sector would be allocated a share of the Quota based on average annual landings from 1993-1997 for each permit category. Based on 1993-1997 data, 89.3% of the annual Quota would be allocated to B1 permit holders and 10.7% to B2 permit holders (Table 3b). Permit category allocations based on a hypothetical commercial quota of 3,024,742 lb would be 2,700,792 for B1 permit holders and 323,950 for B2 permit holders. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

Impacts are expected to be similar to those described under Alternative 3a (5.3.3.1.3.1).

5.3.3.1.4 Quota allocation to separate subregions (Alternative 4)

5.3.3.1.4.1 Quota allocation to separate subregions based on 1988-1997 landings data with additional period allocations January through April and May to December (Alternative 4a)

Under this alternative, the annual quota would be allocated to a northern and southern subregion based on 1988-1997 landings data. The northern subregion would include the states from Maine to New York and the southern subregion would include states from New Jersey to North Carolina (Cape Hatteras). Subregional quotas would be further divided into periods based on the same landing years used in the subregional allocation, that is, 1988-1997. The associated allocations for each subregional period are presented in Table 4.

Landings - The implementation of this quota allocation system will not affect the overall black sea bass landings.

Prices - Given that this allocation would not affect the amount of black sea bass landings, then it is assumed that it will not change the price of black sea bass.

Consumer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in consumer surplus associated with this fishery.

Harvest Costs - Since is it not anticipated that the number of gear employed to harvest black sea bass will change as a consequence of this alternative, then it would be expected that the harvest cost would remain relatively constant.

Producer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in producer surplus associated with this fishery.

Enforcement Costs - This alternative will reduce the burden of enforcing black sea bass fishery closures. Under this alternative, the black sea bass fishery in the EEZ could potentially be closed two times throughout the year (i.e., once per subregion) versus up to four times (i.e., once per quarter) under the quarterly system currently in effect (status quo). From a budgetary perspective, enforcement expense may not change. However, the opportunity cost of diverting enforcement services to this measure may decrease.

Distributive Effects - Each of the proposed regional allocations would have some distributive impacts. These impacts are associated with the potential changes in landings in 2002 relative to 2000 landings for specific regions. For example, under this alternative the southern region could have higher landings in 2002 compare to the base year (Table 148). As such, they may have an increase in revenues associated with increase in landings. The increase in revenue for vessels landings in that region will come at the expense of vessels operating in the northern region that are projected to have reduction in landings in 2002 compared to the base year.

5.3.3.1.4.2 Quota allocation to separate subregions based on 1993-1997 landings data with additional period allocations January through April and May to December (Alternative 4b)

Under this alternative, the annual quota would be allocated to a northern and southern subregion based on 1993-1997 landings data. The northern subregion would include the states from Maine to New York and the southern subregion would include states from New Jersey to North Carolina (Cape Hatteras). Subregional quotas would be further divided into periods based on the same landing years used in the subregional allocation, that is, 1993-1997. The associated allocations for each subregional period are presented in Table 4.

Impacts are expected to be similar to those described under Alternative 4a (5.3.3.1.4.1).

5.3.3.1.5 State-by-state allocations (Alternative 5)

5.3.3.1.5.1 State-by-state allocations based on 1988-1997 landings data (Alternative 5a)

Under this alternative, the quota would be allocated to the states based on historic landings data. The state-by-state allocation system will distribute the black sea bass quota to the states based on their share of commercial landings for the 1988 to 1997 period (Tables 5and 6). States would then have the flexibility to design their own management systems for the fishermen that land in their state. For any specific year, landings in individual states will be adjusted to account for excess landings in the previous year quota. State allocations based on a hypothetical commercial quota of 3,024,742 lb are shown on Table 149. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

Landings - The implementation of this quota allocation system will not affect the overall black sea bass landings.

Prices - Given that this allocation would not affect the amount of black sea bass landings, then it is assumed that it will not change the price of black sea bass.

Consumer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in consumer surplus associated with this fishery.

Harvest Costs - Since is it not anticipated that the number of gear employed to harvest black sea bass will change as a consequence of this alternative, then it would be expected that the harvest cost would remain relatively constant.

Producer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in producer surplus associated with this fishery.

Enforcement Costs - The preferred alternative will reduce the burden of enforcing closure, since the black sea bass fishery in the EEZ could potentially be closed one time throughout the year versus up to four times (i.e., once per quarter) under the quarterly system currently in effect (status quo). From a budgetary perspective, enforcement expense may not change. However, the opportunity cost of diverting enforcement services to this measure may decrease.

Distributive Effects - Each of the proposed state-by-state allocations would have some distributive impacts. These impacts are associated with the potential changes in landings in 2002 relative to 2000 landings for specific states. For example, under this alternative states such as Maine, Rhode Island, New York, New Jersey, Delaware, Maryland, and North Carolina could have higher landings in 2002 compare to the base year (Table 133). As such, they may have an increase in revenues associated with increase in landings. The increase in revenue for vessels landings in those states will come at the expense of vessels operating in other states that are projected to have reduction in landings in 2002 compared to the base year.

5.3.3.1.5.2 State-by-state allocations based on 1993-1997 landings data (Alternative 5b)

Under this alternative, the quota would be allocated to the states based on historic landings data. The state-by-state allocation system will distribute the black sea bass quota to the states based on their share of commercial landings 1993-1997 period (Tables 5 and 6). States would then have the flexibility to design their own management systems for the fishermen that land in their state. For any specific year, landings in individual states will be adjusted to account for excess landings in the previous year quota. State allocations based on a hypothetical commercial quota of 3,024,742 lb are shown on Table 149. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

Impacts are expected to be similar to those described under Alternative 5a (5.3.3.1.5.1), except for different and distributive effects.

Distributive Effects - Each of the proposed state-by-state allocations would have some distributive impacts. These impacts are associated with the potential changes in landings in 2002 relative to 2000 landings for specific states. For example, under this alternative states such as Maine, Rhode Island, New York, New Jersey, Delaware, and Maryland could have higher landings in 2002 compare to the base year (Table 133). As such, they may have an increase in revenues associated with increase in landings. The increase in revenue for vessels landings in those states will come at the expense of vessels operating in other states that are projected to have reduction in landings in 2002 compared to the base year.

5.3.3.1.5.3 State-by-state allocations based on best five landings years for each state during the period 1988-1997 (Alternative 5c)

Under this alternative, the quota would be allocated to the states based on historic landings data. The state-by-state allocation system will distribute the black sea bass quota to the states based on the best 5-years commercial landings for each state during the 1988 to 1997 period (Tables 5 and 6). States would then have the flexibility to design their own management systems for the fishermen that land in their state. For any specific year, landings in individual states will be adjusted to account for excess landings in the previous year quota. State allocations based on a hypothetical commercial quota of 3,024,742 lb are shown on Table 149. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

Impacts are expected to be similar to those described under Alternative 5a (5.3.3.1.5.1), except for different distributive effects.

Distributive Effects - Each of the proposed state-by-state allocations would have some distributive impacts. These impacts are associated with the potential changes in landings in 2002 relative to 2000 landings for specific states. For example, under this alternative states such as Maine, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, and North Carolina could have higher landings in 2002 compare to the base year (Table 133). As such, they may have an increase in revenues associated with increase in landings. The increase in revenue for vessels landings in those states will come at the expense of vessels operating in other states that are projected to have reduction in landings in 2002 compared to the base year.

5.3.3.1.5.4 State-by-state allocations based on best five landings years for each state during the period 1980-1997 (Alternative 5d)

Under this alternative, the quota would be allocated to the states based on historic landings data. The state-by-state allocation system will distribute the black sea bass quota to the states based on the best 5-years commercial landings for each state during the 1980 to 1997 period (Table 5). States would then have the flexibility to design their own management systems for the fishermen that land in their state. For any specific year, landings in individual states will be adjusted to account for excess landings in the previous year quota. State allocations based on a hypothetical commercial quota of 3,024,742 lb are shown on Table 149. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

Impacts are expected to be similar to those described under Alternative 5a (5.3.3.1.5.1), except for different distributive effects.

Distributive Effects - Each of the proposed state-by-state allocations would have some distributive impacts. These impacts are associated with the potential changes in landings in 2002 relative to 2000 landings for specific states. For example, under this alternative states such as Maine, Rhode Island, Connecticut, New York, New Jersey, Delaware, Virginia, and North Carolina could have higher landings in 2002 compare to the base year (Table 133). As such, they may have an increase in revenues associated with increase in landings. The increase in revenue for vessels landings in those states will come at the expense of vessels operating in other states that are projected to have reduction in landings in 2002 compared to the base year.

5.3.3.1.5.5 *De minimus* specifications (Alternative 5e)

This alternative is a sub-alternative under each state-by-state quota alternative. As such, any of the state-by-state allocations described above could have a *de minimus* specification associated with it. Any state that has commercial landings of less than 0.1% of the total coastwide commercial landings in the last preceding year for which data are available is eligible for *de minimus* status. The *de minimus* specifications only apply to the commercial fishery. There are no *de minimus* allowances for the black sea bass recreational fishery.

Any state that is granted *de minimus* status will be allocated 0.1% of the coastwide commercial quota under a state-by-state commercial quota allocation system. The sum of the allocations to *de minimus* states will be deducted from the coastwide commercial quota each year prior to the remainder is allocated to the other states. Table 6 indicates that Maine is the only state that has landed less than 0.1% of the total coastwide black sea bass commercial landings for any given year during the 1988 to 1999 period. There have been no black sea bass landings reported in New Hampshire during the 1988 to 1999 period. For example, if two states are granted *de minimus* status under this alternative, 0.2% of the annual coastwide quota would be allocated to the qualifying state and 99.8% to the remaining states.

Impacts are expected to be similar to those described under Alternative 5a (5.3.3.1.5.1), except for different distributive effects.

Distributive Effects - The proposed *de minimus* specification may have some distributive impacts. For example, consider that two states qualify for *de minimus* status, and received an aggregate allocation of 0.2% of the total coastwide quota. There is potential for additional revenue for vessels landings in the states qualifying as *de minimus* which will come at the expense of vessels operating in other states which are projected to have an aggregate reduction in landings of 0.2%.

5.3.3.1.5.6 Coastwide quota to facilitate state-by-state allocations implemented by the Commission (Alternative 5f: preferred alternative)

A coastwide quota system without quarterly or seasonal breakdowns, would not remedy the problems identified in section 1.0 (Purpose and Need for Action). In fact, a coastwide system without quarterly or seasonal breakdowns would likely exacerbate the current problems that the fishery is experiencing because it is unlikely that possession limits could be designed to keep the fishery open for the year. However, in combination with a state-by-state allocation system adopted by the states, it would be beneficial to the stock. A state-by-state quota system could allow for the most equitable distribution of the commercial quota to fishermen. Specifically, under this alternative, states 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 state specific landing patterns using possession limits and seasons to ensure a continuous and steady supply of product over the season for producers and/or a fair an equitable distribution of black sea bass to all fishermen who have traditionally landed black sea bass in their state.

For purposes of analyzing the preferred alternative, it is assumed that a state-by-state allocation of the coastwide quota for the 2003-2004 period will occur as follows: Maine 0.5%, New Hampshire 0.5%, Massachusetts 13%, Rhode Island 11%, Connecticut 1.0%, New York 7%, New Jersey 20%, Delaware 5%, Maryland 11%, Virginia 20%, and North Carolina 11%. States would then have the flexibility to design their own management systems for the fishermen that land in their state. State allocations based on a hypothetical commercial quota of 3,024,742 lb are shown on Table 9b. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

Landings - The implementation of this quota allocation system will not affect the overall black sea bass landings.

Prices - Given that this allocation would not affect the amount of black sea bass landings, then it is assumed that it will not change the price of black sea bass.

Consumer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in consumer surplus associated with this fishery.

Harvest Costs - Since is it not anticipated that the number of gear employed to harvest black sea bass will change as a consequence of this alternative, then it would be expected that the harvest cost would remain relatively constant.

Producer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in producer surplus associated with this fishery.

Enforcement Costs - The preferred alternative will reduce the burden of enforcing black sea bass fishery closures. Under this alternative, the black sea bass fishery in the EEZ could potentially be closed one time throughout the year versus up to four times (i.e., once per quarter) under the quarterly system currently in effect (status quo). From a budgetary perspective, enforcement expense may not change. However, the opportunity cost of diverting enforcement services to this measure may decrease.

Distributive Effects - The proposed state-by-state allocations would have some distributive impacts. These impacts are associated with the potential changes in landings in 2003 relative to 2000 landings for specific states. For example, under this alternative states such as Maine, New Hampshire, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, and North Carolina could have higher landings in 2003 compare to the base year (Table 9b). As such, they may have an increase in revenues associated with increase in landings. The increase in revenue for vessels landings in those states will come at the expense of vessels operating in other states that are projected to have reduction in landings in 2003 compared to the base year.

5.3.3.1.6 Hybrid quota system: coastwide quota from January through April and state-by-state quotas from May through December (Alternative 6)

5.3.3.1.6.1 Hybrid quota system based on 1988-1997 landings data: coastwide quota from January through April and state-by-state quotas from May through December (Alternative 6a)

Under this alternative, the quota would be allocated to two time periods (January through April and May through December) based on historic landings data for the 1988-1997 period. During the first period, the quota would be allocated to the coast. During the second period, the quota would be allocated to the states based on landings data during the May through December period for the years 1988-1997. During the second period, states would then have the flexibility to design their own management systems for the fishermen that land in their state. For any specific year, landings in individual states will be adjusted to account for excess landings in the previous year quota. The quota allocations by periods (coastwide and state-by-state) based on a hypothetical commercial quota of 3,024,742 lb are shown on Table 7. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

Landings - The implementation of this quota allocation system will not affect the overall black sea bass landings.

Prices - Given that this allocation would not affect the amount of black sea bass landings, then it is assumed that it will not change the price of black sea bass.

Consumer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in consumer surplus associated with this fishery.

Harvest Costs - Since is it not anticipated that the number of gear employed to harvest black sea bass will change as a consequence of this alternative, then it would be expected that the harvest cost would remain relatively constant.

Producer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in producer surplus associated with this fishery.

Enforcement Costs - Under this hybrid quota allocation system enforcement costs are expected to be similar to those under the current system.

Enforcement Costs - This alternative will reduce the burden of enforcing black sea bass fishery closures. Under this alternative, the black sea bass fishery in the EEZ could potentially be closed twice throughout the year (i.e., once per time period) versus up to four times (i.e., once per quarter) under the quarterly system currently in place (status quo). From a budgetary perspective, enforcement expense may not change. However, the opportunity cost of diverting enforcement services to this measure may decrease.

Distributive Effects - The proposed hybrid allocation would distribute the quota to two major time periods, January through April and May through December. Base on a hypothetical quota of 3,074,742 lb and the allocation by periods described above, the overall projected landings for periods one and two in 2002 would be about 28% and 4% higher than in 2000 for the same time frames, respectively (Table 135). However, when the period two quota is allocated to specific states some distributed impacts would occur. For example, under this alternative Maine, Rhode Island, New York, New Jersey, Delaware, Maryland, and North Carolina could have higher landings during the second period in 2002 compare to the base year (Table 136). As such, they may have an increase in revenues associated with increase in landings. The increase in revenue for vessels landings in those states will come at the expense of vessels operating in other states that are projected to have reduction in landings in 2002 compared to the base year. However, vessels affected by the potential decrease in landings in period two that also land black sea bass during period one may see a reduction in revenue losses as they may be able to compensate losses in period two due to higher projected landings during period one 2002 compared to 2000.

5.3.3.1.6.2 Hybrid quota system based on 1993-1997 landings data: coastwide quota from January through April and state-by-state quotas from May through December (Alternative 6b)

Under this alternative, the quota would be allocated to two time periods (January through April and May through December) based on historic landings data for the 1993-1997 period. During the first period, the quota would be allocated to the coast. During the second period, the quota would be allocated to the states based on landings data during the May through December period for the years 1993-1997. During the second period, states would then have the flexibility to design their own management systems for the fishermen that land in their state. For any specific year, landings in individual states will be adjusted to account for excess landings in the previous year quota. The quota allocations by periods (coastwide and state-by-state) based on a hypothetical commercial quota of 3,024,742 lb are shown on Table 7. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

Impacts are expected to be similar to those described under Alternative 6a (5.3.3.1.6.1), except for different distributive effects.

Distributive Effects - The proposed hybrid allocation would distribute the quota to two major time periods, January through April and May through December. Base on a hypothetical quota of 3,074,742 lb and the allocation by periods described above, the overall projected landings for periods one and two in 2002 would be about 22% and 8% higher than in 2000 for the same time frames, respectively (Table 135). However, when the period two quota is allocated to specific states some distributed impacts would occur. For example, under this alternative Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, and North Carolina could have higher landings during the second period in 2002 compare to the base year (Table 136). As such, they may have an increase in revenues associated with increase in landings. The increase in revenue for vessels landings in those states will come at the expense of vessels operating in other states that are projected to have reduction in landings in 2002 compared to the base year. However, vessels affected by the potential decrease in landings in period two that also land black sea bass during period one may see a reduction in revenue losses as they may be able to compensate losses in period two due to higher projected landings during period one 2002 compared to 2000.

5.3.3.1.6.3 Hybrid quota system based on 1980-1997 landings data: coastwide quota from January through April and state-by-state quotas from May through December (Alternative 6c)

Under this alternative, the quota would be allocated to two time periods (January through April and May through December) based on historic landings data for the 1980-1997 period. During the first period, the quota would be allocated to the coast. During the second period, the quota would be allocated to the states based on landings data during the May through December period for the years 1980-1997. During the second period, states would then have the flexibility to design their own management systems for the fishermen that land in their state. For any specific year, landings in individual states will be adjusted to account for excess landings in the previous year quota. The quota allocations by periods (coastwide and state-by-state) based on a hypothetical commercial quota of 3,024,742 lb are shown on Table 7. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

Impacts are expected to be similar to those described under Alternative 6a (5.3.3.1.6.1), except for different distributive effects.

Distributive Effects - The proposed hybrid allocation would distribute the quota to two major time periods, January through April and May through December. Base on a hypothetical quota of 3,074,742 lb and the allocation by periods described above, the overall projected landings for periods one and two in 2002 would be about 42% higher and the January through April period, and 5% lower for the May through December period than in 2000 for the same time frames, respectively (Table 135). When the period two quota is allocated to specific states, additional distributed impacts would occur. For example, under this alternative Maine, Rhode Island, New York, New Jersey, Maryland, and North Carolina could have higher landings during the second period in 2002 compare to the base year (Table 136). As such, they may have an increase in revenues associated with increase in landings. The increase in revenue for vessels landings in those states will come at the expense of vessels operating in other states that are projected to have reduction in landings in 2002 compared to the base year. However, vessels affected by the potential decrease in landings in period two that also land black sea bass during period one may see a reduction in revenue losses as they may be able to compensate losses in period two due to higher projected landings during period one 2002 compared to 2000.

5.3.3.1.7 Hybrid quota system: coastwide quota from January through April and subregional quotas from May through December (Alternative 7)

5.3.3.1.7.1 Hybrid quota system based on 1988-1997 landings data: coastwide quota from January through April and subregional quotas from May through December (Alternative 7a)

Under this alternative, the quota would be allocated to two time periods (January through April and May through December) based on historic landings data for the 1988-1997 period. During the first period, the quota would be allocated to the coast. During the second period, the quota would be allocated to subregions based on landings data during the May through December period for the years 1988-1997. The quota allocations by periods (coastwide and subregion) based on a hypothetical commercial quota of 3,024,742 lb are shown on Table 8. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

Landings - The implementation of this quota allocation system will not affect the overall black sea bass landings.

Prices - Given that this allocation would not affect the amount of black sea bass landings, then it is assumed that it will not change the price of black sea bass.

Consumer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in consumer surplus associated with this fishery.

Harvest Costs - Since is it not anticipated that the number of gear employed to harvest black sea bass will change as a consequence of this alternative, then it would be expected that the harvest cost would remain relatively constant.

Producer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in producer surplus associated with this fishery.

Enforcement Costs - This alternative will reduce the burden of enforcing black sea bass fishery closures. Under this alternative, the black sea bass fishery in the EEZ could potentially be closed three times throughout the year (i.e., once from January through April and twice from May through December) versus up to four times (i.e., once per quarter) under the quarterly system currently in place (status quo). From a budgetary perspective, enforcement expense may not change. However, the opportunity cost of diverting enforcement services to this measure may decrease.

Distributive Effects - The proposed hybrid allocation would distribute the quota to two major time periods, January through April and May through December. Base on a hypothetical quota of 3,074,742 lb and the allocation by periods described above, the overall projected landings for periods one and two in 2002 would be about 28% and 4% higher than in 2000 for the same time frames, respectively (Table 135). However, when the period two quota is allocated to specific regions some impacts would occur. For example, under this alternative the southern region could have higher landings in 2002 compare to the base year (Table 137). As such, vessels fishing for black sea bass in that region may have an increase in revenues associated with increase in landings. The increase in revenue for vessels landings in the southern region will come at the expense of vessels operating in the northern region which are projected to have reduction in landings in 2002 compared to the base year.

5.3.3.1.7.2 Hybrid quota system based on 1993-1997 landings data: coastwide quota from January through April and subregional from May through December (Alternative 7b)

Under this alternative, the quota would be allocated to two time periods (January through April and May through December) based on historic landings data for the 1993-1997 period. During the first period, the quota would be allocated to the coast. During the second period, the quota would be allocated to subregions based on landings data during the May through December period for the years 1993-1997. The quota allocations by periods (coastwide and subregion) based on a hypothetical commercial quota of 3,024,742 lb are shown on Table 8. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

Impacts are expected to be similar to those described under Alternative 7a (5.3.3.1.7.1), except for different distributive effects.

Distributive Effects - The proposed hybrid allocation would distribute the quota to two major time periods, January through April and May through December. Base on a hypothetical quota of 3,074,742 lb and the allocation by periods described above, the overall projected landings for periods one and two in 2002 would be about 22% and 8% higher than in 2000 for the same time frames, respectively (Table 135). However, when the period two quota is allocated to specific regions some distributed impacts would occur. For example, under this alternative the southern region could have higher landings in 2002 compare to the base year (Table 137). As such, vessels fishing for black sea bass in that region may have an increase in revenues associated with increase in landings. The increase in revenue for vessels landings in the southern region will come at the expense of vessels operating in the northern region which are projected to have reduction in landings in 2002 compared to the base year.

5.3.3.1.8 Allocation system by gear type (Alternative 8)

5.3.3.1.8.1 Allocation system by gear type based on 1988-1997 landings data (Alternative 8a)

Under this alternative, the quota would be allocated by gear type based on 1988-1997 landings data. The percentages by gear type would range from 0.40% for gillnets to 45.82% for bottom/mid water trawl gear (Table 9a).

Possession limits would be implemented for each gear type. Possession limits could be modified based on a recommendation of the Monitoring Committee to the Council and Commission and implementation by the Regional Administrator and the states as part of the annual specification process. The quota would apply throughout the management unit, including both state and federal waters. All commercial landings would count toward the quota for each respective gear types. Any landings in excess of the quota that occurred for any gear type would be subtracted from the following year's quota for that gear type. The quota allocations by gear type based on a hypothetical commercial quota of 3,024,742 lb are shown on Table 138. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

Landings - The implementation of this quota allocation system will not affect the overall black sea bass landings.

Prices - Given that this allocation would not affect the amount of black sea bass landings, then it is assumed that it will not change the price of black sea bass.

Consumer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in consumer surplus associated with this fishery.

Harvest Costs - Since is it not anticipated that the number of gear employed to harvest black sea bass will change as a consequence of this alternative, then it would be expected that the harvest cost would remain relatively constant.

Producer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in producer surplus associated with this fishery.

Enforcement Costs - This alternative will introduce the additional burden of enforcing individual gear allocations and preventing vessels that fish for black sea bass with a certain gear type from fishing for black sea bass with that specific gear. From a budgetary perspective, enforcement expense may not change. However, the opportunity cost of diverting enforcement services to these added quota allocations by gear category will increase.

Distributive Effects - The proposed gear allocation would distribute the quota among gear types. Base on a hypothetical quota of 3,074,742 lb and the allocation by gear type described above, the overall projected landings by gear type would change in 2002 compared to 2000. More specifically, bottom/mid water trawls and pots/traps would increase landings by over 74% and 4%, respectively, and gillnets, lines, and other gear would decrease landings by over 70%, 35%, and 75%, respectively. As such, vessels fishing for black sea bass with bottom/mid water trawl and pots/traps may have an increase in revenue associated with increase in landings. The increase in revenue for these vessels will come at the expense of vessels fishing for black sea bass with gillnets, lines, and other type of gear only.

5.3.3.1.8.2 Allocation system by gear type based on 1993-1997 landings data (Alternative 8b)

The same as Alternative 8a (5.3.3.1.8.1) except the base years used in the allocation formula would be 1993-1997 (Table 9a). However, distributive impacts are expected to be less severe because the proportional changes in landings of the hypothetical 2002 allocation based on 1993-1997 landings are closer to the 2000 landings than that of the 2002 allocation based on 1983-1997 landings (Table 138).

Impacts are expected to be similar to those discussed under Alternative 8a (5.3.3.1.8.1).

5.3.3.1.9 Modify the permit requirements for fishermen that have both a Northeast Black Sea Bass Commercial Permit and a Southeast Snapper/Grouper Permit (Alternative 9)

5.3.3.1.9.1 Status quo (Alternative 9a)

Current regulations restrict fishermen with a NER BSB permit from fishing south of Cape Hatteras during a northern closure unless they relinquish their permit for a period of 6 months. Permit data for the Northeast region and Southeast region show that 5 of the vessels holding NER BSB permit for calender year 2000 also held SER S/G commercial limited access permits (either unlimited or 225-lb trip limited type) (Sadler pers. comm.).

Landings - The implementation of this management measure will not affect the overall black sea bass landings.

Prices - Given that this management measure would not affect the amount of black sea bass landings, then it is assumed that it will not change the price of black sea bass.

Consumer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in consumer surplus associated with this fishery.

Harvest Costs - Since is it not anticipated that the number of gear employed to harvest black sea bass will change as a consequence of this alternative, then it would be expected that the harvest cost would remain relatively constant.

Producer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in producer surplus associated with this fishery.

Enforcement Costs - This alternative would allow the current system to continue in effect and no new enforcement burdens will be introduced.

Distributive Effects - No distributive effects are identified under this alternative.

5.3.3.1.9.2 Remove the permit requirement that restricts fishermen from having both a Northeast Black Sea Bass Commercial Permit and a Southeast Snapper/Grouper Permit (Alternative 9b: preferred alternative)

This alternative would remove the requirement that a fisherman with a NER BSB permit has to surrender that permit for 6 months if they want to catch and land black sea bass south of Cape Hatteras during a northern closure. Permit data for the Northeast region and Southeast region show that 5 of the vessels holding NER BSB permit for calender year 2000 also held SER S/G commercial limited access permits (either unlimited or 225-lb trip limited type) It was determine that 5 vessels held both permits at some time in the calender year 2000 (Robert Sadler, pers. comm.).

Impacts are expected to be similar to those described under Alternative 9a (5.3.3.1.9.1).

5.3.3.1.10 Prohibit the wet storage of black sea bass pots/traps during a closure (Alternative 10)

5.3.3.1.10.1 Status quo (Alternative 10a)

A common practice of commercial black sea bass pot/trap fishermen is to allow their pots/traps to remain in the water during periods when the black sea bass fishery is closed. This practice is referred to as wet storage. This practice raises concerns because the pots/traps remaining in the water continue to attract and capture fish which results in increased black sea bass mortality. To address these concerns the Council and Commission have developed the following requirements. Note that the prohibition of wet storage could work under a coastwide or a state-by-state management regime. Details of how the prohibition of wet storage would work under a coastwide management regime is presented in section 2.1.9.1 of the EIS.

This alternative is the status quo Alternative. Under the current system, commercial black sea bass pot/trap fishermen is to allow their pots/traps to remain in the water during periods when the black sea bass fishery is closed.

Impacts are expected to be similar to those discussed under Alternative 9a (5.3.3.1.9.1).

5.3.3.1.10.2 Prohibit the wet storage of black sea bass pots/traps during a closure of longer than two weeks (Alternative 10b)

This alternative would require that all federal permit holders remove black sea bass pots/traps from state and federal waters when the fishery is closed for more than two weeks (14 days). Fishermen will have no more than 10 days, from the starting date of the closure, to remove their pots/traps. Fishermen will not be allowed to deploy pots/traps until the first day of the following open period.

Landings - The implementation of this alternative will not affect the overall black sea bass landings.

Prices - Given that this alternative would not affect the amount of black sea bass landings, then it is assumed that it will not change the price of black sea bass.

Consumer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in consumer surplus associated with this fishery.

Harvest Costs - Since is it not anticipated that the number of gear employed to harvest black sea bass will change as a consequence of this alternative, then it would be expected that the harvest cost would remain relatively constant.

Producer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in producer surplus associated with this fishery.

Enforcement Costs - This alternative will introduce the additional burden of enforcing regulations that would require federal permit holders from removing black sea bass pots/traps from state and federal waters when the fishery is closed. From a budgetary perspective, enforcement expense may not change. However, the opportunity cost of diverting enforcement services to these added requirements will increase.

Distributive Effects - No distributive effects are associated with the implementation of this alternative.

5.3.3.1.10.3 Prohibit the wet storage of black sea bass pots/traps during a closure of longer than four weeks (Alternative 10c)

This alternative would require that all federal permit holders remove all black sea bass pots/traps from state and federal waters when the fishery is closed for more than four weeks (28 days). Fishermen will have no more than 10 days, from the starting date of the closure, to remove their pots/traps. Fishermen will not be allowed to deploy pots/traps until the first day of the following open period.

Impacts are expected to be similar to those discussed under Alternative 10b (5.3.3.1.10.2).

5.3.3.1.11 Black sea bass pot/trap tag program (Alternative 11)

5.3.3.1.11.1 Status quo (Alternative 11a)

This alternative is the status quo Alternative. Under the current system, black sea bass trap tags are not required

Impacts are expected to be similar to those discussed under Alternative 9a (5.3.3.1.9.1).

5.3.3.1.11.2 Pot/trap tag requirements for federal permit holder fishing with black sea bass pots/traps (Alternative 11b)

This alternative would require that any black sea bass pot/trap fished by a federal permit holder must have a valid black sea bass pot/trap tag permanently attached to the pot/trap bridge or central cross-member. Black sea bass trap tags would be purchased from the NMFS Northeast Region Permit Office.

A black sea bass trap is defined as any pot/trap gear that is capable of catching black sea bass.

Impacts are expected to be similar to those discussed under Alternative 9a (5.3.3.1.9.1). Although, from a budgetary perspective enforcement expense may not change, the opportunity cost of diverting enforcement services to these added requirements will increase.

5.3.3.1.12 Limit the number of pots/traps fished by federal permit holders (Alternative 12)

5.3.3.1.12.1 Status quo (Alternative 12a)

This alternative is the status quo Alternative. Under the current system, there is no limit to the number of black sea bass pots/traps that federal permit holders are allowed to fish with, deploy, possess in, or haul back from state or federal waters.

Impacts are expected to be similar to those discussed under Alternative 9a (9.1.1.9.1).

5.3.3.1.12.2 Limit federal permit holders to no more than 400 black sea bass pots/traps (Alternative 12b)

Under this alternative federal permit holders may not fish with, deploy, possess in, or haul back from state or federal waters, more than 400 black sea bass pots/traps.

This program could be implemented in conjunction with the black sea bass pot/trap tag program. In any fishing year, each permit holder would be authorized to purchase a set number of traps, up to a maximum of 400 trap tags.

There is no information regarding the number of pots/traps held by black sea bass pot/trap permit holders. The conservation benefits of trap limits or reductions are difficult to quantify, due to factors such as efficiency and saturation, and changes in fishing practices. This management measure along with the trap tagging measure (5.3.3.1.11.2) decrease the expansion of this type of gear in the black sea bass fishery, thus, reducing fishing effort.

Landings - The implementation of this alternative will not affect the overall black sea bass landings. Since black sea bass landings are limited by trip limits, a change in the amount of black sea bass pots/traps would not affect overall landings.

Prices - Given that this alternative would not affect the amount of black sea bass landings, then it is assumed that it will not change the price of black sea bass.

Consumer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in consumer surplus associated with this fishery.

Harvest Costs - It is not possible to anticipate the effect of trap reductions on harvesting costs due to changes in fishing practices and behavior. However, it is possible that fishermen that under current regulations fish with less than 400 traps, may increase the number of traps he fishes to 400, in order to harvest trip limits more timely.

Producer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in producer surplus associated with this fishery.

Enforcement Costs - This alternative will introduce the additional burden of enforcing regulations to prevent federal permit from fishing with, deploying, possessing, or hauling back from state or federal waters, more than 400 black sea bass pots/traps. From a budgetary perspective, enforcement expense may not change. However, the opportunity cost of diverting enforcement services to these added quota allocation by gear category will increase.

Distributive Effects - No distributive effects are associated with the implementation of this alternative.

5.3.3.1.12.3 Limit federal permit holders to no more than 800 black sea bass pots/traps (Alternative 12c)

Under this alternative federal permit holders may not fish with, deploy, possess in, or haul back from state or federal waters, more than 800 black sea bass pots/traps.

This program could be implemented in conjunction with the black sea bass pot/trap tag program. In any fishing year, each permit holder would be authorized to purchase a set number of traps, up to a maximum of 800 trap tags.

There is no information regarding the number of pots/traps held by black sea bass pot/tarp permit holders. The conservation benefits of trap limits or reductions are difficult to quantify, due to factors such as efficiency and saturation, and changes in fishing practices. This management measure along with the trap tagging measure (5.3.3.1.11.2) decrease the expansion of this type of gear in the black sea bass fishery, thus, reducing fishing effort.

Landings - The implementation of this alternative will not affect the overall black sea bass landings. Since black sea bass landings are limited by trip limits, a change in the amount of black sea bass pots/traps would not affect overall landings.

Prices - Given that this alternative would not affect the amount of black sea bass landings, then it is assumed that it will not change the price of black sea bass.

Consumer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in consumer surplus associated with this fishery.

Harvest Costs - It is not possible to anticipate the effect of trap reductions on harvesting costs due to changes in fishing practices and behavior. However, it is possible that fishermen that under current regulations fish with less than 800 traps, may increase the number of traps he fishes to 800, in order to harvest trip limits more timely.

Producer Surplus - Assuming black sea bass prices will not be affected under the scenario constructed above, there will be no corresponding change in producer surplus associated with this fishery.

Enforcement Costs - This alternative will introduce the additional burden of enforcing regulations to prevent federal permit holders from fishing with, deploying , possessing in, or hauling back from state or federal waters, more than 800 black sea bass pots/traps. From a budgetary perspective, enforcement expense may not change. However, the opportunity cost of diverting enforcement services to these added quota allocation by gear category will increase.

Distributive Effects - No distributive effects are associated with the implementation of this alternative.

5.3.3.2 Options for managing adverse effects from fishing

In order to identify the potential impact of these options, the Council retained Dr. James E. Kirkley of the College of the Virginia Institute of Marine Science, School of Marine Science (College of William and Mary) to conduct and analysis of the economic impacts of the EFH alternatives. The work prepared by Dr. Kirkley and his associates is presented in Appendix E. The options for managing adverse effects from fishing are presented below, and the impacts of these options are presented at the end of Alternative 5.3.3.2.5.

5.3.3.2.1 Status quo: current management measures (EFH Alternative 1: preferred alternative)

This is the "no action alternative." It would result in no additional management measures to minimize the effects of fishing on EFH.

The Council has implemented many regulations that have indirectly acted to reduce fishing gear impacts on EFH. These include many of the current regulations which have restricted fishing effort and thus reduced gear impact on bottom habitat. Such regulations include restrictive harvest limits, gear restricted areas, and restriction on the size of roller rig gear to 18 inch for scup and black sea bass.

5.3.3.2.2 Prohibit bottom tending mobile gear from the nearshore areas surrounding estuaries (EFH Alternative 2)

Alternative 2 would prohibit fishermen from using bottom tending mobile gear in the nearshore areas of Albemarle Sound, Chesapeake Bay, Delaware Bay, and New York Harbor, from 3-miles offshore extending to the 60-foot depth contour. Bottom tending mobile gear in these areas include: bottom otter trawls, clam dredges, and scallop dredges.

These are areas that include EFH for summer flounder, scup, and black sea bass. These areas are also important summer flounder spawning grounds and areas where all three species congregate during warmer months. In addition, the estuarine areas are important nursery habitat for all three species. Although the Council does not have any authority under the MSFCMA to regulate fishing gear in state waters, this alternative could add some protection to the habitat near the entrance of the estuaries. These areas also include non-biogenic reef habitat, which has been identified as EFH for black sea bass and scup. The term non-biogenic refers to all reef habitat except for oyster and mussel beds. Structured habitat is more complex and thus more vulnerable to fishing gear.

5.3.3.2.3 Prohibit bottom tending mobile gear in the area surrounding the Hudson Canyon (EFH Alternative 3)

Alternative 3 would prohibit fishermen from using bottom tending mobile gear in the area surrounding the Hudson Canyon, between the 200-foot and 500-foot isobaths.

The Hudson Canyon is an area that has been identified as an important overwintering area for summer flounder, scup, and black sea bass (NRDC 2001). The EFH source documents indicate that summer flounder, scup, and black sea bass overwinter offshore. Steimle *et al.* (1999a) indicate that juvenile and adult scup leave "inshore waters and move to warmer waters on the outer continental shelf south of Hudson Canyon off New Jersey and along the coast from south of Long Island to North Carolina in depths ranging from 75-185 m." Steimle *et al.* (1999b) indicate that black sea bass migrate "from inshore areas across the continental shelf to outer shelf wintering areas south of New Jersey" and "black sea bass adults spend the winter on the middle to outer continental shelf between 30-240 m (with some as deep as 410 m, but most between 60-150 m) generally south of the Hudson Canyon off central New Jersey." Packer *et al.* (1999) indicate that for summer flounder "wintering grounds are located primarily between Norfolk and Veatch Canyons east of Virginia and Rhode Island, respectively, although they are known to migrate as northeastward as Georges Bank." "Adult summer flounder...remain offshore during colder months on the outer continental shelf at depths down to 150 m." In addition, summer flounder EFH was designated to the depth of 500 ft, which is the rationale for prohibiting gear to this depth.

5.3.3.2.4 Roller rig and rock hopper gear restrictions (EFH Alternative 4)

Alternative 4 would restrict the size or prohibit the use of roller rig and rock hopper gear in the EEZ, from Maine through North Carolina. Alternatives for roller rig gear would include 8 inches, 12 inches, or 18 inches for maximum roller size, or a complete prohibition of roller rig gear. Alternatives for rock hopper gear include 8 inches, 12 inches, or 18 inches, or 22 inches for maximum roller and rubber disk size, or a complete prohibition of rock hopper gear. Specific regulations would prohibit the use of this gear or the use of roller rigs or rock hoppers with rollers and disks larger than the maximum size.

The summer flounder, scup, and black sea bass FMP currently restricts vessels issued moratorium permit for scup and/or black sea bass from using roller rig trawl gear equipped with rollers greater than 18 inch diameters. As such, a restriction on the diameter of rock hopper gear is reasonable as well. An 18 inch diameter corresponded to the maximum roller diameter limitation imposed by the states of Massachusetts and North Carolina to regulate this gear in state waters. In the Gulf of Maine rock hopper gear is restricted to a maximum 12 inch diameter. Council staff is specifically requesting information on the use of roller rig and rock hopper gear during the public hearing process. Information that is needed includes the size of rollers that are currently used, the habitat types in which they are used, and the extent of the use.

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 800-900 hp is required to tow a net with 18 inch to 24 inch rollers, whereas 10 inch to 12 inch rollers can be pulled by a boat using a 175 to 200 hp engine (Simpson pers. comm.).

Information is lacking as to the relationship between roller diameter and the size of the obstruction that it can clear. In general 10 inch to 12 inch diameter rollers can be used for fishing over rough bottom that includes ledges and cliffs (MAFMC 1996a, b). 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. Such structured habitat is more complex and thus more vulnerable to fishing gear. Restricting these gear may help to improve the status of the stocks, leading to recovery, while conserving marine habitat. Gear modifications/restrictions offer the possibility of reducing impacts to EFH throughout the entire region, rather than just in closed areas.

There is some concern as to the effect of roller rig and rock hopper gear on mud bottom areas in the Mid-Atlantic Bight. However, roller rig and rock hopper gear are predominantly used to fish in rough and structured hard bottom areas (NMFS 2001). Additionally, NMFS (2001) states that, "Mud is rare over most of the shelf, but is common in the Hudson valley. Occasionally relic estuarine mud deposits are re-exposed in the swales between sand ridges."

As stated in section 3.2.7.2 of the EIS, there are very little data on these gear or their impact on habitat. As such, it is impossible to do a quantitative analysis on the benefits of this alternative to habitat or the stock.

The economic impact of roller rig and rockhopper gear restrictions is unknown. Council staff is not aware of the extent of the current use or size of either of these gears, in states other than Massachusetts and North Carolina, and is specifically requesting this information during the public hearing process. Even if gear restrictions prove to be effective in reducing impacts to EFH they could also mean a reduction in landings and revenue of targeted species. Gear modifications (to replace these gear, if in use) would require preliminary research to develop gear that would eliminate impacts to EFH and at the same time effectively catch the targeted species. In addition to the time and expense of developing new gear, there is also the implementation expense to the fishery that may not make gear modifications practicable. Such a gear restriction may cause a negative economic impact for minimal benefit to habitat.

5.3.3.2.5 Prohibit street-sweeper gear (EFH Alternative 5)

Alternative 5 would prohibit fishermen from using street-sweeper gear in the EEZ.

Street-sweeper gear is a newly developed trawl gear that is constructed of a series of rubber disc spacers and bristle brushes, as found in actual street sweepers. The distinguishing component of this sweep is the brushes made of stiff bristles mounted on a cylinder core. The brush cylinders are up to 31 inches in diameter and have smaller diameter rubber discs placed between them. The discs are strung on a cable or chain and aligned in series forming the sweep of the trawl net. This innovation probably allows the trawl to be fished on rougher bottom than any other design and it is lighter than rockhopper gear (Carr and Milliken 1998).

The New England Fishery Management Council currently has a ban on street sweeper gear. This action was preventative or precautionary (Carr pers. comm.). The NEFMC is currently trying to acquire information as to the interaction with benthos and the efficiency of the gear. MAFMC staff is not aware of the current extent of the use of this gear or impact of it in the Mid-Atlantic region.

Data are not available to determine the benefits of this alternative to habitat or the stock. As stated in section 3.2.7.2 of the EIS, there are very little data on the gear or its impact to habitat. As such, it is impossible to do a quantitative analysis on the benefits of this alternative to habitat or the stock.

The economic impact of a streetsweeper gear prohibition is unknown. Council staff is not aware of the extent of the use of this gear and is requesting this information during the public hearing process. Even if gear restrictions prove to be effective in reducing impacts to EFH they could also mean a reduction in landings and revenue of targeted species. Gear modifications (to replace this gear, if in use) would require preliminary research to develop gear that would eliminate impacts to EFH and at the same time effectively catch the targeted species. In addition to the time and expense of developing new gear, there is also the implementation expense to the fishery that may not make gear modifications practicable. Such a gear restriction may cause a negative economic impact for minimal benefit to habitat.

Impacts for Options for Managing Adverse Effects From Fishing

In order to identify the potential impact of these options, the Council retained Dr. James E. Kirkley of the College of the Virginia Institute of Marine Science, School of Marine Science (College of William and Mary) to conduct and analysis of the economic impacts of the EFH alternatives. The work prepared by Dr. Kirkley and his associates is presented in Appendix E. A summary of the options evaluated is presented below.

This section presents a summary of the impacts of Alternative 2 (Prohibit bottom tending mobile gear from the nearshore areas surrounding the estuaries) and Alternative 3 (Prohibit bottom tending mobile gear in the area surrounding the Hudson Canyon) and how they relate to the status quo alternative (Rely on current management measures to reduce gear impacts).
For a detailed review of the impacts of these alternatives, please refer to Appendix E. Notice that, the order in which the alternatives are listed in this document differ from the listing order in that appendix document.

Alternatives 4 (Restrict the size of roller rig and rock hopper gear) and 5 (Prohibit street-sweeper gear) were not evaluated due to lack of knowledge of the impacts of these gears on the environment and overall lack of information of the use of these gear by commercial vessels (i.e., number of vessels employing these gears, commercial landings and value generated by this type of gear, fishing areas where these gears are used, etc.). The preferred EFH alternative (rely on current management measures to reduce gear impacts: status quo) is discussed at the end of this section.

The report provides a limited assessment of the potential economic ramifications of Alternatives 2 and 3 relative to the status quo. Although regulating the components of all bottom fishing gear might help protect EFH, it is not known how restricting the size of roller rig and rock hopper gear or prohibiting the use of street sweeper gear will affect or impact the commercial fisheries. Rock hoppers, roller rigs, and street sweeping gear are not used on dredge vessels. It also appears that there has not been any gear work done in the geographic areas associated with the two area closure alternatives. The Resource Assessment and Conservation Engineering (RACE) Division of the Alaska Fisheries Science Center, NMFS, has conducted extensive gear research on the potential ramifications of bottom gear on EFH, but their work has focused mostly on determining how existing gear affects EFH. The research has not yet advanced to the stage in which results could be used to determine gear modifications necessary for protecting EFH. More important, the impacts of gear modifications designed to protect EFH are likely to be area specific, and no studies have been conducted in the areas associated with Alternatives 2 and 3. Projections of potential changes in landings associated with the proposed gear restrictions would be, at best, speculative and highly imprecise. We would expect fixed costs to owners of trawl vessels to increase if the gear restrictions were adopted; we also would anticipate short-run reductions in landings and revenues.

The present work is also limited because it does not address completely the net national benefits. In order to assess completely the affects benefits to society from protection or restoration of EFH, it would be necessary to determine how improvements in EFH would affect future stock levels of the three regulated species, and subsequently, commercial and recreational harvesting activities. That is, the value to society, relative to the three regulated species, would be related to the benefits society derives from changes in commercial and recreational fishing activities. To fully assess the economic value of protecting EFH, it would be necessary to establish some baseline value of how EFH contributes to resource conditions and subsequent landings. It would then be necessary to assess how each specific EFH area contributes to the abundance, availability, recruitment, and growth of each of the three regulated species (i.e., summer flounder, scup, and black sea bass). The baseline information and potential biological responses to protecting EFH are not available. Information necessary for determining the economic value of protecting or restoring EFH for the three regulated species, therefore, is unavailable. We provide in a separate report a methodology, provided the baseline information was available, that could be used to assess the economic value or net benefit to society of restoring and protecting EFH (Strand *et al.* 2001). We also do not address fully address net national benefits because cost information necessary for estimating producer surplus is not available for each of the three gear types.

In lieu of an economic valuation study of protecting EFH, this study examines the potential ramifications of Alternatives 2 and 3 on landings, prices, ex-vessel revenues, and consumer surplus associated with the three regulated species. The study also examines the impacts on landings and ex-vessel revenues of species jointly caught with the three regulated species and the three major bottom gears-fish otter trawl, other otter trawl, and sea scallop dredge--used in the areas associated with Alternatives 2 and 3. Surfclam fishing by dredge is also conducted in the areas; problems with the existing data on surfclam dredge fishing activities, however, limited the scope of analysis relative to the surfclam dredge. The NEFSC logbook data had redundant observations and were incomplete.

Assessment of the potential revenue changes induced by Alternatives 2 and 3 on the commercial fisheries required several mathematical and statistical models. One model was required to determine other areas and species that vessels might fish in response to Alternatives 2 and 3. In addition, the model was also used to predict the quantities of other species that would be caught in the different areas by the different gear types. The estimation of changes in the areas and species fished was based on work done by John Walden of the Northeast Fisheries Science Center, NMFS. Walden had previously developed a mathematical programming model that permits an assessment of changes in areas and landings based on vessel operators maximizing revenues per month (Walden 2001). In addition, the effect of the changes in landings on the ex-vessel prices of summer flounder, scup and black sea bass was estimated. Because of the time limitations and the limited information on long-run biological effects of area closures, the analysis of the alternatives was based solely on the change in fishermen revenues and ex-vessel consumer surplus that result from changes in the areas fished and fish landed. The model and results cannot be used to predict or estimate the potential long-run impacts of protecting EFH. To do so would require a more complex model and different behavioral assumptions (e.g., the baseline information relating the important biological parameters to EFH and different behavioral assumptions, such as profit maximization).

Thus, the analysis is not meant to be a benefit-cost analysis of area closures. Even forgetting about including the long-run effects from the biological change, the economic short-run changes do not consider the change in costs associated with the closed areas, and thus, producer surplus is not calculated. The losses associated with Alternative 2 are underestimated because the areas closed are near shore, forcing the fishermen to spend more money and time traveling to the next best areas (i.e., the models assume fishing costs remain constant after the proposed areas are closed; this bias will not likely alter the estimated impacts associated with the offshore closed area alternative, but may have a substantial impact on the near shore area closed are alternative because fishermen would have to spend more money traveling to the next best areas further offshore). The nature of this bias on Alternative 3 is less clear because the area closed is offshore. The estimated changes in revenues must be taken simply as a partial assessment of the alternatives, awaiting information on fuel expenditures and the long-run biological effects of the closed areas. Furthermore, since the impacts on the analysis are based on logbook data which provides an incomplete set of data on all fishing activity in the region, the EFH area closure alternatives may have projected revenue losses that understate actual short-term losses.

The statistical models that were developed to estimate changes in landings, revenues, and consumer surplus of the species potentially affected by EFH alternatives used data from several sources. Three basic data sources were used for the analyses: (1) the NEFSC logbook data (1996-2000), (2) dealer or weight out data (1996-2000), and (3) the NMFS electronic monthly (1990-1999) database that contains information on total landings and values for all states. The NEFSC logbook data provides data on vessel activities between 1996 and 2000 and covers vessel activities between Maine and North Carolina. The logbook data does not contain price or revenue information, and thus, it was necessary to use the dealer data to estimate prices and revenues per trip and per vessel for the vessel activity contained in the logbook database. The NMFS electronic database provides information on landings and ex-vessel value and prices only for periods between 1990 and 1999. Three data sources were necessary. The logbook data and the dealer data contained the only information that could be used to predict changes in landings and areas. The NMFS electronic monthly database, however, contained the most appropriate data that could be used to estimate how prices and national ex-vessel revenues and consumer benefits would change in response to changes in landings.

Inverse demand or price dependent ex-vessel models were estimated for all species or species categories other than squid. We were unable to obtain statistically significant estimates of the relationship between ex-vessel prices and landings, regardless of the level of temporal aggregation or source of data. Monthly inverse demand models were estimated for the three regulated species-summer flounder, scup, and black sea bass-using the NMFS national electronic database. We were unable to estimate statistically acceptable monthly inverse demand models for monkfish and sea scallops; large quantities were often reported for no specific time period (i.e., NSP in the NMFS code). Annual inverse demand models, however, were estimated for sea scallops and monkfish or angler fish using the NMFS annual national electronic data base and observations between 1970 and 1999. For the other species category, the inverse demand was estimated using mean monthly prices and revenues obtained from the logbook and dealer data; the total number of observations used to estimate the other species category equaled 12. The inverse demand models were used to estimate changes in ex-vessel prices, ex-vessel revenues, and consumer surplus.

It is important to understand that the national database contains the more appropriate data for estimating ex-vessel demand. The three regulated species as well as the other species that might be affective by the EFH alternatives are landed in states other than those between Maine and North Carolina, and thus, prices are also influenced by landings in other states not covered by the logbook and dealer data. Moreover, FMPs require an assessment of national benefits and not only localized benefits (e.g., consumer surplus for the Mid-Atlantic region).

The use of the various databases, however, does present some problems for the analysis. Average ex-vessel prices at the national level do not equal the prices corresponding to the logbook and dealer data. Ex-vessel prices and revenues for the vessel activity available in the logbook database had to be calculated using dealer weight-out data or the port-specific data obtained by NMFS from dealers. There are, thus, differences between ex-vessel prices and revenues obtained from the data sources (e.g., the average annual price for summer flounder equaled $1.87 per pound when calculated using the national data; it equaled $1.09 when calculated using the dealer data). Because of the differences in the data sets, estimates of revenue changes based on the logbook data are different than estimates of revenue changes using the national data. If the dealer prices equaled the national prices, however, the estimated changes in revenues based on the logbook data would equal the estimated changes in revenues based on the national data.

Results of the analyses indicate substantial reductions in revenues and consumer surplus from adoption of either alternative, although Alternative 2 would generate the largest loss (Table 1 in Appendix E). Considering vessels operating between Maine and North Carolina (the logbook data), the overall loss in ex-vessel revenue from the adoption of Alternative 2 is between $2.32 and $2.55 million per year; total landings of all species are projected to decline by 3.91 million pounds. Under Alternative 3, ex-vessel revenues are projected to decline between $2.16 (prices of all species are allowed to change in response in changes in landings) and $2.4 million per year (price is assumed to remain constant); landings are projected to decline by 2.33 million pounds under Alternative 3. Similarly, consumer surplus for all species is projected to decline by $789.0 thousand under Alternative 2 and by $758.0 thousand under Alternative 3. A reason why the potential losses in consumer benefits are so close is that under Alternative 3 there are large losses of sea scallops, which generally have a high consumer surplus value.

The lower bound projected revenue losses (i.e., $2.32 and $2.16 million) assume prices change in response to changes in landings; the higher projected revenue loss assumes no change in ex-vessel prices. It is important to remember that projected ex-vessel values, assuming no price changes, are lower than what would be expected when the projected landings are less than the status quo landings. A decrease in landings normally increases ex-vessel prices, and thus, projected revenues should actually be higher projected using the assumption that ex-vessel prices do not change. Similarly, projected losses in revenues, allowing prices to change in response to changes in landings, would be lower than revenues projected assuming no change in ex-vessel prices. Similar conclusions apply to the case of projected increases in landings. That is, the projected revenues, assuming no price changes, are higher than would be projected if price changes were considered. Higher landings would normally decrease ex-vessel prices. Projected gains, assuming no change in ex-vessel prices, would thus be higher than the gains that would occur if prices were allowed to change in the normal manner (i.e., prices would decline as landings increased). Alternatively, when landings are projected to increase, the projected revenues, assuming no change in prices, understates the ex-vessel value. The projected gains, assuming no changes in prices, therefore, overstate the potential increases in ex-vessel value. The converse applies to the case of landings decreasing relative to the status quo.

The bulk of the loss is imposed on fishermen using fish otter trawls and scallop dredges. The estimated loss in revenue to other gear type is less than $200.0 thousand. Projected losses in revenues to fish otter trawl gear, assuming no changes in ex-vessel prices, equal $2.27 million under Alternative 2 and $1.15 million under Alternative 3. Projected losses to scallop dredge gear, assuming no changes in ex-vessel prices, equal $163.3 thousand under Alternative 2 and $1.07 million under Alternative 3. Actual losses, however, would be less because of price increases relative to decreased landings. No attempt was made to calculate changes in ex-vessel prices by gear type or consumer surplus losses or changes by gear type. In terms of landings, the primary species affected by either Alternative 2 or 3 is summer flounder. Under Alternative 2, revenue is projected to decline by nearly $600.0 thousand; under Alternative 3, the ex-vessel revenue of summer flounder is projected to decline by less than $160.0 thousand. In terms of revenue losses, however, the primary species affected by either Alternative 2 or 3 is sea scallops. Under Alternative 3, the ex-vessel revenue of sea scallops is projected to decline by $1.28 million; under Alternative 2, the ex-vessel revenue of sea scallops is projected to decline by less than $208.0 thousand. Large reductions in revenues for either alternative also occur for the all other species category. Under Alternative 2, ex-vessel revenues for all other species are projected to decline between $1.48 and $1.66 million; under Alternative 3, ex-vessel revenues for all other species are projected to decline between $562.0 and $633.2 thousand.

On a per vessel basis, the potential losses are quite large. On an annual basis, an average of sixty-eight vessels fished the areas defined by Alternatives 2 and 3. Under Alternative 2, the average annual loss per vessel equals between $34.1 and $37.9 thousand. Under Alternative 3, the potential average annual loss is between $31.7 and $35.3 thousand. On a per gear basis, assuming no change in ex-vessel prices, the potential loss in revenue per scallop dredge vessel equals $10.9 thousand under Alternative 2 and $39.7 thousand under Alternative 3. Revenues to fish otter trawl vessels, assuming no changes in ex-vessel prices, decrease by $48.3 thousand under Alternative 2 and by $32.9 under Alternative 3. Revenues to other otter trawl vessels, also assuming no changes in ex-vessel prices, are projected to decline by $19.4 thousand per year under Alternative 2 and by $29.4 thousand under Alternative 3.

If we consider potential changes in ex-vessel revenues on a per trip basis and assume no changes in ex-vessel prices, revenues are projected to decline by $898.3 and $6,204.5, respectively, under Alternative 2 and 3. Projected average losses per trip for affected vessels for the three major gear types are as follows: (1) fish otter trawl--$854.37 (Alternative 2) and $4,069.56 (Alternative 3); (2) sea scallop dredge--$1,081.26 (Alternative 2) and $12,771.62 (Alternative 3); (3) other otter trawl--$3,761.29 (Alternative 2) and $8,831.40 (Alternative 3).

Excluding the all other species category, consumers are most affected by the loss in the sea scallop harvest. The reader is again reminded that these revenue losses are underestimates of total loss to the fishermen because they do not include increased costs from having to fish further offshore. Under Alternative 2, consumer surplus declines by $52.8 thousand; under Alternative 3, consumer surplus declines by nearly $300.0 thousand. The largest reductions in consumer surplus occur for the all other species category: (1) $572.9 thousand for Alternative 2; and (2) $361.5 thousand for Alternative 3. If we consider the national level and only the three regulated species, total consumer surplus declines by $195.6 thousand under Alternative 2 and by $131.7 thousand under Alternative 3.

Overall, we find that Alternative 2 generates the largest losses in terms of product landed (3.91 million pounds), ex-vessel revenues ($2.32 to $2.55 million), and consumer surplus ($789.0 thousand). Alternative 3 generates lower losses in landings (2.33 million pounds) than Alternative 2, but nearly the same losses in ex-vessel revenues ($2.16 to $2.40 million) and consumer surplus ($758.0 thousand). This result is primarily associated with the fact that Alternative 3 more adversely affects sea scallop landings, and the sea scallop is a high-valued product with high consumer surplus. On a per species basis, the largest losses in landings occur for summer flounder under Alternative 2 (526.1 vs. 137.6 thousand pounds under Alternative 3). The largest reductions in scup occur under Alternative 3, 323.2 vs. 62.89 thousand pounds). The largest potential reductions in landings of black sea bass occur under Alternative 2, 15.3 vs. 8.9 thousand pounds). The largest losses in landings occur for the all other species category-3.03 under Alternative 2 vs. 1.47 million pounds under Alternative 3). Relative to the three regulated species, landings are projected to decline by 604.1 and 469.7 thousand pounds, respectively, under Alternatives 2 and 3. On a per vessel basis, the highest average annual losses in revenue occurs for Alternative 2 ($34.1 to $37.9 thousand per year vs. $31.7 and $35.3 thousand under Alternative 3). On a per trip basis, the largest annual losses in revenues are projected to occur under Alternative 3 ($6,204.5 vs. $898.3 under Alternative 2).

The "no action alternative" would result in no additional management measures to minimize the effects of fishing on EFH. Retaining status quo measures to protect habitat is not likely to cause additional economic impacts. If status quo regulations are retained to protect habitat, industry can maintain their current fishing practices. Retaining current measures to achieve the EFH objectives of the SFA would incur no additional burden on the fishing community . In addition, protection of habitat could enhance non-consumptive human activities such as diving. Once the stock is rebuilt long-term social benefits will be realized through a sustainable fishery.

The economic impact of roller rig and rockhopper gear (Alternative 4) restrictions is unknown. As stated in section 3.2.7.2 of the EIS, there are very little data on these gear or their impact on habitat. As such, it is impossible to do a quantitative analysis on the benefits of this alternative to habitat or the stock. Council staff is not aware of the extent of the current use or size of either of these gears, in states other than Massachusetts and North Carolina, and is specifically requesting this information during the public hearing process. Even if gear restrictions prove to be effective in reducing impacts to EFH they could also mean a reduction in landings and revenue of targeted species. Gear modifications (to replace these gear, if in use) would require preliminary research to develop gear that would eliminate impacts to EFH and at the same time effectively catch the targeted species. In addition to the time and expense of developing new gear, there is also the implementation expense to the fishery that may not make gear modifications practicable. Such a gear restriction may cause a negative economic impact for minimal benefit to habitat.

The summer flounder, scup, and black sea bass FMP currently restricts vessels issued moratorium permits for scup and/or black sea bass to roller rig trawl gear with rollers less than 18 inch diameters. An 18 inch diameter corresponded to the maximum roller diameter limitation imposed by the states of Massachusetts and North Carolina to regulate this gear in state waters. In the Gulf of Maine rock hopper gear is restricted to a maximum 12 inch diameter. If restrictions regarding roller size were implemented by the MAFMC then the rules could be made consistent from Maine to North Carolina. This gear restriction may reduce gear conflicts between trawlers and potters. Hard bottom would not as accessible to trawlers because of the reduction in roller size. Potters could continue to fish these areas that were traditionally only accessible by black sea bass pots. Enhancement of structured habitat could enhance non-consumptive human activities such as scuba diving. Once the stock is rebuilt long-term social benefits will be realized through a sustainable fishery.

The economic impact of a streetsweeper gear (Alternative 5) prohibition is unknown. As stated in section 3.2.7.2 of the EIS, there are very little data on these gear or their impact on habitat. As such, it is impossible to do a quantitative analysis on the benefits of this alternative to habitat or the stock. Council staff is not aware of the extent of the use of this gear and is requesting this information during the public hearing process. Even if gear restrictions prove to be effective in reducing impacts to EFH they could also mean a reduction in landings and revenue of targeted species. Gear modifications (to replace this gear, if in use) would require preliminary research to develop gear that would eliminate impacts to EFH and at the same time effectively catch the targeted species. In addition to the time and expense of developing new gear, there is also the implementation expense to the fishery that may not make gear modifications practicable. Such a gear restriction may cause a negative economic impact for minimal benefit to habitat.

The Council and Commission met on June 12, 2002 to adopt a preferred alternative for managing adverse effects from fishing (EFH Alternative). After considerable discussion, they voted to continue to rely on current management measures to reduce gear impacts (Alternative 1: status quo). Retaining status quo measures to protect habitat is not likely to cause additional economic impacts because it will allow industry to maintain current fishing practices. As such, retaining current measures to achieve the EFH objectives of the SFA would incur no additional burden on the fishing community (section 4.2.1 of the EIS). Other non-preferred measures to protect habitat had substantial impacts to participants and communities.

The enforcement costs of the options for managing adverse effects from fishing are not equivalent to the budgetary expense of dockside or at-sea inspection of vessels. Rather, these enforcement costs from an economic perspective, are measured by opportunity cost in terms of foregone enforcement services that must be diverted to enforcing regulations to reduce gear impacts to EFH. The status quo alternative (EFH Alternative 1: preferred alternative) would allow the current system to continue in effect and no new enforcement burdens will be introduced. The EFH regulations prohibiting or restricting the use of gear (EFH Alternatives 2 thru 5) will introduce the additional burden of enforcing these actions. From a budgetary perspective, enforcement expense may not change. However, the opportunity cost of diverting enforcement services to these added actions will increase.

5.3.4 Summary of Impacts

The preferred alternatives adopted in this amendment include: a) a federal coastwide quota with a state-by-state allocation system managed by the Commission (Alternative 5f); b) removal of the permit requirement that restricts fishermen from using a SER S/G Permit during a northern closure (Alternative 9b); c) no additional regulations regarding wet storage of black sea sass pots/traps during a closure (Alternative 10a: status quo); d) no initiation of a pot/trap tag program (Alternative 11a: status quo); e) no restrictions on the numbers of pots/traps used (Alternative 12a: status quo); and f) rely on current management measures to minimize adverse effects of fishing on EFH (EFH Alternative 1: status quo).

Black sea bass commercial fishery alternatives

The overall impacts of black sea bass landings on prices, consumer surplus, and consumer surplus are difficult to determine without detailed knowledge of the relationship between supply and demand factors for these fisheries. In the absence of detailed empirical models for this fishery and knowledge of elasticities of supply and demand, a qualitative approach can be employed to assess potential impacts of the proposed management measures. However, none of the proposed management measures would change the manner in which the black sea bass quota is derived. Therefore, changes in the overall amount of black sea bass landings is not anticipated. The bulk of the alternatives evaluated dealt with quota allocations across time and/or space. These alternatives were assessed as part of the process to establish a new system to allocate the quota throughout the year.

Alternative 1 (status quo) would allow the current system to continue in effect. This alternative will not affect the quantity of black sea bass landed in the commercial fishery. Thus prices, consumer surplus and producer surplus are not expected to change if it continues in effect. The status quo alternative would allow the current system to continue in effect and no new enforcement burdens will be introduced.

Alternatives 2 thru 7 evaluate alternative management systems to the current black sea bass quota allocation system. None of the alternatives are expected to affect the quantity of black sea bass landed in the commercial fishery. Thus prices, consumer surplus and producer surplus are not expected to change if any of these alternatives was implemented. However, with the exception of Alternative 3 (Quota allocations by permit categories) distributive effects were identified for each of these alternatives. From a budgetary perspective, enforcement expense may not change under these alternatives. However, the opportunity cost of diverting enforcement services to this measure may increase for Alternative 3 and decrease for Alternatives 4 thru 7. For Alternative 2, no new enforcement burdens will be introduced.

Alternatives 8, 9, and 10 evaluated an allocation system by gear type, modifications to the black sea bass commercial permit requirement, and the prohibition of wet storage of black sea bass, respectively. Alternative 8 is expected to have some distributional impacts but no changes to landings, and consumer or producer surpluses. No changes in landings, consumer or producer surpluses, or distributional impacts are projected under Alternative 9 or 10. From a budgetary perspective, enforcement expense may not change under these alternatives. However, Alternatives 8 and 10 (except 10a) may have associated increase in opportunity cost associated with the diversion of enforcement services to these measures. For Alternative 8, no new enforcement burdens will be introduced.

Alternatives 11 and 12 evaluated black sea bass tag programs and restrictions on the number of black sea bass pots/traps. Potential enforcement costs may be associated with Alternative 11b (5.3.3.11.2) and harvesting costs with Alternatives 12b and 12c (5.3.3.1.12.2 and 5.3.3.1.12.3). None of these alternatives are expected to impact the quantity of black sea bass landed in the commercial fishery. Thus prices, consumer surplus, producer surplus, and distributed effects are not expected to change. From a budgetary perspective, enforcement expense may not change under these alternatives. However, these alternatives (except 11a and 12a) may have associated increase in opportunity cost associated with the diversion of enforcement services to these measures.

Alternative 5f (preferred alternative) is not expected to affect the quantity of black sea bass landed in the commercial fishery. Thus prices, consumer surplus and producer surplus are not expected to change. However, distributive effects were identified for this alternative. From a budgetary perspective, enforcement expense may not change under this alternative. However, the opportunity cost of diverting enforcement services to this measure may decrease.

Options for managing adverse effects from fishing

Overall, Alternative 2 generates the largest losses in terms of product landed (3.91 million pounds), ex-vessel revenues ($2.32 to $2.55 million), and consumer surplus ($789.0 thousand). Alternative 3 generates lower losses in landings (2.33 million pounds) than Alternative 2, but nearly the same losses in ex-vessel revenues ($2.16 to $2.40 million) and consumer surplus ($758.0 thousand). This result is primarily associated with the fact that Alternative 3 more adversely affects sea scallop landings, and the sea scallop is a high-valued product with high consumer surplus. On a per species basis, the largest losses in landings occur for summer flounder under Alternative 2 (526.1 vs. 137.6 thousand pounds under Alternative 3). The largest reductions in scup occur under Alternative 3, 323.2 vs. 62.89 thousand pounds). The largest potential reductions in landings of black sea bass occur under Alternative 2, 15.3 vs. 8.9 thousand pounds). The largest losses in landings occur for the all other species category-3.03 under Alternative 2 vs. 1.47 million pounds under Alternative 3). Relative to the three regulated species, landings are projected to decline by 604.1 and 469.7 thousand pounds, respectively, under Alternatives 2 and 3. On a per vessel basis, the highest average annual losses in revenue occurs for Alternative 2 ($34.1 to $37.9 thousand per year vs. $31.7 and $35.3 thousand under Alternative 3). On a per trip basis, the largest annual losses in revenues are projected to occur under Alternative 3 ($6,204.5 vs. $898.3 under Alternative 2).

Alternatives 4 (Restrict the size of roller rig and rock hopper gear) and 5 (Prohibit street-sweeper gear) were not evaluated due to lack of knowledge of the impacts of these gears on the environment and overall lack of information of the use of these gear by commercial vessels (i.e., number of vessels employing these gears, commercial landings and value generated by this type of gear, fishing areas where these gears are used, etc.).

The status quo alternative (EFH Alternative 1; preferred alternative) would allow the current system to continue in effect and no new enforcement burdens will be introduced. The EFH regulations prohibiting or restricting the use of gear (EFH Alternatives 2 thru 5) will introduce the additional burden of enforcing these actions. From a budgetary perspective, enforcement expense may not change. However, the opportunity cost of diverting enforcement services to these added actions will increase.

5.3.5 Review of Impacts Relative to the Regulatory Flexibility Analysis

5.3.5.1 Introduction and methods

The RFA requires the federal rulemaker to examine the impacts of proposed and existing rules on small businesses, small organizations, and small governmental jurisdictions. In reviewing the potential impacts of proposed regulations, the agency must either certify that the rule "will not, if promulgated, have a significant economic impact on a substantial number of small entities." The Small Business Administration (SBA) defines a small business in the commercial fishing and recreational fishing activity, as a firm with receipts (gross revenues) of up to $3.0 million. The proposed measures regarding the proposed black sea bass commercial quota allocation systems could affect any vessel holding an active federal permit for black sea bass as well as vessels that fish for that species in state waters. Data from the Northeast permit application database shows that 1,119 commercial vessels are currently permitted to take part in the black sea bass fishery. All permitted vessels readily fall within the definition of small business.

Since all permit holders may not actually land any of the three species the more immediate impact of the rule may be felt by the 730 commercial vessels that are actively participating in this fishery. An active participant was defined as being any vessel that reported having landed one or more pounds of black sea bass in the Northeast dealer data during calendar year 2000. The dealer data covers activity by unique vessels that hold a federal permit of any kind and provides summary data for vessels that fish exclusively in state waters. This means that an active vessel may be a vessel that holds a valid Federal Black Sea Bass Permit; a vessel that holds a valid federal permit but no Black Sea Bass Permit; a vessel that holds a federal permit other than black sea bass and fishes for that species exclusively in state waters; or may be vessel that holds no federal permit of any kind. Of the four possibilities the number of vessels in the latter two categories cannot be estimated because the dealer data provides only summary information for state waters vessels and because the vessels in the last category do not have to report landings. Of the active commercial vessels reported above, 185 did not hold a valid federal permit for black sea bass during calendar year 2000.

In the present RFA the primary unit of observation for purposes of performing a threshold analysis is vessels that participated in the black sea bass fishery during calendar year 2000 irrespective of their permit status.

Not all landings and revenues reported through the federal dealer data can be attributed to a specific vessel. Vessels with no federal permits are not subject to any federal reporting requirements with which to corroborate the dealer reports. Similarly, dealers that buy exclusively from state waters only vessels and have no federal permits, are also not subject to federal reporting requirements. Thus, it is possible that some vessel activity cannot be tracked with the landings and revenue data that are available. Thus, these vessels cannot be included in the threshold analysis, unless each state were to report individual vessel activity through some additional reporting system - which currently does not exist. This problem has two consequences for performing threshold analyses. First, the stated number of entities subject to the regulation is a lower bound estimate, since vessels that operate strictly within state waters and sell exclusively to non-federally permitted dealers cannot be counted. Second, the portion of activity by these uncounted vessels may cause the estimated economic impacts to be over- or underestimated.

The effects of actions were analyzed by employing quantitative approaches to the extent possible. Where quantitative data were not available, qualitative analyses were conducted. In order to conduct a more complete analysis, cumulative impacts were examined in various ways to represent the evaluated quota allocation systems. The alternatives evaluated in this document are described in detail in section 2.0 of the EIS and are briefly described below.

Procedurally, the economic effects of the quota alternatives were estimated using five steps. First, the Northeast dealer data were queried to identify all vessels that landed at least one or more pounds of black sea bass in calendar year 2000. Note that the States of Connecticut and Delaware report canvas (summary) data to NMFS, so landings and revenues by individual vessels cannot be included. Thus, vessels that land exclusively in those states cannot be analyzed. Vessels that land in these, plus other states, are analyzed - but landings and revenues represent only that portion of business conducted in states other than Connecticut and Delaware. It is presumed that the impacts on vessels that cannot be identified will be similar to the participating vessels that are analyzed herein.

The second step was to estimate total revenues from all species landed by each vessel during calendar year 2000. This estimate provides the base from which subsequent changes in landings (due to allocations) and their associated effects on vessel revenues were compared. Since 2000 is the last full year from which data are available (partial year data could miss seasonal fisheries), it was chosen as the base year for the analysis. That is, partial landings data for 2001 were not used in this analysis because the year is not complete. As such, 2000 data were used in the analysis. However, it is important to mention that the 2000 data is preliminary.

The third step was to deduct or add, as appropriate, the expected change in vessel revenues depending upon the potential changes in landings due to the allocation systems evaluated. This was accomplished by estimating proportional spatial/temporal reductions or increases in landings versus the base year 2000.

The fourth step was to divide the estimated 2002 revenues from all species by the 2000 base revenues for every vessel. For step five, if the dividend from step 3 was less than or equal to 0.95 then the vessel was defined as being impacted (i.e., had an expected loss of gross revenues of 5 percent or more) for purposes of the RFA. When possible, a summary table was constructed that report the results of the threshold analysis for the evaluated allocation alternatives. These results were further summarized by home state as defined by permit application data.

The threshold analysis just described is intended to identify impacted vessels and to characterize the potential economic impact on directly affected entities. To further characterize the potential impacts on indirectly impacted entities and the larger communities within which owners of impacted vessels reside, selected county profiles were constructed when possible. Each profile was based on impacts under the state-by-state quota alternatives. These alternatives were chosen to identify impacted counties because they would identify and include a wide range of counties in the analysis. Counties included in the profile had to meet the following criteria: the number of vessels with revenue loss exceeding 5 percent per county was either greater than 4, or all vessels with revenue losses exceeding 5 percent in a given state were from the same home county.

Based on these criteria, a total of up to 4 counties were identified as impacted by the range of management measures evaluated: Barnstable and Suffolk Counties, in Massachusetts; Virginia Beach and Norfolk Counties, in Virginia. Counties not included in this analysis (e.g. in Massachusetts, Maine) did not have enough vessels to meet the criteria specified, i.e., there were less than 4 vessels per county with revenue loss exceeding 5 percent, or all vessels in a state with revenue loss exceeding 5 percent were not home ported within the same county.

It should be noted that the county profiles are intended to characterize the relative importance of commercial fishing and fishing related industries in the home counties. As such, the county profiles provide a link to the Social Impact Analysis (section 6.7, of the EIS) but are not intended to be a substitute for that analysis. The target counties were identified based on the county associated with the vessels homeport as listed in the owner's 2000 permit application. Since county is not a field in the permit application the self-reported homeport was first matched against port names listed in data tables maintained in the Northeast region to assign a home county. Where no such match existed.

Counties were selected as the unit of observation because a variety of secondary economic and demographic statistical data were available from several different sources. Limited data are available for place names (i.e., by town or city name) but in most instances reporting is too aggregated or is not reported due to confidentiality requirements. Reported statistics for the counties (i.e., counties identified as having >= 4 vessels impacted with revenue losses of 5% or greater, see section 5.0) are presented in Table 150. In addition, statistics for counties containing one or more ports that showed commercial revenue dependence on black sea bass, summer flounder, and/or scup of >= 10% --ports and counties identified under the port and community section (section 3.4 of the EIS)--are also presented in that table. The statistics presented in Table 151 include information regarding population, employment, and income.

5.3.5.2 Description of the alternatives

A detailed description of the alternatives evaluated in this document is presented in section 2.0 of the EIS. In addition, an overall discussion of the impacts associated with the evaluated alternatives is presented in section 4.0 of the EIS. A brief description of the alternatives is presented below.

5.3.5.3 Analysis of the impacts of the alternatives

The effects of actions were analyzed by employing quantitative approaches to the extent possible. Where quantitative data were not available, qualitative analyses were conducted. For the purpose of analysis several assumptions must be made. First, average revenue changes noted in this analysis are made using 2000 dealer data and participation unless otherwise specified. In addition to this, 2000 permit files were used to describe permit holders in the fishery. It is important to mention, that, revenue changes for 2002 are dependent upon landings in 2000. For the analyses themselves, changes are estimated by examining the total revenue earned by an individual vessel in 2000, and comparing it to its potential revenue in 2002, given the hypothetical 2002 harvest levels and allocations. Generally, the percent of revenue reduction for vessels varied considerably based on permits it held (i.e., based on the fisheries in which it was able to participate) and species it landed. Diversity in the fleet, perhaps, helps to balance loss in one fishery with revenue generated from other fisheries. Lastly, it is important to keep in mind that while the analyses are based on landings for federally permitted vessels only, those vessels may be permitted to, and frequently do, fish in state waters for a species of fish for which it does not hold a federal permit.

5.3.5.3.1 Black sea bass commercial fishery alternatives

5.3.5.3.1.1 Status quo: quarterly quota system currently in effect (Alternative 1)

Under this alternative the current system will continue to allocate the commercial quota to four quarters based on landings data for the 1988-1992 period. Quarterly allocations based on a hypothetical quota of 3,024,742 lb are shown on Table 1. This is the same annual commercial quota that has been in place since the implementation of Amendment 9. Under this alternative, the proportion of black sea bass allocated to quarters will remain unchanged. As such, it is not expected that landings by participating vessels would change if current fishing practices continue.

If this alternative continues in effect, the basic problem associated with the current black sea bass quota allocation will persist. These problems were discussed in detail in section 2.0 of the EIS. Derby-style fishing practices and early seasonal closures (within the quarters) will continue. Long closures have obvious economic consequences to fishermen and processors. A market glut at the beginning of the quarter allows for a drop in prices as a large number of fish flood the market. After a short landings period, the fishery is closed and fishermen, especially those that fish primarily for black sea bass, are faced with the additional economic concerns of no or reduced income.

In addition, the years used to allocate the current quarterly quota system may not reflect current landings patterns. The base years used to allocate the quarterly quota system are 1988 to 1992, the years before regulations in the summer flounder and other fisheries were implemented.

Derby-style fishing promotes unsafe fishing practices, e.g., fishermen will fish in unsafe weather, in order to catch a "their share" of the quota. Early seasonal closures also result in social burdens associated with fishermen that have no income, e.g., an increase in unemployment.

As larger fish have increased, the current management system has created possible inequities by shifting landings to the north. Therefore early seasonal closures reduce landings inequitably among states. In addition, fishermen indicate that stricter trip limits, that may help to distribute landings evenly throughout the year, favor fishing operations in the north where black sea bass are caught closer to shore. In fact, preliminary data for quarter 4 in 2000 indicate that 41% of the landings for that quarter occurred in one state, Massachusetts.

5.3.5.3.1.2 A quarterly quota system with a rollover provision (Alternative 2)

5.3.5.3.1.2.1 A quarterly quota system with a change in the allocation formula based on 1988-1997 landings data and a rollover provision (Alternative 2a)

Under this alternative the current system will continue to allocate the commercial quota to four quarters based on landings data for the 1988-1997 period. Quarterly allocations based on a hypothetical quota of 3,024,742 lb are shown on Table 1. This is the same annual commercial quota that has been in place since the implementation of Amendment 9. Under this hypothetical quota, the proportion of black sea bass landings allocated to quarters will remain relatively unchanged from those under the current quarterly system (Table 1). The most significant change is in the proportion allocated to the first quarter. Under this alternative the first quarter allocation is reduced from 38.64% under the current allocation system - -status quo- - to 36.16%. However, as indicated in section 2.0, from 1998-2000, on average, over 33% of the first quarter quota has not been taken. Therefore, it is expected that landings by participating vessels would remain relatively unchanged if current fishing practice continue. In addition, a rollover provision would be implemented with this alternative. That is, unused quota from the previous quarters could be added to the next quarter allocation within a year. (i.e., unused quota from quarter 4 could not be added to the quarter 1 allocation the following year.) As such, unharvested black sea bass from one period that is transferred to the following period (within the same year) could allow fishermen to increase revenues.

This alternative will use a quarterly system to allocate the commercial quota like Alternative 1, except that adding a rollover provision and changing the base years for allocation may discourage derby-style fishing for three reasons: 1) fishermen will know that if the quota is not caught it will still be available the next quarter; 2) the quota for the quarters that receive the quota rollover will be increased, therefore decreasing the possibility of an early closure; and 3) the change in the base period used to allocate the quota may more accurately reflect current landings patterns. Eliminating derby-style fishing will reduce the likelihood of an initial market glut, and therefore lowered prices. Both the rollover and the change in allocation may work to reduce the likelihood of quarterly quota overages, and therefore seasonal closures, and the associated economic burdens. This allocation scheme may more accurately reflect current landings patterns because it includes more recent years and a longer time series. In addition, the longer time series may account for environmental variability.

This alternative may reduce derby-style fishing and therefore discourage unsafe fishing practices, e.g., fishermen will not fish in unsafe weather, in order to catch a fair share of the quota. It may eliminate early seasonal closures also the associate social burdens of fishermen that have no income, e.g., an increase in unemployment.

5.3.5.3.1.2.2 A quarterly quota system with a change in the allocation formula based on 1993-1997 landings data and a rollover provision (Alternative 2b)

Under this alternative the current system will continue to allocate the commercial quota to four quarters based on landings data for the 1993-1997 period. Quarterly allocations based on a hypothetical quota of 3,024,742 lb are shown on Table 1. This is the same annual commercial quota that has been in place since the implementation of Amendment 9. Under this hypothetical quota, the proportion of black sea bass landings allocated to quarters will remain relatively unchanged from those under the current quarterly system (Table 1). The most significant change is in the proportion allocated to the first quarter. Under this alternative the first quarter allocation is reduced from 38.64% under the current allocation system --status quo-- to 34.13%. However, as indicated in section 2.0, from 1998-2000, on average, over 33% of the first quarter quota has not been taken. Therefore, it is expected that landings by participating vessels would remain relatively unchanged if current fishing practice continue. In addition, a rollover provision would be implemented with this alternative. That is, unused quota from the previous quarters could be added to the next quarter allocation within a year. (i.e., unused quota from quarter 4 could not be added to the quarter 1 allocation the following year.) As such, unharvested black sea bass from one period that is transferred to the following period (within the same year) could allow fishermen to increase revenues.

This alternative will use a quarterly system to allocate the commercial quota like Alternative 1, except that adding a rollover provision and changing the base years for allocation may discourage derby-style fishing for three reasons: 1) fishermen will know that if the quota is caught it will still be available the next quarter; 2) the quota for the quarters the receive the quota rollover will be increased; 3) the change in the base period used to allocate the quota may more accurately reflect current landings patterns. Distributing the landings evenly throughout the year will reduce the likelihood of an initial market glut, and therefore lowered prices. Both the rollover and the change in allocation may work to reduce the likelihood of quarterly quota overages, and therefore seasonal closures, and the associated economic burdens.

This alternative may reduce derby-style fishing and therefore discourage unsafe fishing practices, e.g., fishermen will not fish in unsafe weather, in order to catch a fair share of the quota. It may eliminate early seasonal closures also the associate social burdens of fishermen that have no income, e.g., an increase in unemployment.

5.3.5.3.1.3 Quota allocation by permit category (Alternative 3)

5.3.5.3.1.3.1 Quota allocation by permit category - 3 separate categories allocate based on landings data from 1988-1997 (Alternative 3a)

This alternative would create three permit categories or sectors based upon documented landings by any vessel with a NER BSB permit prior to June 5, 2001. The qualifying criteria was described in sections 2.0 of the EIS and 2.2 of the RIR.

NEFSC staff determined that based upon Northeast weighout and vessel trip report data, 52 vessels would qualify for A1 permits, 98 for A2 permits, and 1,688 for A3 permits. These vessels were either identified on federally permitted Northeast dealer weighout slips as landing black sea bass or submitted Northeast vessel trip reports that included landings of black sea bass. These numbers may underestimate the number of vessels that actually landed black sea bass during this time period for various reasons. Two of which are: 1) federal vessel and dealer permits for black sea bass were not required until 1996 and 2) North Carolina dealer data were not included in the Northeast dealer data base until 1997.

Each sector would be allocated a share of the Quota based on average annual landings from 1988-1997 for each permit category. Based on 1988-1997 data, 81.7% of the annual Quota would be allocated to A1 permit holders, 12.8% to A2 permit holders, and 5.5% to A3 permit holders (Table 2a). Permit category allocations based on a hypothetical commercial quota of 3,024,742 lb would be 2,470,307 lb for A1 permit holders, 388,074 lb for A2 permit holders, 166,361 lb for A3 permit holders. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

5.3.5.3.1.3.1.1 Threshold analysis for participating vessels

Estimated potential impacts on vessels were calculated by employing varying trip limits for each permit category. Three different sets of trip limits were considered in this analysis. These scenarios are ordered from least restrictive to most restrictive as follows: Scenario A - A1 qualifying vessels would be restricted to 10,000 pounds per trip, A2 qualifying vessels would be restricted to 5,000 pounds per trip, and A3 vessels to 3,000 pounds per trip; Scenario B - A1 qualifying vessels would be restricted to 8,000 pounds per trip, A2 vessels to 4,000 pounds per trip, and A3 vessels to 2,000 pounds per trip; and Scenario C - A1 qualifying vessels would be restricted to 6,000 lb per trip, A2 vessels to 3,000 lb per trip, and A3 vessels to 1,000 lb per trip. These limits were modeled to determine the impacts of potential trip limits on average values over the 1994-1997 period.

Short-run profit impacts of the trip limit scenarios under the three permit categories indicated that on the aggregate the trip limits under Scenario A would result in a 5.15% average reduction in profits for vessels (A1, A2, and A3 combined) affected by the trip limits, 6.50% for Scenario B, and 7.00% for Scenario C. Profits are considered 'short-run' because they are measured as revenues above variable operating costs and labor payments. In the long-run, fixed costs (i.e., insurance, mooring/dockage fees, etc.) must also be paid from these earnings. In addition, average annual loss in profits for vessels affected by the trip limits are $6,397, $7,193, and $7,659 for Scenarios A, B, and C, respectively.

The projected savings or conservation benefit of the proposed trip limits for all vessels (A1, A2, and A3 combined) is 230,979 lb, 313,733 lb, and 475,641 lb for trip limits under Scenarios A, B, and C, respectively. Projected savings or conservation benefit is defined as the additional amount of black sea bass (pounds) that would have been landed (i.e., killed) if the trip limits were not implemented.

5.3.5.3.1.3.2 Quota allocation by permit category - 3 separate categories allocate based on landings data from 1993-1997 (Alternative 3b)

The same as Alternative 3a except the base years used in the allocation formula would be 1993-1997. Under Alternative 3b, the number of vessels that would qualify for A1 and A2 permits would be nearly identical to those under Alternative 3a, and the number of vessels qualifying for A3 permits would be higher than those under Alternative 3a. Based on 1993-1997 data, 80.8% of the annual Quota would be allocated to A1 permit holders, 13.2% to A2 permit holders, and 6.1%

to A3 permit holders (Table 2b). Permit category allocations based on a hypothetical commercial quota of 3,024,742 lb would be 2,442,479 lb for A1 permit holders, 397,754 lb for A2 permit holders, 148,207 lb for A3 permit holders. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

5.3.5.3.1.3.2.1 Threshold analysis for participating vessels

Since the quota allocation to the permit holders is similar to that discussed under Alternative 3a (5.3.5.3.1.3.1), it is expected that overall impacts would be similar to those discussed under that section.

5.3.5.3.1.3.3 Quota allocation by permit category - 2 separate categories allocate based on landings data from 1988-1997 (Alternative 3c)

This alternative would create two permit categories or sectors based upon documented landings by any vessel with a NER BSB permit prior to June 5, 2001. The qualifying criteria was described in sections 2.0 of the EIS and 2.2 of the RIR.

NEFSC staff determine that based upon Northeast weighout and vessel trip report data, 102 vessels would qualify for B1 permits and 1,736 for B2 permits. These vessels were either identified on federally permitted Northeast dealer weighout slips as landing black sea bass or submitted Northeast vessel trip reports that included landings of black sea bass. These numbers may underestimate the number of vessels that actually landed black sea bass during this time period for various reasons. Two of which are: a) federal vessel and dealer permits for black sea bass were not required until 1996 and b) North Carolina dealer data were not included in the Northeast dealer data base until 1997.

Each sector would be allocated a share of the Quota based on average annual landings from 1988-1997 for each permit category. Based on 1988-1997 data, 89.8% of the annual Quota would be allocated to B1 permit holders and 10.1% to B2 permit holders (Table 3a). Permit category allocations based on a hypothetical commercial quota of 3,024,742 lb would be 2,716,521 lb for B1 permit holders and 308,221 lb for B2 permit holders. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

5.3.5.3.1.3.3.1 Threshold analysis for participating vessels

Estimated potential impacts on vessels were calculated by employing varying trip limits for each permit category. Two different sets of trip limits were considered in this analysis. These scenarios are ordered from least restrictive to most restrictive as follows: Scenario A - B1 qualifying vessels would be restricted to 10,000 pounds per trip and B2 qualifying vessels would be restricted to 5,000 lb per trip; Scenario B - B1 qualifying vessels would be restricted to 8,000 lb per trip and B2 vessels to 4,000 lb per trip; and Scenario C - B1 qualifying vessels would be restricted to 6,000 lb per trip and B2 vessels to 3,000 lb per trip, and A3 vessels to 1,000 lb per trip. These limits were modeled to determine the impacts of potential trip limits on average values over the 1994-1997 period.

Short-run profit impacts of the trip limit scenarios under the three permit categories indicated that on the aggregate the trip limits under Scenario A would result in a 3.33% average reduction in profits for vessels (B1 and B2 combined) affected by the trip limits, 4.25% for Scenario B, and 5.33% for Scenario C. Profits are considered 'short-run' because they are measured as revenues above variable operating costs and labor payments. In the long-run, fixed costs (i.e., insurance, mooring/dockage fees, etc.) must also be paid from these earnings. In addition, average annual loss in profits for vessels affected by the trip limits are \$5,570, \$6,169, and \$7,146 for Scenarios A, B, and C, respectively.

The projected savings or conservation benefit of the proposed trip limits for all vessels (B1 and B2 combined) is 166,212 lb, 219,476 lb, and 329,781 lb for trip limits under Scenarios A, B, and C, respectively. Projected savings or conservation benefit is defined as the additional amount of black sea bass (pounds) that would have been landed (i.e., killed) if the trip limits were not implemented.

5.3.5.3.1.3.4 Quota allocation by permit category - 2 separate categories allocate based on landings data from 1993-1997 (Alternative 3d)

The same as Alternative 3c except the base years used in the allocation formula would be 1993-1997. Under Alternative 3d, the number of vessels that would qualify for B1 permits would be nearly identical to those under Alternative 3c, and the number of vessels qualifying for B2 permits would be higher than those under Alternative 3c. Based on 1993-1997 data, 89.3% of the annual Quota would be allocated to B1 permit holders and 10.7% to B2 permit holders (Table 3b). Permit category allocations based on a hypothetical commercial quota of 3,024,742 lb would be 2,700,792 lb for B1 permit holders and 323,950 lb for B2 permit holders. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

5.3.5.3.1.3.4.1 Threshold analysis for participating vessels

Since the quota allocation to the permit holders is similar to that discussed under Alternative 3c (5.3.5.3.1.3.3), it is expected that overall impacts would be similar to those discussed under that section.

5.3.5.3.1.4 Quota allocation to separate subregions (Alternative 4)

5.3.5.3.1.4.1 Quota allocation to separate subregions based on 1988-1997 landings data with additional period allocations January through April and May through December (Alternative 4a)

Under this management measure the commercial quota would be allocated into two subregions. Based on landings data for the 1988 to 1997 period, the northern subregion (Maine to New York) would received 16.72% of the total allocation and the southern subregion (New Jersey Cape Hatteras, North Carolina) 83.28% (Table 4). Each subregional allocation is then divided into two time periods that extend from January through April and from May through December. In the northern subregion 32.53% and 67.47% of the quota would be allocated to the January through April and May through December periods, respectively. In the southern subregion 47.21% and

52.79% of the quota would be allocated to the January through April and May through December periods, respectively (Table 4).

Allocations by subregions and periods based on a hypothetical quota of 3,024,742 lb are shown on Table 4. This is the same annual commercial quota that has been in place since the implementation of Amendment 9. When the quota is allocated by subregion a decrease of 42% is projected for the northern region and an increase of 41% is projected for the southern region relative to 2000 landings (Table 148). When the northern allocation is subdivided by period, a 58% increase is projected for the January through April period and a decrease of 56% is expected for the May through December period. When the southern allocation is subdivided by period, a 23% and 63% increase are projected for the January through April and May through December periods, respectively (Table 148).

This alternative may discourage derby-style fishing by distributing landings throughout the year. Distributing the landings throughout the year will reduce the likelihood of an initial market glut, and therefore lowered prices. This alternative could make it less likely that seasonal closures would occur, eliminating the economic burdens of fishermen with little or no income. This alternative could increase landings in the southern states compared to the status quo.

5.3.5.3.1.4.2 Quota allocation to separate subregions based on 1993-1997 landings data with additional period allocations January through April and May through December (Alternative 4b)

Under this management measure the commercial quota would be allocated into two subregions. Based on landings data for the 1993 to 1997 period, the northern subregion (Maine to New York) would received 14.97% of the total allocation and the southern subregion (New Jersey Cape Hatteras, North Carolina) 85.03% (Table 4). Each subregional allocation would be divided into two time periods that extend from January through April and May through December. In the northern subregion 38.68% and 61.32% of the quota would be allocated to the January through April and May through December periods, respectively. In the southern subregion 44.06% and 55.95% of the quota would be allocated to the January through April and May through December periods, respectively (Table 4).

Allocations by subregions and periods based on a hypothetical quota of 3,024,742 lb are shown on Table 4. This is the same annual commercial quota that has been in place since the implementation of Amendment 9. When the quota is allocated by subregion a decrease of 48% is projected for the northern region and an increase of 44% is projected for the southern region (Table 148). When the northern allocation is subdivided by period, a 69% increase is projected for the January through April period and a decrease of 64% is expected for the May through December period. When the southern allocation is subdivided by period, a 17% and 77% increase are projected for the January through April and May through December periods, respectively. When the southern allocation is subdivided by period, a 17% and 77% increase are projected for the January through April and May through December periods, respectively (Table 148).

This alternative may discourage derby-style fishing by distributing landings throughout the year. Distributing the landings throughout the year will reduce the likelihood of an initial market glut, and therefore lowered prices. This alternative could make it less likely that seasonal closures would occur, eliminating the economic burdens of fishermen with little or no income. This alternative could increase landings in the southern states compared to the status quo.

5.3.5.3.1.5 State-by-state allocations (Alternative 5)

5.3.5.3.1.5.1 State-by-state allocations based on 1988-1997 landings data (Alternative 5a)

Under this management measure the commercial quota would be allocated to states based on landings from 1988 to 1997 (Tables 5 and 6). State allocations based on a hypothetical quota of 3,024,742 lb are shown on Table 149. This is the same annual commercial quota that has been in place since the implementation of Amendment 9. When the hypothetical state-by-state quotas for 2002 are compared against the 2000 landings, various states show proportionately larger or smaller projected 2002 landings compared to 2000 (Table 133).

5.3.5.3.1.5.1.1 Threshold analysis for participating vessels

The results of the threshold analysis are reported in Table 152. A total of 27 vessels were projected to be impacted by revenue losses of 5 percent or greater. The economic impacts for the 727 vessels participating in this fishery range from expected revenue losses on the order of <5 percent for a total of 140 vessels (relative to 2000) to losses in revenues of ≥50 percent for 12 vessels and increase revenue for 560 vessels.

Impacts of the quota allocation were examined relative to a vessel's home state as reported on the vessel's permit application (Table 153). "Home state" indicates the state where a vessel is based and primarily ported, and is presumed to reflect to where the costs and benefits of management actions return. However, home state is self-reported at the time an individual applies for a federal permit and may not necessarily indicate where the vessel subsequently conducts most of its activity. The number of vessels with revenue reduction >5% by home state ranged from none in Delaware, Maryland, North Carolina, New Jersey, New York, Pennsylvania, Rhode Island, and Virginia to one in Maine and 20 in Massachusetts.

Vessels with revenue loss exceeding 5 percent are all concentrated in Massachusetts (Table 153). The most impacted counties are: Barnstable and Suffolk (Table 154). If communities having larger numbers of vessels with revenue loss exceeding 5 percent also have larger total numbers of vessels, the proportion that may be impacted thus may be lower. Based on 2000 descriptive data from NMFS permit files, the mean length and gross tonnage of all the vessels impacted from Massachusetts are 31.25 and 11.25, respectively.

By virtue of holding a valid federal permit for black sea bass a vessel is subject to any regulations that are promulgated under the FMP. From this perspective, these vessels are subject to any quota allocation whether or not they actually choose to engage in the black sea bass fishery. The decision to engage in any given fishery during a given time period is subject to numerous considerations from temporary suspension of fishing due to illness or vessel construction or repair to merely a reasoned decision to pursue other fisheries. Given the limited access nature of the fisheries a vessel may wish to continue to hold a permit to preserve the opportunity to engage in the fishery when circumstance allows.

Many of these vessels hold permits in other fisheries (Table 155). Of the 21 vessels with revenue reductions greater than 5%, 20 hold some federal commercial permit. The remaining vessel have shown black sea bass landings in 2000 but did not have federal permits. This vessel may be fishing exclusively in state water fisheries. In particular most vessels have multispecies, scallop, squid/mackerel/butterfish, and lobster.

This alternative may discourage derby-style fishing by allowing each state to manage it's quota to distribute landings throughout the year. This would allow the states to operate in critical periods that occur because of the market or the availability of black sea bass. Distributing the landings throughout the year would reduce the likelihood of an initial market glut and thus lowered black sea bass prices. Seasonal closures would be less likely, thus eliminating the economic burdens of fishermen with little or no income.

Additionally, states would not get penalized for other states overages and each state would be accountable for achieving their quota. States could implement the ITQ system, which is not allowed under federal jurisdiction.

5.3.5.3.1.5.2 State-by-state allocations based on 1993-1997 landings data (Alternative 5b)

Under this management measure the commercial quota would be allocated to states based on landings from 1988 to 1997 (Tables 5 and 6). State allocations based on a hypothetical quota of 3,024,742 lb are shown on Table 149. This is the same annual commercial quota that has been in place since the implementation of Amendment 9. When the hypothetical state-by-state quotas for 2002 are compared against the 2000 landings, various states show proportionately larger or smaller projected 2002 landings compared to 2000 (Table 133).

5.3.5.3.1.5.2.1 Threshold analysis for participating vessels

The results of the threshold analysis are reported in Table 156. A total of 31 vessels were projected to be impacted by revenue losses of 5 percent or greater. The economic impacts for the 727 vessels participating in this fishery range from expected revenue losses on the order of <5 percent for a total of 219 vessels (relative to 2000) to losses in revenues of ≥50 percent for 16 vessels and increase revenue for 477 vessels.

Impacts of the quota allocation were examined relative to a vessel's home state as reported on the vessel's permit application (Table 157). "Home state" indicates the state where a vessel is based and primarily ported, and is presumed to reflect to where the costs and benefits of management actions return. However, home state is self-reported at the time an individual applies for a federal permit and may not necessarily indicate where the vessel subsequently conducts most of its activity. The number of vessels with revenue reduction >5% by home state ranged from none in Delaware, Maryland, North Carolina, New Jersey, New York, Pennsylvania, Rhode Island, and Virginia to one in Maine and 24 in Massachusetts.

Vessels with revenue loss exceeding 5 percent are all concentrated in Massachusetts (Table 157). The most impacted counties are: Barnstable and Suffolk (Table 158). If communities having larger numbers of vessels with revenue loss exceeding 5 percent also have larger total numbers of vessels, the proportion that may be impacted thus may be lower. Based on 2000 descriptive data from NMFS permit files, the mean length and gross tonnage of all the vessels impacted from Massachusetts are 31.08 and 11.46, respectively.

By virtue of holding a valid federal permit for black sea bass a vessel is subject to any regulations that are promulgated under the FMP. From this perspective, these vessels are subject to any quota allocation whether or not they actually choose to engage in the black sea bass fishery. The decision to engage in any given fishery during a given time period is subject to numerous considerations from temporary suspension of fishing due to illness or vessel construction or repair to merely a reasoned decision to pursue other fisheries. Given the limited access nature of the fisheries a vessel may wish to continue to hold a permit to preserve the opportunity to engage in the fishery when circumstance allows.

Many of these vessels hold permits in other fisheries (Table 159). Of the 25 vessels with revenue reductions greater than 5%, 20 hold some federal commercial permit. The remaining vessel have shown black sea bass landings in 2000 but did not have federal permits. This vessel may be fishing exclusively in state water fisheries. In particular most vessels have multispecies, squid/mackerel/butterfish, and lobster.

This alternative may discourage derby-style fishing by allowing each state to manage it's quota to distribute landings throughout the year. This would allow the states to operate in critical periods that occur because of the market or the availability of black sea bass. Distributing the landings throughout the year would reduce the likelihood of an initial market glut and thus lowered black sea bass prices. Seasonal closures would be less likely, thus eliminating the economic burdens of fishermen with little or no income.

Additionally, states would not get penalized for other states overages and each state would be accountable for achieving their quota. States could implement the ITQ system, which is not allowed under federal jurisdiction.

5.3.5.3.1.5.3 State-by-state allocations based on the best five landing years for each state during the period 1988 to 1997 (Alternative 5c)

Under this management measure the commercial quota would be allocated to states based on landings from 1988 to 1997 (Tables 5 and 6). State allocations based on a hypothetical quota of 3,024,742 lb are shown on Table 149. This is the same annual commercial quota that has been in place since the implementation of Amendment 9. When the hypothetical state-by-state quotas for 2002 are compared against the 2000 landings, various states show proportionately larger or smaller projected 2002 landings compared to 2000 (Table 133).

5.3.5.3.1.5.3.1 Threshold analysis for participating vessels

The results of the threshold analysis are reported in Table 160. A total of 26 vessels were projected to be impacted by revenue losses of 5 percent or greater. The economic impacts for the 727 vessels participating in this fishery range from expected revenue losses on the order of <5 percent for a total of 137 vessels (relative to 2000) to losses in revenues of ≥50 percent for 12 vessels and increase revenue for 564 vessels.

Impacts of the quota allocation were examined relative to a vessel's home state as reported on the vessel's permit application (Table 161). "Home state" indicates the state where a vessel is based and primarily ported, and is presumed to reflect to where the costs and benefits of management actions return. However, home state is self-reported at the time an individual applies for a federal permit and may not necessarily indicate where the vessel subsequently conducts most of its activity. The number of vessels with revenue reduction >5% by home state ranged from none in Delaware, Maryland, North Carolina, New Jersey, New York, Pennsylvania, Rhode Island and Virginia to one in Maine and 19 in Massachusetts.

Vessels with revenue loss exceeding 5 percent are all concentrated in Massachusetts (Table 161). The most impacted counties are: Barnstable and Suffolk (Table 162). If communities having larger numbers of vessels with revenue loss exceeding 5 percent also have larger total numbers of vessels, the proportion that may be impacted thus may be lower. Based on 2000 descriptive data from NMFS permit files, the mean length and gross tonnage of all the vessels impacted from Massachusetts are 31.42 and 11.37, respectively.

By virtue of holding a valid federal permit for black sea bass a vessel is subject to any regulations that are promulgated under the FMP. From this perspective, these vessels are subject to any quota allocation whether or not they actually choose to engage in the black sea bass fishery. The decision to engage in any given fishery during a given time period is subject to numerous considerations from temporary suspension of fishing due to illness or vessel construction or repair to merely a reasoned decision to pursue other fisheries. Given the limited access nature of the fisheries a vessel may wish to continue to hold a permit to preserve the opportunity to engage in the fishery when circumstance allows.

Many of these vessels hold permits in other fisheries (Table 163). All of the 20 vessels with revenue reductions greater than 5% hold some federal commercial permit. In particular most vessels have multispecies, scallop, squid/mackerel/butterfish, and lobster.

This alternative may discourage derby-style fishing by allowing each state to manage it's quota to distribute landings throughout the year. This would allow the states to operate in critical periods that occur because of the market or the availability of black sea bass. Distributing the landings throughout the year would reduce the likelihood of an initial market glut and thus lowered black sea bass prices. Seasonal closures would be less likely, thus eliminating the economic burdens of fishermen with little or no income.

Additionally, states would not get penalized for other states overages and each state would be accountable for achieving their quota. States could implement the ITQ system, which is not allowed under federal jurisdiction.

5.3.5.3.1.5.4 State-by-state allocations based on the best five landing years for each state during the period 1980 to 1997 (Alternative 5d)

Under this management measure the commercial quota would be allocated to states based on landings from 1980 to 1997 (Table 5). State allocations based on a hypothetical quota of 3,024,742 lb are shown on Table 149. This is the same annual commercial quota that has been in place since the implementation of Amendment 9. When the hypothetical state-by-state quotas for

2002 are compared against the 2000 landings, various states show proportionately larger or smaller projected 2002 landings compared to 2000 (Table 133).

5.3.5.3.1.5.4.1 Threshold analysis for participating vessels

The impacts of this state-by-state quota allocation are expected to be similar to those discussed under Alternative 5a (5.3.5.3.1.5.1).

5.3.5.3.1.5.5 *De minimus* specifications (Alternative 5e)

Under this management measure any state that has commercial landings of less than 0.1% of the total coastwide commercial landings in the last preceding year for which data are available is eligible for *de minimus* status. The *de minimus* specifications only apply to the commercial fishery. There are no *de minimus* allowances for the black sea bass recreational fishery.

Any state that is granted *de minimus* status will be allocated 0.1% of the coastwide commercial quota under a state-by-state commercial quota allocation system. The sum of the allocations to *de minimus* states will be deducted from the coastwide commercial quota each year prior to the remainder is allocated to the other states. Table 6 indicates that Maine is the only state that has landed less than 0.1% of the total coastwide black sea bass commercial landings for any given year during the 1988 to 1999 period. There have been no black sea bass landings reported in New Hampshire during the 1988 to 1999 period. For example, if two state are granted *de minimus* status under this alternative, 0.2% of the annual aggregate coastwide quota would be allocated to the qualifying states and 99.8% to the remaining states. Therefore, states not qualifying for *de minimus* status would incur in an aggregate reduction in landings of 0.2% for non-qualifying states. When this reduction is distributed among states and vessels, on average, it is not expected to have a significant economic impact on vessels landing black sea bass.

5.3.5.3.1.5.6 Coastwide quota to facilitate state-by-state allocations implemented by the Commission (Alternative 5f: preferred alternative)

For purposes of analyzing the preferred alternative, it is assumed that a state-by-state allocation of the coastwide quota for the 2003-2004 period will occur as follows: Maine 0.5%, New Hampshire 0.5%, Massachusetts 13%, Rhode Island 11%, Connecticut 1.0%, New York 7%, New Jersey 20%, Delaware 5%, Maryland 11%, Virginia 20%, and North Carolina 11%. States would then have the flexibility to design their own management systems for the fishermen that land in their state. State allocations based on a hypothetical commercial quota of 3,024,742 lb are shown on Table 9b. This is the same annual commercial quota that has been in place since the implementation of Amendment 9. When the hypothetical state-by-state quotas for 2003 are compared against the 2000 landings, various states show proportionately larger or smaller projected 2003 landings compared to 2000 (Table 9b).

Threshold analysis for participating vessels

In general terms, the total number of vessels likely to be impacted by revenue losses of 5 percent or greater are expected to be similar to those under Alternative 5c (State-by-state allocations based on the best five landing years for each state during the period 1988 to 1997; section 5.3.5.3.1.5.3).

This alternative may discourage derby-style fishing by allowing each state to manage its quota to distribute landings throughout the year. This would allow the states to operate in critical periods that occur because of the market or the availability of black sea bass. Distributing the landings throughout the year would reduce the likelihood of an initial market glut and thus lowered black sea bass prices. Seasonal closures would be less likely, thus eliminating the economic burdens of fishermen with little or no income.

5.3.5.3.1.6 Hybrid quota system: coastwide quota from January through April and state-by-state quotas from May through December (Alternative 6)

5.3.5.3.1.6.1 Hybrid quota system based on 1988-1997 landings data: coastwide quota from January through April and state-by-state quotas from May through December (Alternative 6a)

Under this management measure the commercial quota would be allocated into two time periods. Based on landings data for the 1998 to 1997 period, the first period (January thought April) would received 45.23% of the total allocation and the second period (May through December) 54.77% (Table 7). During the first period the quota is allocated to the coast and during the second period the quota is allocated to the states. During the second period the quota system would operate as in the state-by-state allocation system. Allocations by periods and state-by-state allocations for the second period based on a hypothetical quota of 3,024,742 lb are shown on Table 7. This is the same annual commercial quota that has been in place since the implementation of Amendment 9. When the quota is allocated by period, increases of 28% and 4% are projected for the first and second periods, respectively (Table 135). In addition, when the second period quota is allocated to the states (Table 136), various states show proportionately larger or smaller projected 2002 landings compared to 2000.

5.3.5.3.1.6.1.1 Threshold analysis for participating vessels

While most states are projected to have larger landings during the second period in 2002 compared to 2000, three states, Massachusetts, Connecticut and Virginia are projected to have reductions in landings in the order of 84%, 22%, and 11%, respectively (Table 136). Since, close to 100% of the black sea bass landed in Massachusetts was landed during the second period of 2000, it is expected that the economic impacts of this alternative to vessels lading black sea bass in that state would be comparable to those discussed under the state-by-state allocation system described under Alternative 5a. Vessels landings in states expected to have larger projected landings in 2002 compared to 2000 will likely benefit for increase landings and revenues.

Due to the data limitations described in section 3.1, the number of vessels and the degree of revenue reduction associated with a projected 22% decrease in black sea bass landings in Connecticut during the second period cannot be assessed employing dealer data. However, given that only a few thousand pounds of black sea bass were landed in that state during period two 2000, it is not expected that the projected reduction in black sea bass landings in 2002 would affect the overall revenues of the fleet significantly compared to 2000. In addition, vessels affected by the potential decrease in landings in period two that also land black sea bass during period one may see a reduction in revenue losses as they may be able to compensate due to higher projected landings during period one 2002 versus 2000. In 2000, most of the black sea bass (78%) landed in Connecticut was landed during the January through May period.

Projected decrease in landings in the second period in Virginia during the second period would cause 14 vessels to incur in a revenue reduction of less than 5%, of 5-9% for one vessel and of 10-19% for 17 vessels. A total of 32 vessels landed black sea bass in Virginia during the May through December 2000 period. The mean length and weight of the vessels affected with more than 5% revenue losses is 34.94 feet and 13.11 GRTs. According to 2000 NMFS permit files the bulk of the vessels impacted with revenue reductions of 5% or more were home ported in the port of Virginia Beach - 7 vessels (Virginia Beach County) and the port of Norfolk - 4 vessels (Norfolk City County). The remaining vessels were home ported is several ports and counties. In addition, vessels affected by the potential decrease in landings in period two that also land black sea bass during period one may see a reduction in revenue losses as they may be able to compensate due to higher projected landings during period one 2002 versus 2000. In 2000, most of the black sea bass (70%) landed in Virginia was landed during the January through May period.

5.3.5.3.1.6.2 Hybrid quota system based on 1993-1997 landings data: coastwide quota from January through April and state-by-state quotas from May through December (Alternative 6b)

Under this management measure the commercial quota would be allocated into two time periods. Based on landings data for the 1993 to 1997 period, the first period (January thought April) would received 43.32% of the total allocation and the second period (May through December) 56.68% (Table 7). During the first period the quota is allocated to the coast and during the second period the quota is allocated to the states. During the second period the quota system would operate as in the state-by-state allocation system. Allocations by periods and state-by-state allocations for the second period based on a hypothetical quota of 3,024,742 lb are shown on Table 7. This is the same annual commercial quota that has been in place since the implementation of Amendment 9. When the quota is allocated by period, increases of 22% and 8% are projected for the first and second periods, respectively (Table 135). In addition, when the second period quota is allocated to the states (Table 136), various states show proportionately larger or smaller projected 2002 landings compared to 2000.

5.3.5.3.1.6.2.1 Threshold analysis for participating vessels

While most states are projected to have larger landings during the second period in 2002 compared to 2000, two states, Maine and Massachusetts are projected to have reductions in landings in the order of 100% and 92%, respectively (Table 136). Since, close to 100% of the black sea bass landed in Massachusetts was landed during the second period of 2000, it is expected that the economic impacts of this alternative to vessels lading black sea bass in that state would be lower than those discussed under the state-by-state allocation system described under Alternative 5b. Vessels landings in states expected to have larger projected landings in 2002 compared to 2000 will likely benefit for increase landings and revenues. In addition, 428 vessels are projected to have projected increased revenues during the second period in 2002 compared to 2000.

Given that only a few pounds of black sea bass were landed in Maine during the during period two 2000, it is not expected that the projected reduction in black sea bass landings in 2002 would affect the overall revenues of the fleet compared to 2000 significantly.

5.3.5.3.1.6.3 Hybrid quota system based on 1980-1997 landings data: coastwide quota from January through April and state-by-state quotas from May through December (Alternative 6c)

Under this management measure the commercial quota would be allocated into two time periods. Based on landings data for the 1980 to 1997 period, the first period (January thought April) would received 50.18% of the total allocation and the second period (May through December) 49.82% (Table 7). During the first period the quota is allocated to the coast and during the second period the quota is allocated to the states. During the second period the quota system would operate as in the state-by-state allocation system. Allocations by periods and state-by-state allocations for the second period based on a hypothetical quota of 3,024,742 lb are shown on Table 7. This is the same annual commercial quota that has been in place since the implementation of Amendment 9. When the quota is allocated by period, the overall projected landings for periods one and two in 2002 would be about 42% higher and the January through April period, and 5% lower for the May through December period than in 2000 for the same time frames, respectively (Table 135).

5.3.5.3.1.6.3.1 Threshold analysis for participating vessels

While most states are projected to have larger landings during the second period in 2002 compared to 2000, three states, Massachusetts, Connecticut, and Delaware are projected to have reductions in landings in the order of 76%, 44%, and 23%, respectively (Table 136). Since, close to 100% of the black sea bass landed in Massachusetts was landed during the second period of 2000, it is expected that the economic impacts of this alternative to vessels lading black sea bass in that state would be lower than those discussed under the state-by-state allocation system described under Alternative 5b. In addition, vessels from Connecticut and Delaware are expected to have revenue reductions. Vessels landings in states expected to have larger projected landings in 2002 compared to 2000 will likely benefit for increase landings and revenues. In addition, as with the previous alternatives, a large number of vessels would be projected to have projected increased revenues during the second period in 2002 compared to 2000.

Given that only a few thousand pounds of black sea bass were landed in Connecticut during the during period two 2000, it is not expected that the projected reduction in black sea bass landings in 2002 would affect the overall revenues of the fleet compared to 2000 significantly.

5.3.5.3.1.7 Hybrid quota system: coastwide quota from January through April and subregional quotas from May through December (Alternative 7)

5.3.5.3.1.7.1 Hybrid quota system based on 1988-1997 landings data: coastwide quota from January through April and subregional quotas from May through December (Alternative 7a)

Under this management measure the commercial quota would be allocated into two time periods. Based on landings data for the 1988 to 1997 period, the first period (January thought April) would received 45.23% of the total allocation and the second period (May through December) 54.77% (Table 8). During the second period the quota is allocated to a northern subregion (Maine to New York) and a Southern subregion (New Jersey to Cape Hatteras, North Carolina). During the second period, 16.56% of the period's quota is allocated to the northern region and 83.44% to the southern region. Allocations by periods and subregions for the second period based on a hypothetical quota of 3,024,742 lb are shown on Table 8. This is the same annual commercial quota that has been in place since the implementation of Amendment 9. When the quota is allocated by period, increases of 28% and 4% are projected for the first and second periods, respectively (Table 135). In addition, when the second period quota is allocated to the two subregions, the northern subregion is projected to decrease landings by 73% and the southern subregion to increase landings by 140% (Table 137) in 2002 compared to 2000.

5.3.5.3.1.7.1.1 Threshold analysis for participating vessels

Under this alternative, vessels landing black sea bass during the second period in northern states are projected to have a decrease in revenues and vessels landings black sea bass in southern states are projected to have an increase in revenues in 2002 compared to 2000. A threshold analysis of vessels indicate that a total of 83 vessels were projected to be impacted by revenue losses of 5 percent or greater. The economic impacts for the 567 vessels participating in this fishery during the second period range from expected revenue losses on the order of <5 percent for a total of 317 vessels (relative to 2000) to losses in revenues of ≥50 percent for 26 vessels and increase revenue for 167 vessels.

Impacts of the quota allocation were examined relative to a vessel's home state as reported on the vessel's permit application. "Home state" indicates the state where a vessel is based and primarily ported, and is presumed to reflect to where the costs and benefits of management actions return. However, home state is self-reported at the time an individual applies for a federal permit and may not necessarily indicate where the vessel subsequently conducts most of its activity. The number of vessels with revenue reduction >5% by home state ranged from none in Delaware, Maryland, North Carolina, New Jersey, Pennsylvania, and Virginia to one in Maine, 15 in Rhode Island, 25 in Massachusetts, and 32 in New York.

According to 2000 NMFS permit files the bulk of the vessels with revenue losses of 5% or more were home ported in: *Massachusetts* - - 4 vessels were ported in Chatham, Barnstable County and 7 additional vessels in 6 other ports within Barnstable, 7 vessels were home ported in Boston, Suffolk County, and 4 vessels were ported in four additional ports located in three other counties in the state; *New York* - - 18 vessels home ported in Montauk, Suffolk County and 3 vessels in two additional ports within Suffolk County; *Rhode Island* - - 4 vessels were ported in there Washington County ports, 7 vessels were ported in Newport, New Port County, and one vessel in another New Port County port. Based on 2000 descriptive data from NMFS permit files, the mean length and gross tonnage of all the vessels impacted from Massachusetts, Maine, New York, and Rhode Island are 31.29 and 18.38, 44.00 and 7.00, 32.19 and 11.53, and 36.3 and 19.05, respectively.

5.3.5.3.1.7.2 Hybrid quota system based on 1993-1997 landings data: coastwide quota from January through April and subregional quotas from May through December (Alternative 7b)

Under this management measure the commercial quota would be allocated into two time periods. Based on landings data for the 1993 to 1997 period, the first period (January thought April) would received 43.32% of the total allocation and the second period (May through December) 56.68% (Table 8). During the second period the quota is allocated to a northern subregion (Maine to New York) and a Southern subregion (New Jersey to Cape Hatteras, North Carolina). During the second period, 14.92% of the period's quota is allocated to the northern region and 85.08% to the southern region. Allocations by periods and subregions for the second period based on a hypothetical quota of 3,024,742 lb are shown on Table 8. This is the same annual commercial quota that has been in place since the implementation of Amendment 9. When the quota is allocated by period, increases of 22% and 8% are projected for the first and second periods, respectively (Table 135). In addition, when the second period quota is allocated to the two subregions, the northern subregion is projected to decrease landings by 75% and the southern subregion to increase landings by 153% (Table 137) in 2002 compared to 2000.

5.3.5.3.1.7.2.1 Threshold analysis for participating vessels

Under this alternative, vessels landing black sea bass during the second period in northern states are projected to have a decrease in revenues and vessels landings black sea bass in southern states are projected to have an increase in revenues in 2002 compared to 2000. Given the similarity in projected changes in landings during among the subregions during the second period in this alternative and the previously evaluated alternative, it is most likely that impacts will be close to those described above.

5.3.5.3.1.8 Allocation system by gear type (Alternative 8)

5.3.5.3.1.8.1 Allocation system by gear type based on 1988-1997 landings data (Alternative 8a)

Under this alternative, the quota would be allocated by gear type based on 1988-1997 landings data. The percentages by gear type would range from 0.40% for gillnets to 45.82% for bottom/mid water trawl gear (Table 9a). The quota allocations by gear type based on a hypothetical commercial quota of 3,024,742 lb are shown on Table 138. This is the same annual commercial quota that has been in place since the implementation of Amendment 9.

Base on this allocation distribution, the overall projected landings by gear type would change in 2002 compared to 2000. More specifically, bottom/mid water trawls and pots/traps would increase landings by over 74% and 4%, respectively, and gillnets, lines, and other gear would decrease landings by over 70%, 35%, and 75%, respectively.

Potential economic impacts associated with the proposed gear distribution would depend on the proportion of the total vessels landings derived from the harvest of black sea bass by gear type. For example, for vessels that only harvest black sea bass with lines, the impacts would be more severe than that of vessels harvesting not only black sea bass but a wide array of other species with line gear or fish with other type of gear in addition to lines.

5.3.5.3.1.8.2 Allocation system by gear type based on 1993-1997 landings data (Alternative 8b)

The same as Alternative 8a (5.3.5.3.1.8.1), except the base years used in the allocation formula would be 1993-1997 (Table 9a). However, potential adverse economic impacts are expected to be less severe because the proportional changes in landings of the hypothetical 2002 allocation based on 1993-1997 landings are closer to the 2000 landings than that of the 2002 allocation based on 1983-1997 landings (Table 138).

5.3.5.3.1.9 Modify the permit requirements for fishermen that have both a Northeast Black Sea Bass Commercial Permit and a Southeast Snapper/Grouper Permit (Alternative 9)

5.3.5.3.1.9.1 Status quo (Alternative 9a)

This alternative would remove the requirement that a fisherman with a NER BSB permit has to surrender that permit for 6 months if they want to catch and land black sea bass south of Cape Hatteras during a northern closure. Council staff used permit data for the Northeast region to identify vessels that held a black sea bass commercial permit in calender year 2000. This information was merged with permit data from the Southeast region to determine the number of vessels that held a NER BSB permit and also held SER S/G commercial limited access permits (either unlimited or 225-lb trip limited type). It was determine that 5 vessels held both permits at some time in the calender year 2000 (Sadler, pers. comm.).

Requiring these vessels to surrender their NER BSB permit for six months, in order to fish for black sea bass south of Cape Hatteras during a northeast black sea bass closure, places an unnecessary burden on these 5 vessels and economic burden. However, no economic impacts are expected to the overall black sea bass fishery.

5.3.5.3.1.9.2 Remove the permit requirement that restricts fishermen from having both a Northeast Black Sea Bass Commercial Permit and a Southeast Snapper/Grouper Permit (Alternative 9b: preferred alternative)

Only 5 vessels held a NER BSB permit and a SER S/G commercial limited access permit at some time in the calender year 2000. These vessels would benefit from not giving up their NER BSB permit if decided to fish for black sea bass south of Cape Hatteras during a northeast black sea bass closure. That is, there would be no disruption on their fishing activities and thus will not interrupt their business cycle. The implementation of this alternative is not expected to affect the overall fishing landings of other vessels holding NER BSB permit.

5.3.5.3.1.10 Prohibit the wet storage of black sea bass pots/traps during a closure (Alternative 10)

5.3.5.3.1.10.1 Prohibit the wet storage of black sea bass pots/traps during a closure of longer than two weeks (Alternative 10a)

This alternative is the status quo Alternative. Under the current system, commercial black sea bass pot/trap fishermen is to allow their pots/traps to remain in the water during periods when the black sea bass fishery is closed. This alternative would not likely have any impact in the fishery.

5.3.5.3.1.10.2 Prohibit the wet storage of black sea bass pots/traps during a closure of longer than two weeks (Alternative 10b)

This alternative would require that all federal permit holders remove black sea bass pots/traps from state and federal waters when the fishery is closed for more than two weeks (14 days). Fishermen will have no more than 10 days, from the starting date of the closure, to remove their pots/traps. Fishermen will not be allowed to deploy pots/traps until the first day of the following open period.

Under the current regulations, pots/traps that are allowed to stay in the water during a closure continue to fish, when the fishery is reopen, large quantities of black sea bass may be landed at the beginning of the following quarter which may affect price negatively. In addition, any fish landed in this manner counts against the quota for the following quarter, thus increasing the likelihood of an early closure and the associated economic impacts. Potential landings of non-targeted species may also be reduced, thus affecting revenues. Also, removing pots/traps from the water when the fishery is closed will increase operating costs.

The implementation of this alternative will decrease the discard of black sea bass and other non-targeted species as pots/traps are not allowed to stay in the to continue to fish during a closure. It is not expected that the implementation of this alternative would affect the overall landings of black sea bass as they are controlled by a quota.

5.3.5.3.1.10.3 Prohibit the wet storage of black sea bass pots/traps during a closure of longer than four weeks (Alternative 10c)

This alternative would require that all federal permit holders remove all black sea bass pots/traps from state and federal waters when the fishery is closed for more than four weeks (28 days). Fishermen will have no more than 10 days, from the starting date of the closure, to remove their pots/traps. Fishermen will not be allowed to deploy pots/traps until the first day of the following open period.

Impacts are expected to be similar as those described under Alternative 10b (5.3.5.3.1.10.2).

5.3.5.3.1.11 Black sea bass pot/trap tag program (Alternative 11)

5.3.5.3.1.11.1 Status quo (Alternative 11a)

This alternative is the status quo Alternative. Under the current system, black sea bass trap tags are not required. This alternative would not likely have any impact in the fishery.

5.3.5.3.1.11.1 Pot/trap tag requirements for federal permit holder fishing with black sea bass pots/traps (Alternative 11b)

This alternative would require that any black sea bass pot/trap fished by a federal permit holder must have a valid black sea bass pot/trap tag permanently attached to the trap bridge or central cross-member. Black sea bass trap tags would be purchased from the NMFS Northeast Region Permit Office.

A black sea bass trap is defined as any pot/trap gear that is capable of catching black sea bass.

Costs associated with the purchase of tags and the implementation of the program will occur. Potential costs are likely to be similar to those incurred from the implantation of the tag program in the lobster fishery. This management measure along with the alternative restricting the number of pots/traps (Alternative 12b) will aid in decreasing the expansion of this type of gear in the black sea bass fishery, thus, reducing fishing effort.

5.3.5.3.1.12 Limit the number of pots/traps fished by federal permit holders (Alternative 12)

5.3.5.3.1.12.1 Status quo (Alternative 12a)

This alternative is the status quo Alternative. Under the current system, there is no limit to the number of black sea bass pots/traps that federal permit holders are allowed to fish with, deploy, possess in, or haul back from state or federal waters. There are no immediate economic impacts associate with this alternative. However, it would allow for further expansion of the utilization of pots/traps.

5.3.5.3.1.12.2 Limit federal permit holders to no more than 400 black sea bass pots/traps (Alternative 12b)

Under this alternative federal permit holders may not fish with, deploy, possess in, or haul back from state or federal waters, more than 400 black sea bass pots/traps.

This program could be implemented in conjunction with the black sea bass pot/trap tag program. In any fishing year, each permit holder would be authorized to purchase a set number of traps, up to a maximum of 400 trap tags.

There is no information regarding the number of pots/traps held by black sea bass pot/tarp permit holders. The conservation benefits of trap limits or reductions are difficult to quantify, due to factors such as efficiency and saturation, and changes in fishing practices. This management measure along with the trap tagging measure (2.1.1.11.2) will cap the number of pots/traps to 400 per permit holder, thus potentially decreasing the expansion of this type of gear in the black sea bass fishery. Therefore, reducing or capping capitalization in the fishery. The potential conservation and economic benefits of limiting the number of pots/traps would decrease if a large number of permit holder currently fishing substantially less than 400 pots/traps may now increase that number to 400 in order to fill the trip limit in a more timely fashion.

Without being able to predict fishing behavior as a result of the pot/trap limit, is difficult to assess the economic impacts of this alternative. However, this alternative is not expected to increase or decrease landings, as trip limits will continue to constraint landings.

5.3.5.3.1.12.3 Limit federal permit holders to no more than 800 black sea bass pots/traps (Alternative 12c)

Under this alternative federal permit holders may not fish with, deploy, possess in, or haul back from state or federal waters, more than 800 black sea bass pots/traps.

This program could be implemented in conjunction with the black sea bass pot/trap tag program. In any fishing year, each permit holder would be authorized to purchase a set number of traps, up to a maximum of 800 trap tags.

There is no information regarding the number of pots/traps held by black sea bass pot/tarp permit holders. The conservation benefits of trap limits or reductions are difficult to quantify, due to factors such as efficiency and saturation, and changes in fishing practices. This management measure along with the trap tagging measure (2.1.1.11.2) will cap the number of pots/traps to 800 per permit holder, thus potentially decreasing the expansion of this type of gear in the black sea bass fishery. Therefore, reducing or capping capitalization in the fishery. The potential conservation and economic benefits of limiting the number of pots/traps would decrease if a large number of permit holder currently fishing substantially less than 800 pots/traps may now increase that number to 800 in order to fill the trip limit in a more timely fashion.

Without being able to predict fishing behavior as a result of the pot/trap limit, is difficult to assess the economic impacts of this alternative. However, this alternative is not expected to increase or decrease landings, as trip limits will continue to constraint landings.

5.3.5.3.2 Options for managing adverse effects from fishing

A discussion of the potential economic impacts associated with these alternatives was presented in section 2.1.2 of the RIR. For a detailed review of the impacts of these alternatives, please refer to Appendix E. Notice that, the order in which the alternatives are listed in this document differ from the listing order in the appendix document.

5.3.5.3.2.1 Status quo: current management measures (EFH Alternative 1: preferred alternative)

This is the "no action alternative." It would result in no additional management measures to minimize the effects of fishing on EFH.

The Council has implemented many regulations that have indirectly acted to reduce fishing gear impacts on EFH. These include many of the current regulations which have restricted fishing effort and thus reduced gear impact on bottom habitat. Such regulations include restrictive harvest limits, gear restricted areas, and restriction on the size of roller rig gear to 18" for scup and black sea bass.

5.3.5.3.2.2 Prohibit bottom tending mobile gear from the nearshore areas surrounding estuaries (Alternative 2)

Alternative 2 would prohibit fishermen from using bottom tending mobile gear in the nearshore areas of Albemarle Sound, Chesapeake Bay, Delaware Bay, and New York Harbor, from 3-miles offshore extending to the 60-foot depth contour. Bottom tending mobile gear in these areas include: bottom otter trawls, clam dredges, and scallop dredges.

These are areas that include EFH for summer flounder, scup, and black sea bass. These areas are also important summer flounder spawning grounds and areas where all three species congregate during warmer months. In addition, the estuarine areas are important nursery habitat for all three species. Although the Council does not have any authority under the MSFCMA to regulate fishing gear in state waters, this alternative could add some protection to the habitat near the entrance of the estuaries. These areas also include non-biogenic reef habitat, which has been identified as EFH for black sea bass and scup. The term non-biogenic refers to all reef habitat except for oyster and mussel beds. Structured habitat is more complex and thus more vulnerable to fishing gear.

5.3.5.3.2.3 Prohibit bottom tending mobile gear in the area surrounding the Hudson Canyon (Alternative 3)

Alternative 3 would prohibit fishermen from using bottom tending mobile gear in the area surrounding the Hudson Canyon, between the 200-foot and 500-foot isobaths.

The Hudson Canyon is an area that has been identified as an important overwintering area for summer flounder, scup, and black sea bass (NRDC 2001). The EFH source documents indicate that summer flounder, scup, and black sea bass overwinter offshore. Steimle *et al.* (1999a) indicate that juvenile and adult scup leave "inshore waters and move to warmer waters on the outer continental shelf south of Hudson Canyon off New Jersey and along the coast from south of Long Island to North Carolina in depths ranging from 75-185 m." Steimle *et al.* (1999b) indicate that black sea bass migrate "from inshore areas across the continental shelf to outer shelf wintering areas south of New Jersey" and "black sea bass adults spend the winter on the middle to outer continental shelf between 30-240 m (with some as deep as 410 m, but most between 60-150 m) generally south of the Hudson Canyon off central New Jersey." Packer *et al.* (1999) indicate that for summer flounder "wintering grounds are located primarily between Norfolk and Veatch Canyons east of Virginia and Rhode Island, respectively, although they are known to migrate as northeastward as Georges Bank." "Adult summer flounder...remain offshore during colder months on the outer continental shelf at depths down to 150 m." In addition, summer flounder EFH was designated to the depth of 500 ft, which is the rationale for prohibiting gear to this depth.

5.3.5.3.2.4 Restrict the size of roller rig and rock hopper gear (Alternative 4)

Alternative 4 would restrict the size of roller rig and rock hopper gear. Several options for maximum roller size on roller rig gear include 8 inches, 12 inches, or 18 inches.

The maximum size of the rubber discs (cookies) in rock hopper gear could also be restricted to 8 inches, 12 inches, or 18 inches, or 22 inches.

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 800-900 hp is required to tow a net with 18 inch to 24 inch rollers, whereas 10 inch to 12 inch rollers can be pulled by a boat using a 175 to 200 hp engine (Simpson pers. comm.).

Information is lacking as to the relationship between roller diameter and the size of the obstruction that it can clear. In general 10 inch to 12 inch diameter rollers can be used for fishing over rough bottom that includes ledges and cliffs (MAFMC 1996a, b). 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, habitat in these areas would be protected.

The summer flounder, scup, and black sea bass FMP currently restricts vessels issued moratorium permit for scup and/or black sea bass from using roller rig trawl gear equipped with rollers greater than 18 inch diameters. As such, a restriction on the diameter of rock hopper gear is reasonable as well. An 18 inch diameter corresponded to the maximum roller diameter limitation imposed by the states of Massachusetts and North Carolina to regulate this gear in state waters. In the Gulf of Maine rock hopper gear is restricted to a maximum 12 inch diameter. Council staff is not aware of the extent of the current use or size of either of these gears, in the other states, but is actively trying to collect this information.

5.3.5.3.2.5 Prohibit street-sweeper gear (Alternative 5)

Alternative 5 would prohibit fishermen from using street-sweeper gear in the EEZ.

Street-sweeper gear is a newly developed trawl gear that is constructed of a series of rubber disc spacers and bristle brushes, as found in actual street sweepers. The distinguishing component of this sweep is the brushes made of stiff bristles mounted on a cylinder core. The brush cylinders are up to 31 inches in diameter and have smaller diameter rubber discs placed between them. The discs are strung on a cable or chain and aligned in series forming the sweep of the trawl net. This innovation probably allows the trawl to be fished on rougher bottom than any other design and it is lighter than rockhopper gear (Carr and Milliken 1998).

The New England Fishery Management Council currently has a ban on street sweeper gear. This action was preventative or precautionary (Carr pers. comm.). The NEFMC is currently trying to acquire information as to the interaction with benthos and the efficiency of the gear. MAFMC staff is not aware of the current extent of the use of this gear or impact of it in the Mid-Atlantic region.

5.3.6 Summary of Impacts

The preferred alternatives adopted in this amendment include: a) a federal coastwide quota with a state-by-state allocation system managed by the Commission (Alternative 5f); b) removal of the permit requirement that restricts fishermen from using a SER S/G Permit during a northern closure (Alternative 9b); c) no additional regulations regarding wet storage of black sea sass pots/traps during a closure (Alternative 10a: status quo); d) no initiation of a pot/trap tag program (Alternative 11a: status quo); e) no restrictions on the numbers of pots/traps used (Alternative 12a: status quo); and f) rely on current management measures to minimize adverse effects of fishing on EFH (EFH Alternative 1: status quo).

Black sea bass commercial fishery alternatives

Alternatives 1 through 7 evaluate the potential impacts of various quota allocation strategies. While the continuation Alternative 1 (status quo) as a means to allocate the commercial quota will not have an effect on the overall black sea bass landings of commercial vessels currently participating in the fishery (assuming current fishing practices continue) it will not address the problems that exist in the fishery. More specifically, it is likely that derby-style fishing practices and early seasonal closures continue. As such, market gluts and price instability will also continue. Alternative 2, which is similar to Alternative 1 with the inclusion of rollover provisions and base years that better reflect current fishing practices may aid in discouraging derby-style fishing practices and associated economic burdens.

Alternative 3, presents an opportunity to allocate black sea bass quotas to commercial vessels under various permit categories. While short-run profit impacts are projected under the various evaluated permit categories and trip limits scenarios, projected savings or conservation benefits are associated with the various permit categories and trip limits analyzed. The overall negative (short-run profit losses) and positive (projected savings and conservation benefits) of the 2 separate permit categories scheme are superior to those associated with the 3 separate permit categories scheme.

Alternatives 4 thought 7 analyzed quota allocation measures to subregions, states, and time period/regions, respectively. While all of these alternatives may discourage derby-style fishing by allowing the quota to be distributed throughout the year and are projected to have economic impacts relatively similar for participating vessels, the state-by-state alternatives provides each state with the opportunity to closely monitor the fishery in their waters. Individual state can manage their allocations accounting for regional fishing patterns thus increasing benefits to local fishermen.

Alternatives 8, 9, and 10 evaluated an allocation system by gear type, modifications to the black sea bass commercial permit requirement, and the prohibition of wet storage of black sea bass, respectively. None of these alternatives are expected to impact the quantity of black sea bass landed in the commercial fishery.

Alternatives 11 and 12 evaluated black sea bass tag programs and restrictions on the number of black sea bass pots/traps. None of these alternatives are expected to impact the quantity of black sea bass landed in the commercial fishery. It is not possible to anticipate the effect of trap reductions on harvesting costs due to changes in fishing practices and behavior. However, it is possible that fishermen that under current regulations fish with less than 400 or 800 traps, may increase the number of traps he fishes, in order to achieve the trip limits in a more timely fashion.

Alternative 5f (preferred alternative) evaluated a coastwide quota to facilitate the state-by-state allocations implemented by the Commission. A state-by-state quota system could allow for the most equitable distribution of the commercial quota to fishermen. Specifically, under this alternative, states 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 state specific landing patterns using possession limits and seasons to ensure a continuous and steady supply of product over the season for producers and/or a fair an equitable distribution of black sea bass to all fishermen who have traditionally landed black sea bass in their state. This alternative is not expected to impact the quantity of black sea bass landed by the commercial fishery.

Options for managing adverse effects from fishing

Overall, we find that Alternative 2 generates the largest losses in terms of product landed (3.91 million pounds), ex-vessel revenues ($2.32 to $2.55 million), and consumer surplus ($789.0 thousand). Alternative 3 generates lower losses in landings (2.33 million pounds) than Alternative 2, but nearly the same losses in ex-vessel revenues ($2.16 to $2.40 million) and consumer surplus ($758.0 thousand). This result is primarily associated with the fact that Alternative 3 more adversely affects sea scallop landings, and the sea scallop is a high-valued product with high consumer surplus. On a per species basis, the largest losses in landings occur for summer flounder under Alternative 2 (526.1 vs. 137.6 thousand pounds under Alternative 3). The largest reductions in scup occur under Alternative 3, 323.2 vs. 62.89 thousand pounds). The largest potential reductions in landings of black sea bass occur under Alternative 2, 15.3 vs. 8.9 thousand pounds). The largest losses in landings occur for the all other species category-3.03 under Alternative 2 vs. 1.47 million pounds under Alternative 3). Relative to the three regulated species, landings are projected to decline by 604.1 and 469.7 thousand pounds, respectively, under Alternatives 2 and 3. On a per vessel basis, the highest average annual losses in revenue occurs for Alternative 2 ($34.1 to $37.9 thousand per year vs. $31.7 and $35.3 thousand under Alternative 3). On a per trip basis, the largest annual losses in revenues are projected to occur under Alternative 3 ($6,204.5 vs. $898.3 under Alternative 2).

Alternatives 4 (Restrict the size of roller rig and rock hopper gear) and 5 (Prohibit street-sweeper gear) were not evaluated due to lack of knowledge of the impacts of these gears on the environment and overall lack of information of the use of these gear by commercial vessels (i.e., number of vessels employing these gears, commercial landings and value generated by this type of gear, fishing areas where these gears are used, etc.).

Retaining status quo measures (Alternative 1: preferred alternative) to protect habitat is not likely to cause additional economic impacts. This will allow industry to maintain current fishing practices. Retaining current measures to achieve the EFH objectives of the SFA would incur no additional burden on the fisherman.

5.3.7 Other Impacts

5.3.7.1 County impacts

For the reasons specified in section 3.1 of this RIR, the economic impacts on vessels of a specified h-port were analyzed on a county wide basis. As stated in section 3.1, this profile of impacted counties was based on impacts under various alternatives evaluated. Counties included in the profile had to meet the following criteria:

- the number of vessels with revenue loss exceeding 5 percent per county was either greater than 4, or
- all vessels with revenue loss exceeding 5 percent in a given state were from the same home county.

The results of these analyses are summarized below. The counties of Barnstable and Suffolk were identified as impacted under the proposed state-by-state allocation measures and the counties of Virginia Beach and Norfolk City were identified as impacted under the proposed hybrid allocation measures. Counties not included in this analysis (e.g., in Massachusetts and Maine did not have enough vessels with revenue loss exceeding 5 percent to meet the criteria specified, i.e., there were less than 4 vessels with revenue loss exceeding 5 percent per county, or all vessels with revenue loss exceeding 5 percent in a state were not home ported within the same county.

Table 150 details population, employment personal income and the contribution of commercial fishing and sea food processing to total personal income for selected counties. Counties presented in Table 150 correspond to the counties identified as impacted (>= 4 vessels with revenue loss exceeding 5 percent per county) due to the management measures evaluated (i.e., as described in the above paragraph). In addition, the same information is provided for Counties identified as containing one or more ports that showed commercial revenue dependence on summer flounder, scup, and black sea bass identified in section 3.4 of the EIS] (Table 151). Data presented in Tables 150 and 151 were obtained from data bases supplied by the Minnesota IMPLAN Group for the calendar year 1999.

Of the 4 counties identified in Table 150, the percentage of total personal income derived from commercial fishing sales or sea food processing sales was less than 1% for all counties. These data indicate that each of the identified counties in Table 150 are not substantially dependent upon sales of commercial fishing products to sustain the county economies. Population in these counties were less than 700,000 and ranged from 213,221 in Barnstable County to 653,503 in Suffolk County.

Counties presented in Table 151 are counties identified as containing one or more ports that showed 10% or more commercial revenue dependence on summer flounder, scup, and/or black sea bass, 1999 (section 3.4 in the EIS). In most cases, with the exception of Washington (2.42%), Cape May (1.09%) and Pamlico (2.39%) Counties, less than 1% of the total personal income in these counties was derived from commercial fishing. These data indicate that each of the identified counties in Table 151 are not substantially dependent upon sales of commercial fishing products to sustain the county economies.

5.4 OTHER APPLICABLE LAWS

5.4.1 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. U.S. fishermen usually 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 other fisheries by causing transfers of fishing effort.

5.4.2 Treaties or International Agreements

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

5.4.3 Federal Law and Policies

5.4.3.1 Impacts on protected species under the Endangered Species Act and Marine Mammal Protection Act

There are numerous species which inhabit the management unit of this FMP that are afforded protection under the ESA of 1973 (i.e., for those designated as threatened or endangered) and/or the MMPA of 1972. Twelve are classified as endangered or threatened under the ESA, while the remainder are protected by the provisions of the MMPA. Marine mammals include the northern right whale, humpback whale, fin whale, minke whale, harbor porpoise, white-sided dolphin, bottlenose dolphin, common dolphin, harp seal, harbor seal and gray seal. The status of these and other marine mammal populations inhabiting the Northwest Atlantic has been discussed in detail in the U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments. Initial assessments were presented in Blaylock, *et al.* (1995) and are updated in Waring *et al.* (1999).

This amendment only addresses the commercial allocation of the black sea bass fishery options for managing adverse effects of fishing on summer flounder, scup, and black sea bass EFH. The principal gears used for the commercial black sea bass fishery are pots/traps and otter trawls. These gears are categorized as Category 2 in the final List of Fisheries for 2000 for the taking of marine mammals by commercial fishing operations under Section 114 of the MMPA of 1972. Currently, all gear, including pot/trap gear (black sea bass pots/traps are defined as lobster pots under the LWTRP) are required to meet the requirements of the LWTRP and the HPTRP. In addition, the preferred alternatives are not expected to increase commercial black sea bass fishing effort. On the contrary, the proposed actions are aimed at reducing fishing effort in the commercial black sea bass fishery and impacts of commercial gear on habitat. As such, minimal interaction is expected between commercial black sea bass gear and protected species.

The protected species found in New England and Mid-Atlantic waters are listed below.

Endangered: Right whale *(Eubalaena glacialis),* Humpback whale *(Megaptera novaeangliae),* Fin whale *(Balaenoptera physalus),* Sperm whale *(Physeter macrocephalus),* Blue whale *(Balaenoptera musculus),* Sei whale *(Balaenoptera borealis),* Kemp's ridley *(Lepidochelys kempi),* Leatherback turtle *(Dermochelys coriacea),* Green sea turtle *(Chelonia mydas)* Shortnose sturgeon *(Acipenser brevirostrum),* Gulf of Maine distinct population segment of (DPS) Atlantic salmon *(Salmo salar).*

Threatened: Loggerhead turtle *(Caretta caretta)*

Other marine mammals: Other species of marine mammals likely to occur in the management unit include the minke whale *(Balaenoptera acutorostrata),* white-sided dolphin *(Lagenorhynchus acutus),* white-beaked dolphin *(Lagenorhynchus albirostris),* bottlenose dolphin *(Tursiops truncatus),* [coastal stock listed as depleted under the MMPA], pilot whale *(Globicephala melaena),* harbor porpoise *(Phocoena phocoena),* Risso's dolphin *(Grampus griseus),* common dolphin *(Delphinis delphis),* spotted dolphin (*Stenella* spp.), striped dolphin *(Stenella coeruleoalba),* killer whale *(Orcinus orca),* beluga whale *(Delphinapterus leucas),* Northern bottlenose whale *(Hyperoodon ampullatus),* goosebeaked whale *(Ziphius cavirostris)* and beaked whale (*Mesoplodon* spp.). Pinnipeds species include harbor *(Phoca vitulina)* and gray seals *(Halichoerus grypus)* and less commonly, hooded *(Cystophora cristata)* harp *(Pagophilus groenlandicus)* and ringed seals *(Phoca hispida).*

5.4.3.1.1 Protected species of particular concern

5.4.3.1.1.1 North Atlantic right whale

The northern right whale was listed as endangered throughout it's range on June 2, 1970 under the ESA. The current population is considered to be at a low level and the species remains designated as endangered (Waring *et al.* 1999). A Recovery plan has been published and is in effect (NMFS 1991). This is a strategic stock because the average annual fishery-related mortality and serious injury from all fisheries exceeds the Potential Biological Removal (PBR).

North Atlantic right whales range from wintering and calving grounds in coastal waters of the southeastern US to summer feeding grounds, nursery and presumed mating grounds in New England and northward to the Bay of Fundy and Scotian shelf (Waring *et al.* 1999). Approximately half of the species' geographic range is within the area in which the summer flounder, scup, and black sea bass fisheries are prosecuted. In the management area as a whole, right whales are present throughout most months of the year, but are most abundant between February and June. The species uses mid-Atlantic waters as a migratory pathway from the winter calving grounds off the coast of Florida to spring and summer nursery/feeding areas in the Gulf of Maine.

NMFS designated right whale critical habitat on June 3, 1994 (59 FR 28793). Portions of the critical habitat within the action area include the waters of Cape Cod Bay and the Great South Channel off the coast of Massachusetts, where the species is concentrated at different times of the year.

The western North Atlantic population of right whales was estimated to be 295 individuals in 1992 (Waring *et al.* 1999). The current population growth rate of 2.5% as reported by Knowlton *et al.* (1994) suggests the stock may be showing signs of slow recovery. However, considerable uncertainty exists about the true size of the current stock (Waring *et al.* 1999).

5.4.3.1.1.2 Humpback whale

The humpback whale was listed as endangered throughout it's range on June 2, 1970. This species is the fourth most numerically depleted large cetacean worldwide. In the western North Atlantic humpback whales feed during the spring through fall over a range which includes the eastern coast of the US (including the Gulf of Maine) northward to include waters adjacent to Newfoundland/Labrador and western Greenland (Waring *et al.* 1999). During the winter, the principal range for the North Atlantic population is around the Greater and Lesser Antilles in the Caribbean (Waring *et al.* 1999).

About half of the species' geographic range is within the management area of the summer flounder, scup, and black sea bass FMP. As noted above, humpback whales feed in the northwestern Atlantic during the summer months and migrate to calving and mating areas in the Caribbean. Five separate feeding areas are utilized in northern waters after their return; the Gulf of Maine (which is within the management unit of this FMP) is one of those feeding areas. As with right whales, humpback whales also use the Mid-Atlantic as a migratory pathway. Since 1989, observations of juvenile humpbacks in that area have been increasing during the winter months, peaking January through March (Swingle *et al.* 1993). It is believed that non-reproductive animals may be establishing a winter feeding area in the Mid-Atlantic since they are not participating in reproductive behavior in the Caribbean. It is assumed that humpbacks are more widely distributed in the management area than right whales. They feed on a number of species of small schooling fishes, including sand lance and Atlantic herring.

The most recent status and trends of the for the Western North Atlantic stock of humpback whales are given by Waring *et al.* (1999). The current rate of increase of the North Atlantic humpback whale population has been estimated at 9.0% (CV=0.25) by Katona and Beard (1990) and at 6.5% by Barlow and Clapham (1997). The minimum population estimate for the North Atlantic humpback whale population is 10,019 animals, and the best estimate of abundance is 10,600 animals (CV=0.07; Waring *et al.* 1999).

5.4.3.1.1.3 Fin whale

The fin whale was listed as endangered throughout it's range on June 2, 1970 under the ESA. The fin whale is ubiquitous in the North Atlantic and occurs from the Gulf of Mexico and Mediterranean Sea northward to the edges of the arctic ice pack (Waring *et al.*1999). The overall pattern of fin whale movement is complex, consisting of a less obvious north-south pattern of migration than that of right and humpback whales. However, based on acoustic recordings from hydrophone arrays, Clark (1995) reported a general southward "flow pattern" of fin whales in the fall from the Labrador/Newfoundland region, south past Bermuda, and into the West Indies. The overall distribution may be based on prey availability, and fin whales are found throughout the management area for this FMP in most months of the year. This species preys opportunistically on both invertebrates and fish (Watkins *et al.* 1984). As with humpback whales, they feed by filtering large volumes of water for the associated prey. Fin whales are larger and faster than humpback and right whales and are less concentrated in nearshore environments.

Hain *et al.* (1992) estimated that about 5,000 fin whales inhabit the northeastern United States continental shelf waters. Shipboard surveys of the northern Gulf of Maine and lower Bay of Fundy targeting harbor porpoise for abundance estimation provided an imprecise estimate of 2,700 (CV=0.59) fin whales (Waring *et al.* 1999).

5.4.3.1.1.4 Loggerhead sea turtle

The loggerhead turtle was listed as "threatened" under the ESA on July 28, 1978, but is considered endangered by the World Conservation Union (IUCN) and under the Convention on International Trade in Endangered Species of Flora and Fauna (CITES). Loggerhead sea turtles are found in a wide range of habitats throughout the temperate and tropical regions of the Atlantic. These include open ocean, continental shelves, bays, lagoons, and estuaries (NMFS& FWS 1995). In the management unit of this FMP they are most common on the open ocean in the northern Gulf of Maine, particularly where associated with warmer water fronts formed from the Gulf Stream. The species is also found in entrances to bays and sounds and within bays and estuaries, particularly in the Mid-Atlantic.

Since they are limited by water temperatures, sea turtles do not usually appear on the summer foraging grounds in the Gulf of Maine until June, but are found in Virginia as early as April. They remain in these areas until as late as November and December in some cases, but the large majority leave the Gulf of Maine by mid-September. Loggerheads are primarily benthic feeders, opportunistically foraging on crustaceans and mollusks (NMFS & FWS 1995). Under certain conditions they also feed on finfish, particularly if they are easy to catch *(e.g.,* caught in gillnets or inside pound nets where the fish are accessible to turtles).

A Turtle Expert Working Group (TEWG 1998) conducting an assessment of the status of the loggerhead sea turtle population in the Western North Atlantic (WNA), concluded that there are at least four loggerhead subpopulations separated at the nesting beach in the WNA (TEWG 1998). However, the group concluded that additional research is necessary to fully address the stock definition question. The four nesting subpopulations include the following areas: northern North Carolina to northeast Florida, south Florida, the Florida Panhandle, and the Yucatan Peninsula. Genetic evidence indicates that loggerheads from Chesapeake Bay southward to Georgia appear nearly equally divided in origin between South Florida and northern subpopulations. Additional research is needed to determine the origin of turtles found north of the Chesapeake Bay.

The TEWG analysis also indicated the northern subpopulation of loggerheads may be experiencing a significant decline (2.5% - 3.2% for various beaches). A recovery goal of 12,800 nests has been assumed for the Northern Subpopulation, but current nests number around 6,200 (TEWG 1998). Since the number of nests have declined in the 1980's, the TEWG concluded that it is unlikely that this subpopulation will reach this goal given this apparent decline and the lack of information on the subpopulation from which loggerheads in the WNA originate. Continued efforts to reduce the adverse effects of fishing and other human-induced mortality on this population are necessary.

The most recent 5-year ESA sea turtle status review (NMFS & USFWS 1995) highlights the difficulty of assessing sea turtle population sizes and trends. Most long-term data comes from nesting beaches, many of which occur extensively in areas outside U.S. waters. Because of this lack of information, the TEWG was unable to determine acceptable levels of mortality. This status review supports the conclusion of the TEWG that the northern subpopulation may be experiencing a decline and that inadequate information is available to assess whether its status has changed since the initial listing as threatened in 1978. NMFS & USFWS (1995) concluded that loggerhead turtles should remain designated threatened but noted that additional research will be necessary before the next status review can be conducted.

Sea sampling data from the sink gillnet fisheries, Northeast otter trawl fishery, and Southeast shrimp and summer flounder bottom trawl fisheries indicate incidental takes of loggerhead turtles. Loggerheads are also known to interact with the lobster pot fishery. The degree of interaction between loggerheads and the summer flounder, scup, and black sea bass recreational fisheries is unknown. However, by analogy with other fisheries (i.e., South Atlantic) interactions are expected to be minimal.

5.4.3.1.1.5 Leatherback sea turtle

The leatherback is the largest living sea turtle and ranges farther than any other sea turtle species, exhibiting broad thermal tolerances (NMFS& USFWS 1995). Leatherback turtles feed primarily on cnidarians (medusae, siphonophores) and tunicates (salps, pyrosomas) and are often found in association with jellyfish. These turtles are found throughout the management unit of this FMP. While they are predominantly pelagic, they occur annually in Cape Cod Bay and Narragansett

Bay primarily during the fall. Leatherback turtles appear to be the most susceptible to entanglement in lobster gear and longline gear compared to the other sea turtles commonly found in the management unit. This may be the result of attraction to gelatinous organisms and algae that collect on buoys and buoy lines at or near the surface.

Nest counts are the only reliable population information available for leatherback turtles. Recent declines have been seen in the number of leatherbacks nesting worldwide (NMFS & USFWS 1995). The status review notes that it is unclear whether this observation is due to natural fluctuations or whether the population is at serious risk. It is unknown whether leatherback populations are stable, increasing, or declining, but it is certain that some nesting populations (e.g, St. John and St. Thomas, U.S. Virgin Islands) have been extirpated (NMFS 1998).

Sea sampling data from the southeast shrimp fishery indicate recorded takes of leatherback turtles. As noted above, leatherbacks are also known to interact with the lobster pot fishery. However, by analogy with other fisheries (i.e., South Atlantic) interactions are expected to be minimal.

5.4.3.1.1.6 Kemp's ridley sea turtle

The Kemp's ridley is probably the most endangered of the world's sea turtle species. The only major nesting site for ridleys is a single stretch of beach near Rancho Nuevo, Tamaulipas, Mexico (Carr 1963). Estimates of the adult population reached a low of 1,050 in 1985, but increased to 3,000 individuals in 1997. First-time nesting adults have increased from 6% to 28% from 1981 to 1989, and from 23% to 41% from 1990 to 1994, indicating that the ridley population may be in the early stages of growth (TEWG 1998).

Juvenile Kemp's ridleys inhabit northeastern US coastal waters where they forage and grow in shallow coastal during the summer months. Juvenile ridleys migrate southward with autumnal cooling and are found predominantly in shallow coastal embayments along the Gulf Coast during the late fall and winter months.

Ridleys found in mid-Atlantic waters are primarily post-pelagic juveniles averaging 40 cm in carapace length, and weighing less than 20 kg (NMFS 1998). After loggerheads, they are the second most abundant sea turtle in Virginia and Maryland waters, arriving in there during May and June and then emigrating to more southerly waters from September to November (NMFS 1998). In the Chesapeake Bay, ridleys frequently forage in shallow embayments, particularly in areas supporting SAV (Lutcavage and Musick 1985; NMFS 1998). The juvenile population in Chesapeake Bay is estimated to be 211 to 1,083 turtles (NMFS 1998).

The model presented by Crouse *et al.* (1987) illustrates the importance of subadults to the stability of loggerhead populations and may have important implications for Kemp's ridleys. The vast majority of ridleys identified along the Atlantic Coast have been juveniles and subadults. Sources of mortality in this area include incidental takes in fishing gear, pollution and marine habitat degradation, and other man-induced and natural causes. Loss of individuals in the Atlantic, therefore, may impede recovery of the Kemp's ridley sea turtle population.

Sea sampling data from the northeast otter trawl fishery and southeast shrimp and summer flounder bottom trawl fisheries has recorded takes of Kemp's ridley turtles. However, by analogy with other fisheries (i.e., South Atlantic) interactions are expected to be minimal.

5.4.3.1.1.7 Green sea turtle

Green sea turtles are more tropical in distribution than loggerheads, and are generally found in waters between the northern and southern 20°C isotherms (NMFS 1998). In the wester Atlantic region, the summer developmental habitat encompasses estuarine and coastal waters as far north as Long Island Sound, Chesapeake Bay, and the North Carolina sounds, and south throughout the tropics (NMFS 1998). Most of the individuals reported in U.S. waters are immature (NMFS 1998). Green sea turtles found north of Florida during the summer must return to southern waters in autumn or risk the adverse effects of cold temperatures.

There is evidence that green turtle nesting has been on the increase during the past decade. For example, increased nesting has been observed along the Atlantic coast of Florida on beaches where only loggerhead nesting was observed in the past (NMFS 1998). Recent population estimates for the western Atlantic area are not available. Green turtles are threatened by incidental captures in fisheries, pollution and marine habitat degradation, destruction/disturbance of nesting beaches, and other sources of man-induced and natural mortality.

Juvenile green sea turtles occupy pelagic habitats after leaving the nesting beach. At approximately 20 to 25 cm carapace length, juveniles leave pelagic habitats, and enter benthic foraging areas, shifting to a chiefly herbivorous diet (NMFS 1998). Post-pelagic green turtles feed primarily on sea grasses and benthic algae, but also consume jellyfish, salps, and sponges. Known feeding habitats along U.S. coasts of the western Atlantic include shallow lagoons and embayments in Florida, and similar shallow inshore areas elsewhere (NMFS 1998).

Sea sampling data from the scallop dredge fishery and southeast shrimp and summer flounder bottom trawl fisheries have recorded incidental takes of green turtles. However, by analogy with other fisheries (i.e., South Atlantic) interactions are expected to be minimal.

5.4.3.1.1.8 Shortnose sturgeon

Shortnose sturgeon occur in large rivers along the western Atlantic coast from the St. Johns River, Florida (possibly extirpated from this system), to the Saint John River in New Brunswick, Canada. The species is anadromous in the southern portion of its range *(i.e.,* south of Chesapeake Bay), while northern populations are amphidromous (NMFS 1998). Population sizes vary across the species' range with the smallest populations occurring in the Cape Fear and Merrimack Rivers and the largest populations in the Saint John and Hudson Rivers (Dadswell 1979; NMFS 1998).

Shortnose sturgeon are benthic and mainly inhabit the deep channel sections of large rivers. They feed on a variety of benthic and epibenthic invertebrates including molluscs, crustaceans (arnphipods, chironomids, isopods), and oligochaete worms (Vladykov and Greeley 1963; Dadswell 1979). Shortnose sturgeon are long-lived (30 years) and mature at relatively old ages.

In northern areas, males reach maturity at 5-10 years, while females reach sexual maturity between 7 and 13 years.

In the northern part of their range, shortnose sturgeon exhibit three distinct movement patterns that are associated with spawning, feeding, and overwintering periods. In spring, as water temperatures rise above 8° C, pre-spawning shortnose sturgeon move from overwintering grounds to spawning areas. Spawning occurs from mid/late April through mid/late May. Post-spawned sturgeon migrate downstream to feed throughout the summer.

As water temperatures decline below 8° C again in the fall, shortnose sturgeon move to overwintering concentration areas and exhibit little movement until water temperatures rise again in spring (NMFS 1998). Young-of-the-year shortnose sturgeon are believed to move downstream after hatching (NMFS 1998) but remain within freshwater habitats. Older juveniles tend to move downstream in fall and winter as water temperatures decline and the salt wedge recedes. Juveniles move upstream in spring and feed mostly in freshwater reaches during summer.

Shortnose sturgeon spawn in freshwater sections of rivers, typically below the first impassable barrier on the river *(e.g.,* dam). Spawning occurs over channel habitats containing gravel, rubble, or rock-cobble substrates (NMFS 1998). Additional environmental conditions associated with spawning activity include decreasing river discharge following the peak spring freshet, water temperatures ranging from 9 -12 C, and bottom water velocities of 0.4 - 0.7 m/sec (NMFS 1998).

5.4.3.1.1.9 Atlantic salmon

The last two decades mark a period of decline in stock status for all Atlantic salmon populations of the north Atlantic. In response to a petition request to list Atlantic salmon as endangered under the ESA, the NMFS and F&WS conducted a status review of salmon populations in New England and developed a proposed rule to list several stocks in eastern Maine as threatened under ESA. Subsequently, the State of Maine developed a conservation plan to meet the goals of the proposed rule. The services withdrew the proposed rule and worked with the State of Maine to implement the conservation plan in lieu of a listing action. Despite these efforts, populations remain critically low, and with documentation of new disease threats the Gulf of Maine Distinct Population Segment (DPS) has since been listed as endangered. Current management efforts focus on the recovery of natural populations and support of sustainable aquaculture to manage the population as sustainable resources.

The status review of Atlantic salmon can be found at the website: *www.nmfs.noaa.gov/prot_res/PR3/status_reviews.html.*

5.4.3.1.1.10 Seabirds

The Migratory Bird Treaty Act (MBTA), 16 U.S. C. 703-712, was originally enacted in 1918. In its current form, it implements bilateral treaties to protect migratory birds between the United States and Great Britain, Mexico, Japan, and the former Union of Soviet Socialists Republics. Under the MBTA it is unlawful to pursue, hunt, take, capture, kill, possess, trade, or transport any migratory bird, or any part, nest, or egg of a migratory bird. Violations of the MBTA carry criminal penalties; any equipment and means of transportation used in activities in violation of the

MBTA may be seized by the United States government and, upon conviction, must be forfeited to it. The MBTA is administered by the Department of the Interior, which is authorized to promulgate regulations allowing activities (such as hunting) which would otherwise violate the general prohibitions of the MBTA. To date, the MBTA has been applied to the territory of the United States and coastal waters extending 3 miles from shore.

Most of the following information about seabirds is taken from the Mid-Atlantic Regional Marine Research Program (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. Nine species of 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.). In addition, the bald eagle is listed as threatened under the ESA and is a bird of aquatic ecosystems.

Like marine mammals, seabirds are vulnerable to entanglement in commercial and recreational fishing gear. The interaction has not been quantified in the recreational fishery, but impacts are not considered significant. Human activities such as coastal development, habitat degradation and destruction, and the presence of organochlorine contaminants are considered the major threats to some seabird populations. Endangered, threatened or otherwise protected bird species, including the roseate tern and piping plover, are unlikely to be impacted by the gear types employed in the summer flounder, scup, and black sea bass fisheries.

5.4.3.2 National marine sanctuaries

In addition to the issue of general habitat degradation, several habitats within the summer flounder, scup, and black sea bass management units are protected under the National Marine Sanctuaries Act (NMSA) of 1973. National marine sanctuaries are allowed to be established under the NMSA. Currently, there are 11 designated marine sanctuaries that create a system that protects over 14,000 square miles (National Maine 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 January 30, 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, Virginia 23604.

NOAA/NOS issued a proposed rule on February 8, 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 November 4, 1992, the Sanctuary was Congressionally designated. Implementing regulations (15 CFR 940) became effective March 1994. Commercial fishing is not specifically regulated by the 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. Correspondence for this sanctuary should be addressed to: Stellwagen Bank NMS, 14 Union Street, Plymouth, Massachusetts 02360.

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

5.4.3.3 Indian treaty fishing rights

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

5.4.3.4 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.

5.4.3.5 Paper Work Reduction Act of 1995

The Paperwork Reduction Act (PRA) concerns the collection of information. The intent of the PRA 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.

Currently, all black sea bass Federally-permitted dealers must submit weekly reports of fish purchases. The owner or operator of any vessel issued a moratorium vessel permit for black sea bass 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. These reporting requirements are critical for monitoring the harvest level in this fishery.

None of the evaluated quota allocation systems will affect the existing reporting requirements previously approved under OMB Control Nos. 0648-0202 (Vessel permits) and 0648-0212 (Vessel logbooks). Dealer reporting (OMB Control No. 0648-0229) will not be affected under the evaluated quota allocation systems with the exception of quota allocations by permit categories (3-separate permit categories and 2-separate permit categories) and allocation by gear type (5 separate gear types). Under the current reporting requirements for black sea bass, dealers report on a weekly basics through the IVR system. However, if a dealer is required to report black sea bass weekly by permit category, then the reporting requirement for this species increases by two under the 3-separate permit categories allocation, by one under the 2-separate permit categories allocation, and by four under the gear type allocation. Dealer permit data indicates that 328 dealers held black sea bass dealer permits in 2001. Assuming that 328 dealers hold a Federal Black Sea Bass Permit and are subject to report under the quota allocation system by permit categories, then, the 3-permit category will have an additional associated 3,408 hours of burden, at a cost of $43,410 to the government and $62,718 to the public. For the 2-permit category, the additional hours burden is 1,704, and the associated costs to the government and public are $21,705 and $31,359, respectively. For the gear type allocation, the additional hours burden is 6,816, and the associated costs to the government and public are $86,820 and $125,436, respectively.

In addition to the costs described above, monitoring costs will also be incurred under the various quota systems. These costs will vary depending on the amount of time required to monitor the black sea bass quota under the different quota systems. For example, under the current quarterly quota system, coastwide landings and projections are monitored during four time periods through the year. However, under the state-by-state quota allocation system, landings and projection would have to be monitored for 10 states along the coast (Maine through North Carolina, excluding New Hampshire) through the year. In addition, under the quarterly quota system up to 4 fishery closure notices may be generated throughout the year i.e., one for each quarter, while under a state-by-state quota allocation system up to up to 10 fishery closure notices may be generated throughout the year i.e., one for each estate. It is estimated that approximately 26 hours are required to monitor the black sea bass fishery during any specific quarter (including landings monitoring, landings projections, and the preparation of closure notices).

If it is assumed that 26 hours are required to monitor the fishery for any given "unit period" (e.g., quarter, state, gear type, geographic area) and that the estimated annualized costs to the federal government is $25/hour (wage and overhead cost, on average), then, the associated monitoring costs of the various quota allocation systems are as follow: $1,950 for the 3-permit category allocation (3 permit types x 26 hours per permit x $25/hour); $1,300 for the 2-permit category allocation (2 permit types x 26 hours per permit x $25/hour); $2,600 for the separate subregion allocation (2 regions with 2 time periods each x 26 hours per region/time period x $25/hour); $6,500 for the state-by-state allocation (10 states x 26 hours per state x $25/hour); $7,150 for the hybrid allocation (coastwide from January-April and 10 states from May-December x 26 hours per "unit period" x $25/hour); and $3,250 for the gear allocation (5 gear types x 26 hours per gear type x $25/hour). These estimates incorporate costs associated with the preparation of closure notices. If a closure notice is not required for a specific "unit period," then the associated monitoring cost will be lower than estimated above. The monitoring costs described in this paragraph are costs associated with the implementation of individual quota systems. However, if the Council were to adopt a quota allocation strategy composed of two allocation systems (e.g., subregion allocation combined with gear allocation), then the monitoring costs would depend on the combination of the allocation system adopted.

Changes in monitoring costs will occur if the commercial black sea bass quota is managed through a coastwide system without quarterly or seasonal breakdowns provided that the Commission adopts a state-by-state allocation of the coastwide quota. For example, under the current quarterly quota system, coastwide landings and projections are monitored during four time periods through the year. However, under the preferred quota allocation system, NMFS would have to monitor landings and projections on a coastwide basis, thus reducing monitoring costs compared to the status quo. It is estimated that approximately 26 hours are required to monitor the black sea bass fishery during any specific quarter (including landings monitoring, landings projections, and the preparation of closure notices). If it is assumed that 26 hours are required to monitor the fishery for any given "unit period" (i.e., quarter, coastwide) and that the estimated annualized costs to the federal government is $25/hour (wage and overhead cost, on average), then the associated monitoring costs of the coastwide allocation system is $650 or approximately, $1,950 less than the monitoring cost under the current quarterly quota allocation system ($2,600; 4 quarters x 26 hours per quarter x $25/hour).

5.4.3.6 Impacts of the plan relative to federalism

This amendment does not contain policies with federalism implications sufficient to warrant preparation of a federalism assessment under Executive Order 12612.

5.4.3.7 Coastal zone management program consistency

The Coastal Zone Management Act (CZMA) 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 60 days in which to agree or disagree with the Councils' evaluation. If a state fails to respond within 60 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 will be reviewed relative to CZM programs of Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina. Letters will be sent to all of the states listed along with a hearing draft of the FMP. The letters to all of the states will state that the Council concluded that the FMP would not 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.

5.4.4 State Management Activities

This Amendment will apply to all states from Maine to North Carolina. This includes Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Potomac River Fisheries Commission, Maryland, Virginia, and North Carolina.

5.4.4.1 Compliance

The Commission has established compliance criteria as a part of the interstate management process for summer flounder, scup, and black sea bass. This Amendment only modifies the compliance criteria that pertain to the black sea bass commercial fishery. The following compliance criteria that are listed in the previous amendments will remain unchanged:

-Commercial size limits and mesh requirements
-Commercial quota provisions
-Commercial fishery closure ability
-Recreational harvest limit
-Permit and reporting requirements
-Area closures
-Gear restrictions

5.4.4.1.1 Compliance reporting contents and schedules

The Compliance reporting requirements will remain unchanged relative to Amendment 12 to the Summer Flounder, Scup, and Black Sea Bass FMP.

5.4.4.1.2 Procedures for determining compliance

Procedures for determining a state's compliance with the provisions of an FMP are contained in section 7 of the Interstate Fisheries Management Program Charter (ASMFC 2001). The following compliance determination will be done in addition to the Summer Flounder, Scup, and Black Sea Bass FMP Monitoring Committee activities. The following represents compliance determination procedures as applied to this plan:

The Plan Review Team (PRT) will continually review the status of state implementation, and advise the Management Board any time that a question arises concerning state compliance. The Plan Review Team will review annual state compliance reports and prepare a compliance review for the Management Board summarizing the status of the fishery and any compliance recommendations on a state-by-state basis.

Upon review of a report from the PRT, or at any time by request from a member of the Management Board, the Management Board will review the status of an individual state's compliance. If the Management Board finds that a state's regulatory and management program fails to meet the requirements of this section, it may recommend that the state be found out of compliance. The recommendation must include a specific list of the state's deficiencies in implementing and enforcing the FMP and the actions that the state must take in order to come back in compliance.

If the Management Board recommends that a state be found out of compliance, it shall report that recommendation to the ISFMP Policy Board for further review.

The Policy Board shall, within 30 days of receiving a recommendation of non-compliance from a Management Board/Section, review that recommendation of non-compliance. If it concurs in the decision, it shall recommend at that time to the Commission that a State be found out of compliance.

The Commission shall consider any recommendation as quickly as possible and within 30 days of receipt. Any State which is the subject of a recommendation for a finding of non-compliance shall be given an opportunity to present written and/or oral testimony concerning whether it should be found out of compliance. If the Commission agrees with the recommendation of the Policy Board, it may determine that a State is not in compliance with the relevant fishery management plan, and specify the actions the State must take to come into compliance. Upon a non-compliance determination, the Executive Director shall within ten working days notify the State, the Secretary of Commerce, and the Secretary of the Interior of the Commission's determination.

5.4.4.1.3 Adaptive management process

The Commission will participate in the Amendment to allocate the commercial quota to the states and implement other commercial management measures.

In accordance with the Commission's Interstate Fisheries Management Program Charter, each FMP may provide for changes within the management program to adapt to changing circumstances. Changes made under adaptive management shall be documented in writing through addenda to the FMP. The Management Board shall in coordination with each relevant state, utilizing that states established public review process, ensure that the public has an opportunity to review and comment upon proposed adaptive management changes. The states shall adopt adaptive management changes through established legislative and regulatory procedures. However, the states may have a range of procedures and time frames available for the adjustment and implementation of fishery regulations.

5.4.4.2 Impact of federal regulations on state management activities

The action proposed in this Amendment is identical to that proposed by the Commission for the coastal states.

6.0 COUNCIL REVIEW AND MONITORING OF THE FMP

A complete description of Council review and monitoring of the FMP can be found in section 9.4.1 of Amendment 2. There is no additional information to modify this section at this time.

7.0 LIST OF PREPARERS

This amendment was prepared by the following members of the MAFMC staff: Dr. Christopher M. Moore, Dr. José L. Montañez, Valerie Whalon, Kathy Collins, and Marla Trollan. Lou

Chiarella of NMFS Habitat Division assisted in documenting the potential gear impacts to Summer Flounder, Scup, and Black Sea Bass EFH. Scott Steinback assisted in documenting the hybrid commercial quota alternatives and economic aspects of the recreational fishery.

8.0 AGENCIES AND ORGANIZATIONS

In preparing this amendment, the Council and the Commission consulted with the NMFS, New England and South Atlantic Fishery Management Councils, Fish and Wildlife Service, Department of State, and the states of Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and North Carolina through their membership on the Council. As noted in section 5.4.4.3, states that are members within the management unit will also be consulted through the Coastal Zone Management Program consistency process.

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Table 1. Black sea bass quarterly quota allocation based on commercial landings for various times and periods.

Quarter	1988-1992[1]	1988-1997	1993-1997
Jan-Mar	38.64%	36.16%	34.13%
Apr-May	29.26%	29.45%	29.64%
July-Sept	12.33%	13.61%	15.13%
Oct-Dec	19.77%	20.78%	21.10%
Total	100.00%	100.00%	100.00%

Quarterly allocation based on a hypothetical[2] commercial quota of 3,024,742 lbs.

Quarter	1988-1992[1]	1988-1997	1993-1997
Jan-Mar	1,168,760	1,093,747	1,032,344
Apr-May	885,040	890,787	896,534
July-Sept	372,951	411,667	457,643
Oct-Dec	597,991	628,541	638,221
Total	3,024,742	3,024,742	3,024,742

[1]**Quarterly quota allocation currently in effect.**
[2]**This is the same commercial quota level that has been in place since the implementation of Amendment 9.**

Table 2a. Average annual distribution of black sea bass landings by three permit categories (1988-1997).

Category	Black Sea Bass Landings (lbs)	Percent of Landings
A1 (>= 10,000 lbs)	2,183,497	81.67%
A2 (2,000-9,999 lbs)	342,991	12.83%
A3 (< 2,000 lbs)	147,080	5.50%
Total	2,673,567	100.00%

Table 2b. Average annual distribution of black sea bass landings by three permit categories (1993-1997).

Category	Black Sea Bass Landings (lbs)	Percent of Landings
A1 (>= 10,000 lbs)	2,044,856	80.75%
A2 (2,000-9,999 lbs)	333,079	13.15%
A3 (< 2,000 lbs)	154,298	6.09%
Total	2,532,233	100.00%

Source: Northeast Weighout Data.

Table 3a. Average annual distribution of black sea bass landings by two permit categories (1988-1997).

Category	Black Sea Bass Landings (lbs)	Percent of Landings
B1 (>= 4,000 lbs)	2,401,100	89.81%
B2 (< 4,000 lbs)	272,467	10.19%
Total	2,673,567	100.00%

Table 3b. Average annual distribution of black sea bass landings by two permit categories (1993-1997).

Category	Black Sea Bass Landings (lbs)	Percent of Landings
B1 (>= 4,000 lbs)	2,260,914	89.29%
B2 (< 4,000 lbs)	271,319	10.71%
Total	2,532,233	100.00%

Source: Northeast Weighout Data.

Table 4. Black sea bass allocation by subregion.

Subregion	% allocation based on 1988 to 1997 landings	% allocation based on 1993 to 1997 landings
North	16.72% coastwide	14.97% coastwide
South	83.28% coastwide	85.03% coastwide

Assuming a hypothetical[1] commercial quota of 3,024,742 (lbs).

North	505,737 lbs	452,804 lbs
South	2,519,005 lbs	2,571,938 lbs

Allocating the northern quota component to periods based on 1988-1997 landings and 1993-1997 landings would yield the following period allocations:

Period	% Years 1988-1997	lbs	%Years 1993-1997	lbs
Jan-Apr	32.53	164,516	38.68	175,145
May-Dec	67.47	341,221	61.32	277,659
Total	100.00	505,737	100.00	452,804

Allocating the southern quota component to periods based on 1988-1997 landings and 1993-1997 landings would yield the following period allocations:

Period	% Years 1988-1997	lbs	% Years 1993-1997	lbs
Jan-Apr	47.21	1,189,222	44.06	1,133,196
May-Dec	52.79	1,329,783	55.94	1,438,742
Total	100.00	2,519,005	100.00	2,571,938

[1]This is the same commercial quota level that has been in place since the implementation of Amendment 9.

Table 5. State-by-state black sea bass landings for various time periods and the allocations adopted by the Commission for the 2003-2004 fishing year.

State	1980-1997	%	1988-1997	%	1993-1997	%	Best 5-years[1] 1980-1997	%	Best 5-years[2] 1988-1997	%	1997-2001	%	2001	%	State Allocation %
ME	13,561	0.02	7,561	0.03	103	0.00	13,543	0.05	7,553	0.04	474	0.00	465	0.02	0.50
NH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.50
MA	3,906,939	6.86	1,783,939	6.02	232,435	1.76	2,100,212	8.44	1,599,386	8.49	2,141,448	15.95	570,300	20.61	13.00
RI	5,085,716	8.93	1,571,716	5.31	732,467	5.53	2,872,000	11.54	1,024,144	5.44	965,872	7.19	375,944	13.58	11.00
CT	266,297	0.47	144,297	0.49	45,962	0.35	179,061	0.72	112,933	0.60	65,574	0.49	15,349	0.55	1.00
NY	2,651,773	4.65	1,443,773	4.88	970,078	7.33	1,187,462	4.77	970,078	5.15	1,001,986	7.46	251,233	9.08	7.00
NJ	16,154,960	28.36	10,351,960	34.96	5,061,750	38.25	6,136,717	24.66	6,061,850	32.17	3,018,782	22.49	646,824	23.37	20.00
DE	2,280,763	4.00	1,475,763	4.98	640,077	4.84	927,900	3.73	885,948	4.70	473,815	3.53	25,449	0.92	5.00
MD	6,055,698	10.63	3,926,698	13.26	1,944,254	14.69	2,500,922	10.05	2,403,622	12.76	1,719,410	12.81	147,254	5.32	11.00
VA	14,031,720	24.63	6,218,720	21.00	2,811,785	21.25	5,653,000	22.72	3,880,538	20.60	3,328,308	24.79	607,025	21.93	20.00
NC	6,521,467	11.45	2,690,467	9.08	796,013	6.01	3,315,729	13.32	1,895,175	10.06	708,770	5.28	127,856	4.62	11.00
Total	56,968,894	100.00	29,614,894	100.00	13,234,924	100.00	24,886,546	100.00	18,841,227	100.00	13,424,439	100.00	2,767,699	100.00	100.00

[1]Best 5-years commercial landings for each state during the 1980 to 1997 period.
[2]Best 5-years commercial landings for each state during the 1988 to 1997 period.

Table 6. Black sea bass commercial landings by year, Maine to Cape Hatteras, NC, 1988-1999.

ST	88	89	90	91	92	93	94	95	96	97	98	99	5-years[1] 88-97	%
ME	1,700	3,875	1,883	0	0	0	8	10	85	0	0	0	**7,553**	**0.04009**
MA	476,900	351,384	435,928	244,169	43,123	39,459	20,800	41,525	39,646	91,005	280,696	573,541	**1,599,386**	**8.48876**
RI	220,900	205,279	198,273	73,918	140,879	221,853	86,616	89,075	157,084	177,839	134,838	175,785	**1,024,144**	**5.43565**
CT	59,300	10,900	13,935	9,400	4,800	4,663	4,000	8,501	16,826	11,972	8,860	14,756	**112,933**	**0.59939**
NY	121,000	77,290	71,928	91,679	111,798	125,370	121,519	192,727	259,575	270,887	135,697	209,464	**970,078**	**5.14870**
NJ	1,180,300	840,687	990,161	1,034,133	1,244,929	1,380,592	956,917	797,096	1,221,896	705,249	578,517	500,896	**6,061,850**	**32.17333**
DE	171,000	132,086	149,700	189,300	193,600	85,800	70,000	165,900	166,148	152,229	126,830	168,339	**885,948**	**4.70218**
MD	394,700	295,964	342,522	481,027	468,231	361,533	220,492	302,565	546,487	513,177	314,775	485,427	**2,403,622**	**12.75725**
VA	792,700	649,661	885,643	498,916	580,015	762,732	389,967	362,817	789,802	506,467	826,817	740,015	**3,880,538**	**20.59599**
NC	724,729	350,243	414,860	183,975	220,647	178,015	168,950	101,895	162,457	184,696	155,825	105,825	**1,895,175**	**10.05866**
Tot	4,143,229	2,917,369	3,504,833	2,806,517	3,008,022	3,160,017	2,039,269	2,062,111	3,360,006	2,613,521	2,562,855	2,974,048	**18,841,227**	**100.0000**

Table 7. Black sea bass allocation by period and by state (second period allocation) - - hybrid allocation system.

Period	% allocation based on 1988 to 1997 landings	% allocation based on 1993 to 1997 landings	% allocation based on 1980 to 1997 landings
January-April	45.23% coastwide	43.32% coastwide	50.18% coastwide
May-December	54.77% state-by-state	56.68% state-by-state	49.82% state-by-state

Assuming a hypothetical[1] commercial quota of 3,024,742 (lbs).

January-April	1,368,091 lbs	1,310,318 lbs	1,517,816 coastwide
May-December	1,656,651 lbs	1,714,424 lbs	1,506,926 state-by-state

Allocating the May-December quota component to states based on 1988-1997, 1993-1997, and 1980-1997 landings would yield the following state-by-state allocations:

State	% Best 5 Years 1988-1997	lbs	% Years 1993-1997	lbs	% Best 5 Years 1980-1997[2]	lbs
ME	0.02017	334	0.00000	0	0.01240	187
MA	5.87660	97,355	2.96464	50,826	10.03248	151,182
RI	5.26069	87,151	4.64630	79,657	13.56661	204,439
CT	0.15373	2,547	0.32472	5,567	0.08752	1,319
NY	5.24499	86,891	6.98859	119,814	6.45691	97,301
NJ	39.29247	650,939	39.27077	673,267	33.39988	503,312
DE	5.33329	88,354	4.42180	75,808	1.90153	28,655
MD	23.68344	392,352	25.58454	438,627	20.51459	309,140
VA	10.92528	180,994	11.98461	205,467	10.39684	156,673
NC	4.20933	69,734	3.81403	65,389	3.63115	54,719
Total	99.99999	1,656,651	100.00000	1,714,424	100.00000	1,506,926

[1]This is the same commercial quota level that has been in place since the implementation of Amendment 9.
[2]New Hampshire would receive 0.00009% of allocation.

Table 8. Black sea bass allocation by period and region (second period allocation) –hybrid allocation system.

Period	% allocation based on 1988 to 1997 landings	% allocation based on 1993 to 1997 landings
January-April	45.23% coastwide	43.32% coastwide
May-December	54.77% Regional	56.68% Regional

Assuming a hypothetical[1] commercial quota of 3,024,742 (lbs).

January-April	1,368,091 lbs	1,310,318 lbs
May-December	1,656,651 lbs	1,714,424 lbs

Allocating the May-December quota component to regions based on 1988-1997 landings, and 1993-1997 landings would yield the following regional allocations:

Region	% Years 1988-1997	lbs	% Years 1993-1997	lbs
North	16.56%	274,278	14.92%	255,865
South	83.44%	1,382,373	85.08%	1,458,559
Total	100.00%	1,656,651	100.00%	1,714,424

[1]This is the same commercial quota level that has been in place since the implementation of Amendment 9.

Table 9a. Black sea bass landings (percentage) by gear type, Maine to Cape Hatteras, North Carolina, for various time periods.

Gear Type	88-97	93-97	00
Bottom/Mid water trawls	45.82%	45.51%	29.88%
Pot/Traps	44.72%	43.14%	48.82%
Gill Nets	0.40%	0.65%	1.56%
Lines	7.75%	8.37%	13.67%
Other	1.31%	2.33%	6.07%

Table 9b. Potential changes in black sea bass commercial landings associated with the preferred alternative and a hypothetical[1] commercial TAL of 3,024,742 pounds for 2003.

State	2003 Allocation (%)	2003 Quota Allocation (lbs)	2000 Landings[2] (lbs)	% Changed
ME	0.5%	15,124	9	167941.22
NH	0.5%	15,124	0	NA
MA	13.0%	393,216	626,012	-37.19
RI	11.0%	332,722	101,494	227.82
CT	1.0%	30,247	14,795	104.44
NY	7.0%	211,732	134,960	56.88
NJ	20.0%	604,948	588,110	2.86
DE	5.0%	151,237	55,283	173.57
MD	11.0%	332,722	304,927	9.12
VA	20.0%	604,948	648,118	-6.66
NC	11.0%	332,722	185,334	79.53
Total	100.0%	3,024,742	2,659,042	13.75

[1]This is the same commercial quota level that has been in place since the implementation of Amendment 9.
[2]Prelininary Dealer Data.

Table 10. Latitude and longitude coordinates of nearshore gear restricted areas (EFH Alternative 2).

Block 1

Point	N. lat.	W. long.
1	40°	74°
2	40°	73° 20'
3	40° 35'	73° 20'
4	40° 35'	74°
5	40°	74°

Block 2

Point	N. lat.	W. long.
1	38° 20'	75°
2	38° 20'	74° 30'
3	39° 10'	74° 30'
4	39° 10'	74° 50'
5	39°	74° 50'
6	39°	75°
7	38° 20'	75°

Table 10 (continued). Latitude and longitude coordinates of nearshore gear restricted areas (EFH Alternative 2).

Block 3

Point	**N. lat.**	**W. long.**
1	36° 30'	76°
2	36° 30'	75° 20'
3	37° 30'	75° 20'
4	37° 30'	75° 50'
5	37° 10'	75° 50'
6	37° 10'	76°
7	36° 30'	76°

Block 4

Point	**N. lat.**	**W. long.**
1	35° 20'	75° 30'
2	35° 20'	75° 10'
3	36° 10'	75° 10'
4	36° 10'	75° 40'
5	35° 50'	75° 40'
6	35° 50'	75° 30'
7	35° 20'	75° 30'

Table 11. Latitude and longitude coordinates of gear restricted area surrounding the head of the Hudson Canyon. (EFH Alternative 3).

Block 5

Point	N. lat.	W. long.
1	39° 10'	73°
2	39° 10'	72° 30'
3	39° 40'	72° 30'
4	39° 40'	72° 10'
5	39° 50'	72° 10'
6	39° 50'	73°
7	39° 10'	73°

Table 12. Summer flounder commercial landings by distance from shore, 1999.

	Summer Flounder			
	0-3 miles ('000 lbs)	3-200 miles ('000 lbs)	Total ('000 lbs)	% EEZ
ME		6	6	100.0
NH	NA	NA		
MA	308	497	805	61.7
RI	727	910	1637	55.6
CT	108	137	245	55.9
NY	354	450	804	56.0
NJ	206	1712	1918	89.3
DE	7	1	8	12.5
MD	67	167	234	71.4
VA	169	2027	2196	92.3
NC	850	1960	2810	69.8
Total	2796	7867	10663	73.8

Source: NMFS General Canvass Data.

Table 13. Scup commercial landings by distance from shore, 1999.

	Scup			
	0-3 miles ('000 lbs)	3-200 miles ('000 lbs)	Total ('000 lbs)	% EEZ
ME	NA	NA		
NH	NA	NA		
MA	654	8	662	1.2
RI	607	673	1280	52.6
CT	87	10	97	10.3
NY	169	291	460	63.3
NJ	8	788	796	99.0
DE	NA	NA		
MD	0	0	0	
VA	0	28	28	100.0
NC	2	76	78	97.4
Total	1527	1874	3401	55.1

Source: NMFS General Canvass Data.

Table 14. Black sea bass commercial landings by distance from shore, 1999.

	Black Sea Bass			
	0-3 miles ('000 lbs)	3-200 miles ('000 lbs)	Total ('000 lbs)	% EEZ
ME	NA	NA		
NH	NA	NA		
MA	571	3	574	0.5
RI	65	111	176	63.1
CT	2	12	14	85.7
NY	82	127	209	60.8
NJ	8	493	501	98.4
DE	NA	NA		
MD	78	407	485	83.9
VA	2	738	740	99.7
NC	26	564	590	95.6
Total	834	2455	3289	74.6

Source: NMFS General Canvass Data.

Table 15. Mean length (inches) at age of male and female summer flounder collected from the spring and autumn NEFC 1975-1989 bottom trawl surveys.

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

Source: Almeida pers. comm.

Table 16. Length-weight relationships for summer flounder, expressed as $\log_{10}$ weight = $\log_{10}$ a + b (Log_{10} Length), correlation coefficient (r), & expected mean weight at 15.7" (400 mm) TL for each month by sex.

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

* 1 gram = 0.035 ounces: 1 ounce = 28.35 g.

Source: Morse, 1981.

Table 17. Parameters of the von Bertalanffy growth equation derived for summer flounder in the Middle Atlantic Bight.*

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

* Asymptotic standard errors for each parameter in parentheses.
\# 1 cm = 0.3937"; 1" = 2.540 centimeters.

Source: USDC 1986.

Table 18. NEFSC spring trawl survey (offshore strata 1-12, 61-76) stratified mean number of summer flounder per tow at age. ***Note: 2000 indices are preliminary in unaudited data, aged with a preliminary 2000 age-length key.***

	Age										
Year	1	2	3	4	5	6	7	8	9	10	All
1976	0.03	1.7	0.68	0.28	0.01	0.01	0.01				2.72
1977	0.61	1.3	0.7	0.1	0.09	0.01		0.01			2.82
1978	0.7	0.95	0.66	0.19	0.04	0.03	0.03			0.02	2.62
1979	0.06	0.18	0.08	0.04	0.03			0.01			0.4
1980	0.01	0.71	0.31	0.14	0.02	0.06	0.03	0.02		0.01	1.31
1981	0.59	0.53	0.17	0.08	0.05	0.03	0.02	0.01			1.48
1982	0.69	1.41	0.12	0.02							2.24
1983	0.32	0.39	0.19	0.03	0.01				0.01		0.95
1984	0.17	0.33	0.09	0.05		0.01	0.01				0.66
1985	0.55	1.56	0.21	0.04	0.02						2.38
1986	1.49	0.43	0.2	0.02	0.01						2.15
1987	0.46	0.43	0.02	0.01							0.92
1988	0.59	0.79	0.07	0.02							1.47
1989	0.06	0.23	0.02	0.01							0.32
1990	0.62	0.03	0.06								0.71
1991	0.79	0.27		0.02							1.08
1992	0.76	0.41	0.01		0.01						1.19
1993	0.73	0.5	0.04								1.27
1994	0.35	0.53	0.04	0.01							0.93
1995	0.79	0.27	0.02				0.01				1.09
1996	1.08	0.56	0.12								1.76
1997	0.29	0.67	0.09	0.01							1.06
1998	0.27	0.52	0.32	0.06	0.01	0.01					1.19
1999	0.22	0.74	0.48	0.13	0.02	0.01					1.6
2000	0.2	1.08	0.63	0.11	0.19	0.02					2.22
Mean	0.5	0.66	0.22	0.07	0.04	0.02	0.02	0.01	0.01	0.02	1.46

Table 19. NEFSC autumn trawl (inshore strata 1-61, offshore strata <=55 meters (1,5,9,61,65,69,73)) mean number of summer flounder per tow at age.

	AGE						
YEAR	0	1	2	3	4	5+	TOTAL
1982	0.55	1.52	0.40	0.03			2.50
1983	0.96	1.46	0.34	0.12	0.01	0.01	2.90
1984	0.18	1.39	0.43	0.07	0.01	0.01	2.09
1985	0.59	0.80	0.46	0.05		0.02	1.92
1986	0.39	0.83	0.11	0.11			1.44
1987	0.07	0.58	0.20	0.03	0.02		0.90
1988	0.06	0.62	0.18	0.03			0.89
1989	0.31	0.21	0.05				0.57
1990	0.44	0.38	0.03	0.04			0.89
1991	0.76	0.84	0.09		0.01		1.70
1992	0.99	1.04	0.25	0.03	0.01		2.32
1993	0.23	0.80	0.03	0.01			1.07
1994	0.75	0.67	0.09	0.01	0.01		1.53
1995	0.93	1.16	0.28	0.02	0.01		2.40
1996	0.11	1.24	0.57	0.04			1.96
1997	0.17	1.29	1.14	0.29	0.02	0.02	2.93
1998	0.38	2.13	1.63	0.33	0.04	0.01	4.52
1999	0.21	1.73	1.49	0.31	0.04	0.01	3.79
Mean	0.45	1.04	0.43	0.10	0.02	0.01	2.02

Table 20. NEFSC Winter trawl survey (offshore strata from 27-185 meters (15-100 fathoms): 1-3, 5-7, 9-11, 13-14, 16-17, 61-63, 65-67, 69-71, 73-75; Southern Georges Bank to Cape Hatteras), mean number, mean weight (kg), and mean number at age per tow.
Note: 2000 indicies are from preliminary, unaudited data, aged with a preliminary 2000 age-length key.

Year	Stratified mean number per tow	Coefficient of variation	Stratified mean weight (kg) per tow	Coefficient of variation
1992	12.295	15.6	4.898	15.4
1993	13.604	15.2	5.497	11.9
1994	12.051	17.8	6.033	16.1
1995	10.930	12.0	4.808	11.6
1996	31.246	24.2	12.351	22.0
1997	10.283	24.0	5.544	16.6
1998	7.756	20.7	5.131	16.6
1999	11.055	13.3	7.987	11.4
2000	16.008		12.741	

	AGE								
YEAR	1	2	3	4	5	6	7	8+	TOTAL
1992	7.15	4.74	0.33	0.04	0.01	0.03	0.00	0.00	12.29
1993	6.50	6.70	0.31	0.05	0.02	0.02	0.00	0.00	13.60
1994	3.76	7.20	0.82	0.26	0.00	0.01	0.00	0.00	12.05
1995	6.07	4.59	0.25	0.02	0.00	0.00	0.00	0.00	10.93
1996	22.17	8.33	0.60	0.12	0.03	0.00	0.00	0.00	31.25
1997	3.86	4.80	1.04	0.43	0.11	0.04	0.00	0.00	10.28
1998	1.68	3.25	2.29	0.42	0.10	0.01	0.00	0.01	7.76
1999	2.11	4.80	2.90	0.84	0.28	0.06	0.04	0.03	11.06
2000	0.75	6.68	5.03	2.50	0.77	0.18	0.09	0.02	16.01
Mean	5.97	5.65	1.55	0.52	0.16	0.04	0.02	0.01	13.90

Table 21. Total catch at age of summer flounder (000s), ME-NC.

	AGE										
YEAR	0	1	2	3	4	5	6	7	8	9	TOTAL
1982	5.344	19.423	10.149	935	328	116	67	26	4	0	36.392
1983	4.925	28.441	10.911	2.181	693	323	16	36	5	2	47.533
1984	4.802	26.582	15.454	3.180	829	95	4	5	1	4	50.956
1985	2.078	14.623	17.979	1.767	496	252	30	5	2	1	37.233
1986	1.942	17.140	11.055	3.782	316	140	58	12	3	0	34.448
1987	1.137	17.212	10.838	1.648	544	25	29	33	11	0	31.477
1988	795	20.557	14.562	2.137	644	121	19	15	6	0	38.856
1989	960	4.790	7.306	1.692	353	55	9	3	1	0	15.169
1990	1.856	8.808	2.187	995	221	30	8	2	1	0	14.108
1991	1.001	12.149	7.148	742	217	32	3	1	0	0	21.293
1992	1.368	11.197	6.026	1.125	151	70	2	1	0	0	19.940
1993	1.285	11.235	5.601	566	73	45	20	2	1	0	18.828
1994	1.638	10.362	6.996	982	205	26	14	0	5	0	20.227
1995	592	5.828	7.303	1.239	397	77	2	1	0	0	15.440
1996	162	6.925	9.278	1.785	417	71	16	1	3	0	18.658
1997	30	2.545	8.046	3.149	553	160	11	4	0	0	14.498
1998	45	2.220	6.354	5.228	978	137	18	1	0	0	14.981
1999	181	2.186	6.267	4.024	1.162	359	55	14	-<1	0	14.248

Table 22. Sex ratios (male:female) of summer flounder, collected in NMFS bottom trawls between Cape Cod and Cape Hatteras, 1974-1979 combined.

Total Length interval (in)	Spring	Summer	Fall	Winter	Total
8.1-10.0	15:7	12:4	175:63	49:12	251:86
10.1-12.0	76:32	90:31	298:84	38:16	502:163
12.1-14.0	93:56	213:93	430:205	31:24	767:378
14.1-15.9	80:94	139:137	284:456	28:42	531:729
16.0-17.9	22:90	50:115	71:204	16:32	159:441
18.0-19.9	7:41	7:63	31:138	4:20	49:262
20.0-21.9	2:16	4:28	3:77	2:10	11:131
22.0-23.8	0:10	0:6	1:36	0:5	1:57
>23.9	0:3	0:5	0:20	0:5	0:33
Total	295:349	515:482	1293:1283	168:166	2271:2280
%	46:54	52:48	50:50	50:50	50:50

Source: Morse, 1981 modified.

Table 23. Fecundity relationships of summer Flounder, with length expressed as Log_{10} fecundity = Log_{10} a + b, and weight and ovary weight expressed as fecundity = a + bX.

Years		n	a	b
1974-1977	Length (cm)*	134	-3.098	3.402
1974-1976	Weight (g)**	79	-101867.500	908.864
1974-1976	Ovary weight (g)	79	552515.161	10998.048

* 1 cm = 0.394 inches;1 inch = 2.540 cm.
** 1 gram = 0.035 ounces;1 ounce = 28.35 grams.

Source: Morse, 1981.

Table 24. The mean back-calculated lengths (inches TL) of scup ages 1 to 10 from various studies. The number in parenthesis is sample size.

	Age (Years)									
	1	2	3	4	5	6	7	8	9	10
Sisson 1974 (250)	2.9	6.2	8.5	10.2	11.4	12.3	12.9	13.3	13.6	13.8
Hamer 1979 (1429)	5.6	8.6	10.1	11.2	11.8	12.5	13.3	14.1	14.8	15.4
Pierce 1980 (230)	4.6	7.5	9.7	11.4	12.7	13.7	14.5	15.2	15.7	16.1
Crecco *et al.* 1981										
research trawl (697)	4.4	7.4	9.3	10.6	11.9	12.8	13.6	14.1	14.5	14.8
commercial trawl	4.8	7.9	9.7	11.0	11.9	12.7	13.3	14.1	14.6	16.0
Howell/Simpson 1985 (5999)	4.0	7.7	9.6	11.0	12.2	13.1	13.7	14.3	14.7	15.3
Campbell *et al.* (unpub.) (2170)	4.3	6.6	8.6	10.2	11.6	12.8	13.7	14.5	15.3	15.8

Note: FL in millimeters converted to TL in inches.

Source: MAFMC 1996a.

Table 25. Theoretical growth parameters for scup collected in various studies.

	L-inf			
	FL (mm)	TL (in)	k	t_o
Sisson 1974	324	(14.4)	0.34	-0.31
Hamer 1979	341	(15.1)	0.29	-0.80
Pierce 1980	396	(17.6)	0.24	-0.35
Finkelstein 1969				
male	343	(15.2)	0.27	-0.41
female	374	(16.6)	0.22	-0.47
Crecco *et al.* 1981	366	(16.3)	0.25	-0.35
Howell/Simpson 1985	389	(17.3)	0.22	-0.35
Campbell *et al.* (unpub.)	422	(18.8)	0.18	-0.51

Source: MAFMC 1996a.

Table 26. 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 27. The mean back-calculated lengths (TL inches) at age for black sea bass collected from the Mid-Atlantic, 1973-75.

		Age (Years)								
	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 28. Atlantic coast estuaries which are designated as EFH (x) for summer flounder.

	Mid-Atlantic Estuaries																	
	Waquiot Bay			Buzzards Bay			Narragansett Bay			Long Island Sound			Connecticut River			Gardiners Bay		
Life Stage	*	M	S	*	M	S	T	M	S	T	M	S	T	M	*	*	M	S
A					x	x			x					x			x	
J		x	x		x	x	x	x	x		x	x		x			x	x
L		x	x		x	x		x	x									
E																		

	South Shore Bay Complex			Hudson R./ Raritan B.			Barnegat Bay			New Jersey Inland Bays			Delaware Bay			Delaware Inland Bays		
Life Stage	*	M	S	T	M	S	T	M	S	T	M	S	T	M	S	*	M	S
A		x	x		x	x		x	x		x	x		x	x		x	x
J		x	x		x	x		x	x		x	x		x	x		x	x
L				x	x	x		x	x		x	x					x	x
E																		

	Chincoteagu e Bay			Chesapeake Bay Mainstem			Chester River			Choptank River			Patuxent River			Potomac River		
Life Stage	*	*	S	T	M	S	T	M	*	T	M	*	T	M	*	T	M	*
A			x		x	x		x			x			x			x	
J			x		x	x		x			x			x			x	
L					x	x												
E																		

	Tangier/ Pocomoke Sound			Rappahannoc k River			York River			James River		
Life Stage	*	M	*	T	M	*	T	M	*	T	M	*
A		x			x			x			x	
J		x			x			x			x	
L					x			x			x	
E												

Salinity Zone

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

Life stage

A - Adults
J - Juveniles
L - Larvae
E - Egg

Table 28 (continued). Atlantic coast estuaries which are designated as EFH (x) for summer flounder.

	Southeast Estuaries																				
	Albemarie Sound			Pamlico Sound			Pamlico/ Pungo Rivers			Neuse River			Bougue Sound			New River			Cape Fear River		
Life Stage	T	M	✳	T	M	S	T	M	✳	T	M	✳	T	M	S	T	M	S	T	M	S
A		x			x	x		x			x			x	x		x	x		x	x
J	x	x			x	x	x	x			x			x	x		x	x		x	x
L		x			x	x					x			x	x		x	x		x	x
E																					

	Winyah Bay			N & S Santee Rivers			Charleston Harbor			St. Helena Sound			Broad River			Savannah River			Ossabaw Sound		
Life Stage	T	M	S	T	M	✳	T	M	S	T	M	S	T	M	S	T	M	S	T	M	S
A			x		x			x	x		x	x		x	x						
J		x	x		x			x	x		x	x		x	x		x	x		x	x
L		x	x		x			x	x		x	x		x	x		x	x		x	x
E																					

	St. Cathe/ Sapelo Sound			Altamaha River			St. Andrew /St. Simon Sound			St. Johns River			Indian River			Biscayne Bay		
Life Stage	T	M	S	T	M	S	T	M	S	T	M	S	✳	M	S	✳	M	S
A										x	x	x		x	x			
J		x	x		x	x		x	x	x	x	x		x	x			
L		x	x		x	x		x	x		x	x		x	x			
E																		

Salinity Zone

T - Tidal Fresh
M - Mixing
S - Seawater
✳ - Salinity Zone not present

Life stage

A - Adults
J - Juveniles
L - Larvae
E - Egg

Table 29. Atlantic coast estuaries which are designated as EFH (x) for scup.

	North Atlantic Estuaries																	
	Passama-quoddy Bay			Englishman Machias Bays			Narraguagus Bay			Blue Hill Bay			Penobscot Bay			Muscongus Bay		
Life Stage	T	M	S	T	M	S	T	M	S	T	M	S	T	M	S	T	M	S
A																		
J																		
L																		
E																		
	Damariscotia River			Sheepscot River			Kennebec/ Androscoggin Rivers			Casco Bay			Saco Bay			Wells Harbor		
Life Stage	T	M	S	T	M	S	T	M	S	T	M	S	T	M	S	✳	M	S
A																		
J																		
L																		
E																		
	Great Bay			Merrimack River			Massachusetts Bay			Boston Harbor			Cape Cod Bay					
Life Stage	T	M	S	T	M	✳	✳	✳	S	✳	M	S	✳	M	S			
A															x			
J									x					x	x			
L																		
E																		

Salinity Zone

T - Tidal Fresh
M - Mixing
S - Seawater
✳ - Salinity Zone not present

Life stage

A - Adults
J - Juveniles
L - Larvae
E - Egg

Table 29 (continued). Atlantic coast estuaries which are designated as EFH (x) for scup.

	Mid-Atlantic Estuaries																	
	Waquiot Bay			Buzzards Bay			Narragansett Bay			Long Island Sound			Connecticut River			Gardiners Bay		
Life Stage	✳	M	S	✳	M	S	T	M	S	T	M	S	T	M	✳	✳	M	S
A			x			x		x	x			x						x
J			x			x		x	x			x						x
L			x			x			x			x						x
E			x		x	x			x			x						x
	South Shore Bay Complex			Hudson R./ Raritan B.			Barnegat Bay			New Jersey Inland Bays			Delaware Bay			Delaware Inland Bays		
Life Stage	✳	M	S	T	M	S	T	M	S	T	M	S	T	M	S	✳	M	S
A			x			x									x			x
J			x			x			x			x		x	x			x
L						x												
E						x												
	Chincoteague Bay			Chesapeake Bay Mainstem			Chester River			Choptank River			Patuxent River			Potomac River		
Life Stage	✳	✳	S	T	M	S	T	M	✳	T	M	✳	T	M	✳	T	M	✳
A					x	x												
J					x	x												
L																		
E																		
	Tangier/ Pocomoke Sound			Rappahannock River			York River			James River								
Life Stage	✳	M	✳	T	M	✳	T	M	✳	T	M	✳						
A																		
J																		
L																		
E																		

<u>Salinity Zone</u>
T - Tidal Fresh
M - Mixing
S - Seawater
✳ - Salinity Zone not present

<u>Life stage</u>
A - Adults
J - Juveniles
L - Larvae
E - Egg

Table 30. Atlantic coast estuaries which are designated as EFH (x) for black sea bass.

	Mid-Atlantic Estuaries																	
	Waquiot Bay			Buzzards Bay			Narragansett Bay			Long Island Sound			Connecticut River			Gardiners Bay		
Life Stage	✳	M	S	✳	M	S	T	M	S	T	M	S	T	M	✳	✳	M	S
A						x			x									x
J						x			x			x						x
L						x												
E						x												

	South Shore Bay Complex			Hudson R./ Raritan B.			Barnegat Bay			New Jersey Inland Bays			Delaware Bay			Delaware Inland Bays		
Life Stage	✳	M	S	T	M	S	T	M	S	T	M	S	T	M	S	✳	M	S
A			x					x	x		x	x			x			
J								x	x		x	x		x	x		x	x
L																		
E																		

	Chincoteague Bay			Chesapeake Bay Mainstem			Chester River			Choptank River			Patuxent River			Potomac River		
Life Stage	✳	✳	S	T	M	S	T	M	✳	T	M	✳	T	M	✳	T	M	✳
A			x		x	x												
J			x		x	x												
L																		
E																		

	Tangier/ Pocomoke Sound			Rappahannoc k River			York River			James River		
Life Stage	✳	M	✳	T	M	✳	T	M	✳	T	M	✳
A		x									x	
J		x									x	
L												
E												

Salinity Zone
T - Tidal Fresh
M - Mixing
S - Seawater
✳ - Salinity Zone not present

Life stage
A - Adults
J - Juveniles
L - Larvae
E - Egg

Table 31. Gear reported to land 1 % or greater of total landings for each state, 1999.

Percent of Landings for All Species by State

Gear	CT	DE	MA	MD	ME	NC	NH	NJ	NY	RI	VA	% All States Combined
By Hand, Other		18										
Diving Outfits, Other					5							1
Dredge Clam			9	10				39	1	1		6
Dredge Crab		11									1	
Dredge Mussel					1							
Dredge Other					3							
Dredge Scallop, Sea	7		10		1		1	2			1	2
Dredge Urchin, Sea					1							
Floating Traps (Shallow)										1		
Fyke And Hoop Nets, Fish				2								
Gill Nets, Drift, Other		4		3				2				1
Gill Nets, Drift, Runaround						1						
Gill Nets, Other						14						1
Gill Nets, Sink/Anchor,			12	5	1		42	5	5	4	3	4
Gill Nets, Stake		7										
Haul Seines, Beach				2							1	
Haul Seines, Long						1						
Hoes					1							
Lines Hand, Other		1	2	1		1	1		1			1
Lines Long Set With Hooks			4			1		1	4			1
Lines Long, Shark						1						
Lines Troll, Other						1						
Lines Trot With Baits				17								1
Not Coded	16				1			1	30			2
Otter Trawl Bottom, Shrimp					1	6	3					1
Otter Trawl Midwater			11		21		8			18		6
Pots And Traps, Conch		2										
Pots And Traps, Crab, Blue		51		36		36		3			6	8
Pots And Traps, Crab, Other			2							1		
Pots And Traps, Eel		2		1								
Pots And Traps, Fish		1		3								
Pots And Traps, Lobster Inshore	13		5		25		9			4		5
Pots And Traps, Lobster Offshore	2		4				9	1		2		1
Pots And Traps, Other			1		1							
Pound Nets, Crab				1								
Otter Trawl Bottom, Crab						1						
Otter Trawl Bottom, Fish	61		38	3	9	7	26	26	58	56	2	18
Pound Nets, Fish				14		1			1		4	2
Purse Seines, Herring			1		23							4
Purse Seines, Menhaden						27		18			74	28
Purse Seines, Other											7	2

Source: NMFS 2001.

Table 32. Proposed impact of fishing gear on summer flounder, scup, and black sea bass EFH.

GEAR TYPE	POTENTIAL IMPACT	NONE
HAUL SEINES, BEACH		
LONGLINE, BOTTOM		X
LONGLINE, PELAGIC		X
GILL NET, SINK, OTHER	X	
GILL NET, OTHER	X	
POT/TRAP, LOBSTER	X	
POTS + TRAPS, OTHER	X	
POUND NET		X
TRAWL, OTTER, BOTTOM	X	
TRAWL, OTTER, MIDWATER		X
DREDGE, CLAM	X	
DREDGE, OTHER	X	
DREDGE, SCALLOP, SEA	X	
PURSE SEINE, HERRING		X
PURSE SEINE, OTHER		X
PURSE SEINE, MENHADEN		X
DIVING GEAR		X
OTHER		X
UNKNOWN		X

Table 33. Studies of the impacts of fishing gear on the structural components of fish habitat.

Habitat	Gear Type	Location	Results	Reference(s)
Eelgrass	Scallop dredge	North Carolina	Comparison of reference quadrats with treatments of 15 and 30 dredgings in hard sand and soft mud substrates within eelgrass meadows. Eelgrass biomass was significantly greater in hard sand than soft mud sites. Increased dredging resulted in significant reductions in eelgrass biomass and number of shoots.	Fonesca et al. (1984)
Eelgrass and shoalgrass	Clam rake and "clam kicking"	North Carolina	Comparison of effect of two fishing methods. Raking and "light" clam kicking treatments, biomass of seagrass was reduced approximately 25% below reference sites but recovered within one year. In "intense" clam kicking treatments, biomass of seagrass declined approximately 65% below reference sites. Recovery did not begin until more than 2 years after impact and biomass was still 35% below the level predicted from controls to show no effect.	Peterson et al. (1987)
Eelgrass and shoalgrass	Clam rakes (pea digger and bull rake)	North Carolina	Compared impacts of two clam rake types on removal of seagrass biomass. The bull rake removed 89% of shoots and 83% of roots and rhizomes in a completely raked 1 m2 area. The pea digger removed 55% of shoots and 37% of roots and rhizomes.	Peterson et al. (1983)
Seagrass	Trawl	western Mediter-ranean	Noted loss of *Posidonia* meadows due to trawling; 45% of study area. Monitored recovery of the meadows after installing artificial reefs to stop trawling. After 3 years plant density has increased by a factor of 6.	Guillen et al. (1994)
Sponge-coral hard-bottom	Roller-rigged trawl	off Georgia coast	Assessed effect of single tow. Damage to all species of sponge and coral observed; 31.7% of sponges, 30.4% of stony corals, and 3.9% of octocorals. Only density of barrel sponges (*Cliona* spp.) significantly reduced. Percent of stony coral damage high because of low abundance. Damage to other sponges, octocorals, and hard corals varied but changes in density not significantly different. No significant differences between trawled and reference sites after 12 months.	Van Dolah et al. (1987)
Sponge-coral hard-bottom	roller-frame shrimp trawl	Biscayne Bay, Florida	Damage to approximately 50% of sponges, 80% of stony corals, and 38% of soft corals.	Tilmant (1979) (cited in Van Dolah et al. 1987)

Source: Auster and Langton 1998.

Table 33 (continued). Studies of the impacts of fishing gear on the structural components of fish habitat.

Habitat	Gear Type	Location	Results	Reference(s)
Various tropical emergent benthos	Trawl	North West Shelf, Australia	Catch rates of all fish and large and small benthos show that in closed areas fish and small benthos abundance increased over 5 years while large benthos (>25 cm) stayed the same or increased slightly. In trawled areas all groups of animals declined. Found that settlement rate and growth to 25 cm was on the order of 15 years for the benthos.	Sainsbury et al. (In press)
Gravel pavement	Scallop dredge	Georges Bank	Assessed cumulative impact of fishing. Undredged sites had significantly higher percent cover of the tube-dwelling polychaete *Filograna implexa* and other emergent epifauna than dredged sites. Undredged sites had higher numbers of organisms, biomass, species richness, and species diversity than dredged sites. Undredged sites were characterized by bushy epifauna (bryozoans, hydroids, worm tubes) while dredged sites were dominated by hard-shelled molluscs, crabs, and echinoderms.	Collie et al. (1996, 1997)
Gravel-boulder	Assumed roller-rigged trawl	Gulf of Maine	Comparison of site surveyed in 1987 and revisited in 1993. Initially mud draped boulders and high density patches of diverse sponge fauna. In 1993, evidence of moved boulders, reduced densities of epifauna and extreme truncation of high density patches.	Auster et al. (1996)
Cobble-shell	Assumed trawl and scallop dredge	Gulf of Maine	Comparison of fished site and adjacent closed area. Statistically significant reduction in cover provided by emergent epifauna (e.g., hydroids, bryozoans, sponges, serpulid worms) and sea cucumbers.	Auster et al. (1996)
Gravel	Beam trawl	Irish Sea	An experimental area was towed 10 times. Density of epifauna (e.g., hydroids; soft corals, *Alcyonium digitatum*) was decreased approximately 50%.	Kaiser and Spencer (1996a)
Boulder-Gravel	Roller-rigged trawl	Gulf of Alaska	Comparisons of single tow trawled lane with adjacent reference lane. Significant reductions in density of structural components of habitat (two types of large sponges and anthozoans). No significant differences in densities of a small sponge and mobile invertebrate fauna. 20.1% boulders moved or dragged. 25% of ophiuroids (*Amphiophiura ponderosa*) in trawled lanes were crushed or damaged compared to 2% in reference lanes.	Freese et al. (In prep.)
Gravel over sand	Scallop dredge	Gulf of St. Lawrence	Assessed effects of single tows. Suspended fine sediments and buried gravel below the sediment-water interface. Overturns boulders.	Caddy (1973)

Source: Auster and Langton 1998.

Table 33 (continued). Studies of the impacts of fishing gear on the structural components of fish habitat.

Habitat	Gear Type	Location	Results	Reference(s)
Bryozoan beds (on sand and cobble)	Otter trawl and roller-rigged trawl	New Zealand	Qualitative comparison of closed and open areas. Two bryozoans produce "coral-like" forms and provide shelter for fishes and their prey. Comparisons of fished site with reference sites and prior observations from fishers show reduced density and size of colonies.	Bradstock and Gordon (1983)
Mussel bed	Otter trawl	Strangford Lough, Northern Ireland	Comparison of characteristics of trawled and untrawled *Modiolus modiolus* beds as pre and post impacts of a trawl. Trawled areas, confirmed with sidescan sonar, showed mussel beds disconnected with reductions in attached epibenthos. The most impacted sites were characterized by few or no intact clumps, mostly shell debris, and sparse epifauna. Trawling resulted in a gradient of complexity with flattened regions at the extreme. Immigration of *Nephrops* into areas previously dominated by *Modiolus* may result in burial of new recruits due to burrowing activities; precluding a return to a functional mussel bed habitat.	Magorrian (1995)
Sand-mud	Trawl and scallop dredge	Hauraki Gulf, New Zealand	Comparisons of 18 sites along a gradient of fishing effort (i.e., heavily fished sites through unfished reference sites). A gradient of increasing large epifaunal cover correlated with decreasing fishing effort.	Thrush et al. (In press)
Soft sediment	Scallop dredge	Port Phillip Bay, Australia	Compared reference and experimentally towed sites in BACI designed experiment. Bedforms consisted of cone shaped callianasid mounds and depressions prior to impact. Depressions often contained detached seagrasses and macroalgae. Only dredged plot changed after dredging. Eight days after dredging the area was flattened; mounds were removed and depressions filled. Most callianasids survived and density did not change in 3 mo following dredging. One month post impact, seafloor remained flat and dredge tracks distinguishable. Six months post impact mounds and depressions were present but only at 11 months did the impacted plot return to control plot conditions.	Currie and Parry (1996)
Sand	Beam trawl	North Sea	Observations of effects of gear. As pertains to habitat, trawl removed high numbers of the hydroid *Tubularia*.	DeGroot (1984)

Source: Auster and Langton 1998.

Table 33 (continued). Studies of the impacts of fishing gear on the structural components of fish habitat.

Habitat	Gear Type	Location	Results	Reference(s)
Gravel-sand-mud	Trawl	Monterey Bay	Comparison of heavily trawled (HT) and lightly trawled (LT) sites. The seafloor in the HT area had significantly higher densities of trawl tracks while the LT area had significantly greater densities of rocks >5 cm and mounds. The HT area had shell debris on the surface while the LT area had a cover of flocculent material. Emergent epifauna density was significantly higher for all taxa (anenomes, sea pens, sea whips) in the LT area.	Engel and Kvitek (MS1997)
Sand	Otter trawl	North Sea	Observations of direct effects of gear. Well buried boulders removed and displaced from sediment. Trawl doors smoothed sand waves. Penetrated seabed 0-40 mm (sand and mud).	Bridger (1970, 1972)
Sand-shell	Assumed trawl and scallop dredge	Gulf of Maine	Comparison of fished site and adjacent closed area. Statically significant reduction of habitat complexity based on reduced cover provided by biogenic depressions and sea cucumbers. Observations at another site showed multiple scallop dredge paths resulting in smoothed bedforms. Scallop dredge paths removed cover provided by hydrozoans which reduced local densities of associated shrimp species. Evidence of shell aggregates dispersed by scallop dredge.	Auster et al. (1996)
Sand-silt to mud	Otter trawl with chain sweep and roller gear	Long Island Sound	Diver observations showed doors produced continuous furrows. Chain gear in wing areas disrupted amphipod tube mats and bounced on bottom around mouth of net, leaving small scoured depressions. In areas with drifting macroalgae, the algae draped over grounder of net during tows and buffered effects on the seafloor. Roller gear also created scoured depressions. Spacers between discs lessened impacts.	Smith et al. 1985

Source: Auster and Langton 1998.

Table 34. Studies of short-term impacts of fishing on benthic communities.

Taxa	Gear and Sediment Type	Region	Results	Reference(s)
Infauna	beam trawl; megaripples and flat substrate	Irish Sea, U.K.	Assessed at the immediate effects of beam trawling and found a reduction in diversity and abundance of some taxa in the more stable sediments of the northeast sector of their experimental site but could not find similar effects in the more mobile sediments. Out of the top 20 species 19 had lower abundance levels at the fished site and nine showed a statistically significant decrease. Coefficient of variation for numbers and abundance was higher in the fished area of the NW sector supporting the hypothesis that heterogeneity increases with physical disturbance. Measured a 58% decrease in mean abundance and a 50% reduction in the mean number of species per sample in the sector resulting from removal of the most common species. Less dramatic change in the sector where sediments are more mobile.	Kaiser and Spencer (1996a)
Starfish	beam trawl; coarse sand, gravel and shell, muddy sand, mud	Irish Sea, U.K.	Evaluated damage to starfish at three sites in the Irish sea that experienced different degrees of trawling intensity. Used ICES data to select sites and used side scan to confirm trawling intensity. Found a significant correlation between starfish damage (arm regeneration) and trawling intensity.	Kaiser (1996)
Horse mussels	otter trawl; horse mussel beds,	Strangford Lough; N. Ireland	Used video/rov, side scan and benthic grabs to characterize the effect of otter trawling and scallop dredging on the benthic community. There was special concern over the impact on *Modiolus* beds in the Lough. Plotted the known fishing areas and graded impacts based on a subjective 6 point scale; found significant trawl impacts. Side scan supported video observations and showed areas of greatest impact. Found that in otter trawl areas that the otter boards did the most damage. Side scan suggested that sediment characteristics had changed in heavily trawled areas.	Industrial Science Division. (1990)
Benthic fauna	beam trawl; mobile megaripples structure and stable uniform sediment	Irish Sea, U.K.	Sampled trawled areas 24 hours after trawling and 6 months later. On stable sediment found significant difference immediately after trawling. Reduction in polychaetes but increase in hermit crabs. After six months there was no detectable impact. On megaripples substrate no significant differences were observed immediately after trawling or 6 months later.	Kaiser et al MS 1997

Source: Auster and Langton 1998.

Table 34 (continued). Studies of short-term impacts of fishing on benthic communities.

Taxa	Gear and Sediment Type	Region	Results	Reference(s)
Bivalves, sea scallop, surf clams, ocean quahog	scallop dredge, hydraulic clam dredge; various substrate types	Mid-Atlantic Bight, USA	Submersible study of bivalve harvest operations. Scallops harvested on soft sediment (sand or mud) had low dredge induced mortality for uncaught animals (<5%). Culling mortality (discarded bycatch) was low, approx. 10%. Over 90% of the quahogs that were discarded reburrowed and survived whereas 50% of the surf clams died. Predators crabs, starfish, fish and skates, moved in on the quahogs and clams in the predator density 10 items control area levels within 8 hours post dredging. Noted numerous "minute" predators feeding in trawl tracks. Non-harvested animals, sand dollars, crustaceans and worms significantly disrupted but sand dollars suffered little apparent mortality.	Murawski and Serchuck (1989)
Ocean quahog	hydraulic clam dredge;	Long Island, N.Y., USA	Evaluated clam dredge efficiency over a transect and changed up to 24 hours later. After dredge fills it creates a "windrow of clams". Dredge penetrates up to 30 cm and pushes sediment into track shoulders. After 24 hours track looks like a shallow depression. Clams can be cut or crushed by dredge with mortality ranging from 7 to 92 %, being dependent on size and location along dredge path. Smaller clams survive better and are capable of reburrowing in a few minutes. Predators, crabs, starfish and snails, move in rapidly and depart within 24 hours.	Meyer et al. (1981)
Macro-benthos	scallop dredge; coarse sand	Mercury Bay, New Zealand	Benthic community composed of small short-lived animals at two experimental and adjacent control sites. Sampling before and after dredging and three months later. Dredging caused an immediate decrease in density of common macrofauna. Three months later some populations had not recovered. Immediate post-trawling snails, hermit crabs and starfish were feeding on damaged and exposed animals	Thrush et al. (1995)
Scallops and associated fauna	scallop dredge; "soft sediment"	Port Phillip Bay, Australia	Sampled twice before dredging and three times afterwards, up to 88 days later. The mean difference in species number increased from 3 to 18 after trawling. The total number of individuals increased over the sampling time on both experimental and control primarily as a result of amphipod recruitment, but the number of individuals at the dredged sites were always lower than the control. Dissimilarity increased significantly, as a result of dredging, because of a decrease in species numbers and abundance.	Currie and Parry (1994)

Source: Auster and Langton 1998.

Table 34 (continued). Studies of short-term impacts of fishing on benthic communities.

Taxa	Gear and Sediment Type	Region	Results	Reference(s)
Sea Scallops and associated fauna	otter trawl and scallop dredge; gravel and sand	Gulf of St. Lawrence, Canada	Observed physical change to sea floor from otter doors and scallop dredge and lethal and nonlethal damage to the scallops. Noted an increase in the most active predators within the trawl tracks compared to outside; winter flounder, sculpins and rock crabs. No increase in starfish or other sedentary forms within in an hour of dredging.	Caddy (1973)
Macrofauna	beam trawl; hard-sandy substrate	North Sea, coast of Holland	Sampling before and after beam trawling (*hrs, 16 hrs and 2 weeks) showed species specific changes in macrofaunal abundance. Decreasing density ranged from 10 to 65% for species of echinoderms (starfish and sea urchins but not brittle stars), tube dwelling polychaetes and molluscs at the two week sampling period. Density of some animals did not change others increased but these were not significant after 2 weeks.	Bergman and Hup (1992)
Benthic fauna	beam trawl and shrimp trawl; hard sandy bottom, shell debris and sandy-mud	North Sea, German coast	Preliminary report using video and photographs comparing trawled and untrawled areas. Presence and density of brittle stars, hermit crabs, other "large" crustaceans and flatfish was higher in the controls than the beam trawl site. Difference in sand ripple formation in trawled areas was also noted, looking disturbed not round and well developed. Found a positive correlation with damage to benthic animals and individual animal size. Found less impact with the shrimp trawl, diver observations confirmed low level of impact although the net was "festooned" with worms. Noted large megafauna, mainly crabs, in trawl tracks.	Rumhor et al. (1994)
Soft bottom macrofauna	beam trawl; very fine sand	North Sea, Dutch Sector	Compared animal densities before and after trawling and looked at fish stomach contents. Found that total mortality due to trawling varied between species and size class of fish, ranging from 4 to 139% of pretrawling values. (values> 100% indicate animals moving into the trawled area). Mortality for echinoderms was low, 3 to 19%, undetectable for some molluscs, esp. solid shells or small animals, while larger molluscs had a 12 to 85% mortality. Burrowing crustaceans had low mortality but epifaunal crustaceans approximated 30 % but ranged as high as 74%. Annelids were generally unaffected except for Pectinaria, a tube building animal. Generally mortality increased with number of times the area was trawled (once or twice). Dab were found to be the major savager, immigrating into the area and eating damaged animals.	Santbrink and Bergman (1994)

Source: Auster and Langton 1998.

Table 34 (continued). Studies of short-term impacts of fishing on benthic communities.

Taxa	Gear and Sediment Type	Region	Results	Reference(s)
Hermit Crabs	beam trawl	Irish Sea, U.K.	Compared the catch and diet of two species of hermit crab on trawled and control sites. Found significant increases in abundance on the trawl lines two to four days after trawling for both species but also no change for one species on one of two dates. Found a general size shift towards larger animals after trawling. Stomach contents weight was higher post-trawling for one species. Diets of the crabs were similar but proportions differed.	Ramsey et al. (1996)
Sand macrofauna and infauna	scallop dredge	Irish Sea	Compared experimental treatments based frequency of tows (i.e., 2,4,12,25). Bottom topography changes did not change grain size distribution, organic carbon, or chlorophyll content. Bivalve molluscs and peracarid crustaceans did not show significant changes in abundance or biomass. Polychaetes and urchins showed significant declines. Large molluscs, crustaceans and sand eels were also damaged. In general, there was selective elimination of fragile and sedentary components of the infauna as well as large epifaunal taxa.	Eleftheriou and Robertson (1992)

Source: Auster and Langton 1998.

Table 35. Studies of long-term impacts of fishing on benthic communities.

Habitat Type and Taxa Present	Time Period	Location	Effect	Reference(s)
Sand; macrobenthos and meiofauna	2-7 months	Bay of Fundy	Experimental trawling in high energy area. Otter trawl doors dug up to 5 cm deep and marks were visible for 2 to 7 months. Initial significant effects on benthic diatoms and nematodes but no significant impact on macrofauna. No significant longterm effects.	Brylinsky et al. (1994)
Quartz sand; benthic infauna	5months	South Carolina Estuary	Compared benthic community in two areas, one open to trawling one closed, before and after shrimp season. Found variation with time but no relationship between variations and trawling per se.	Van Dolah et al. (1991)
Sandy; ocean quahogs	----	Western Baltic	Observed otter board damage to bivalves, especially ocean quahogs, and found an inverse relation between shell thickness and damage and a positive correlation between shell length and damage.	Rumhor and Krost (1991)
Subtidal shallows and channel; macrobenthos	100 years	Wadden Sea	Reviewed changes in benthic community documented over 100 years. Considered 101species. No long term trends in changing abundance for 42 common species, with 11 showing considerable variation. Sponges, coelenterates and bivalves suffered greatest losses while polychaetes showed the largest gains. Decrease subtidally for common species from 53 to 44 and increase intertidally from 24 to 38.	Reise (1982)
Intertidal sand; lug worms	4 years	Wadden Sea	Studied impact of lugworm harvesting versus control site. Machine digs 40 cm gullies. Immediate impact is a reduction in several benthic species and slow recovery for some the larger long-lived species like soft shelled clams. With one exception, a polychaete, the shorter-lived macrobenthic animals showed no decline. It took several years for the area to recover to prefishing conditions.	Beukema (1995)
Various habitat types; all species	---	North Sea	Review of fishing effects on the North Sea based primarily on ICES North Sea Task Force reports. Starfish, sea urchins and several polychaetes showed a 40 to 60 % reduction in density after beam trawling but some less abundant animals showed no change and one polychaete increased. At the scale of the North Sea the effect of trawling on the benthos is unclear.	Gislason (1994)

Source: Auster and Langton 1998.

Table 35 (continued). Studies of long-term impacts of fishing on benthic communities.

Habitat Type and Taxa Present	Time Period	Location	Effect	Reference(s)
Sand; macrofauna	73 years	Kattegatt	Compared benthic surveys form 1911-1912 with 1984. Community composition has changed with only approximately 30% similarity between years at most stations. Primary change was a decrease in sea urchins and increase in brittle stars. Animals were also smaller in 1984. Deposit feeders have decreased while suspension feeders and carnivores have increased.	Pearson et al. (1985)
Subtidal shallows and channels; Macrofauna	55 years	Wadden Sea, Germany	Documented increase in mussel beds and associated species such as polychaetes and barnacles when comparing benthic survey data. Noted loss of oyster banks, *Sabellaria* reefs and subtidal sea grass beds. Oysters were overexploited and replaced by mussels; *Zostera* lost to disease. Conclude that major habitat shifts are the result of human influence.	Riesen and Reise (1982)
146 stations; Ocean Quahogs	---	Southern North Sea, Europe	Arctica valves were collected from 146 stations in 1991 and the scars on the valve surface were dated, using internal growth bands, as an indicator of the frequency of beam trawl damage between 1959 and 1991. Numbers of scars varied regionally and temporally and correlated with fishing.	Witbaard and Klein (1994)
Various habitats; Macrofauna	85 years	Western English Channel, UK	Discusses change and causes of change observed in benthic community based on historic records and collections. Discusses effects of fishing gear on dislodging hydroid and bryozoan colonies, and speculates that effects reduce settlement sites for queen scallops.	Holme (1983)
Gravel/sand; Macrofauna	3 years	Central California, USA	Compared heavily trawled area with lightly trawled (closed) area using Smith MacIntyre grab samples and video transect data collected over three years. Trawl tracks and shell debris were more numerous in heavily trawled area, as were amphinomid polychaetes and oligochaetes in most years. Rocks, mounds and flocculent material were more numerous at the lightly trawled station. Commercial fish were more common in the lightly trawled area as were epifaunal invertebrates. No significant differences were found between stations in term of biomass of most other invertebrates.	Engel and Kvitek (MS 1997)
Fine sand; razor clam	----	Barrinha, Southern Portugal	Evaluated disturbance lines in shell matrix of the razor clam and found an increase in number of disturbance lines with length and age of the clams. Sand grains were often incorporated into the shell suggestive of a major disturbance , such as trawling damage, and subsequent recovery and repair of the shell.	Gaspar et al. (1994)

Source: Auster and Langton 1998.

Table 35 (continued). Studies of long-term impacts of fishing on benthic communities.

Habitat Type and Taxa Present	Time Period	Location	Effect	Reference(s)
Fine to medium sand; ocean quahogs	----	Southern New Jersey, USA	Compared areas unfished, recently fished and currently fished for ocean quahogs using hydraulic dredges. Sampled invertebrates with a Smith MacIntyre grab. Few significant differences in numbers of individuals or species were noted, no pattern suggesting any relationship to dredging.	MacKenzie (1982)
Gravel, shell debris and fine mud; Horse mussel community	8 years	Strangford Lough, Northern Ireland	Review paper of effects of queen scallop fishery on the horse mussel community. Compared benthic survey from the 1975-80 period with work in 1988. Scallop fishery began in 1980. *Modiolus* community has remained unchanged essentially from 1857 to 1980. The scallop fishery has a large benthic faunal bycatch, including horse mussels. Changes in the horse mussel community are directly related to the initiation of the scallop fishery and there is concern about the extended period it will take for this community to recover.	Brown (1989)
Shallow muddy sand; scallops	6 months	Maine, USA	Sampled site before, immediately after and up to 6 months after trawling. Loss of surficial sediments and lowered food quality of sediments, measured as microbial populations, enzyme hydrolyzable amino acids and chlorophyll *a*, was observed. Variable recovery by benthic community. Correlation with returning fauna and food quality of sediment.	Watling et al. (MS 1997)
Sand and seagrass; hard shelled clams and bay scallops	4 years	North Carolina, USA	Evaluated effects of clam raking and mechanical harvesting on hard clams, bay scallops, macroinvertebrates and seagrass biomass. In sand, harvesting adults showed no clear pattern of effect. With light harvesting seagrass biomass dropped 25% immediately but recovered in a year. In heavy harvesting seagrass biomass fell 65% and recovery did not start for >2 years and did not recover up to 4 years later. Clam harvesting showed no effect on macroinvertebrates. Scallop densities correlated with seagrass biomass.	Peterson et al. (1987)
Gravel pavement; benthic magafauna	Not known	Northern Georges Bank, USA	Used side scan, video and naturalist dredge sampling to characterize disturbed and undisturbed sites based on fishing activity records. Documented a gradient of community structure from deep, undisturbed to shallow disturbed sites. Undisturbed sites had more individual organisms, greater biomass, greater species richness and diversity and were characterized by an abundant bushy epifauna. Disturbed sites were dominated by hard-shelled molluscs, crabs and echinoderms.	Collie et al. (1997)

Source: Auster and Langton 1998.

Table 35 (continued). Studies of long-term impacts of fishing on benthic communities.

Habitat Type and Taxa Present	Time Period	Location	Effect	Reference(s)
Sand; epifauna	3 year	Grand Banks, Canada	Experimentally trawled site 12 times each year within 31 to 34 hours for three years. Total invertebrate bycatch biomass declined over the three year study in trawls. Epibenthic sled samples showed lower biomass, averaging 25%, in trawled areas than reference sites. Scavenging crabs were observed in trawl tracks after first 6 hours and trawl damage to brittle stars and sea urchins was noted. No significant effects of trawling were found for four dominant species of mollusc.	Prena et al. (MS 1997)
Sand, shrimp and macrobenthos	7 months	New South Wales, Australia	Sampled macrofauna, pretrawling, after trawling and after commercial shrimp season using Smith McIntyre grab at experimental and control sites. Under water observation of trawl gear were also made. No detectable changes in macrobenthos was found or observed.	Gibbs et al. (1980)
Soft sediment; scallops and associated fauna	17 months	Port Phillip Bay, Australia	Sampled 3 months before trawling and 14 months after trawling. Most species showed a 20 to 30% decrease in abundance immediately after trawling. Dredging effects generally were not detectable following the next recruitment within 6 months but some animals had not returned to the trawling site 14 months post trawling.	Currie and Parry (1996)
Bryozoans; fish and associated fauna	----	Tasman Bay, New Zealand	Review of ecology of the coral-like bryozoan community and changes in fishing gear and practices since the 1950s. Points out the interdependence of fish with this benthic community and that the area was closed to fishing in 1980 because gear had developed which could fish in and destroy the benthic community thereby destroying the fishery.	Bradstock and Gordon (1983)
Various habitat types; diverse tropical fauna	5+years, ongoing	North West Shelf, Australia	Describes a habitat dependent fishery and an adaptive management approach to sustaining the fishery. Catch rates of all fish and large and small benthos show that in closed areas fish and small benthos abundance increased over 5 years while large benthos (>25 cm) stayed the same or increased slightly. In trawled areas all groups of animals declined. Found that settlement rate and growth to 25 cm was on the order of 15 years for the benthos.	Sainsbury et al. (In press)

Source: Auster and Langton 1998.

Table 35 (continued). Studies of long-term impacts of fishing on benthic communities.

Habitat Type and Taxa Present	Time Period	Location	Effect	Reference(s)
Mudflat; commercial clam cultivation and benthos	7 months	South-east England	Sampled benthic community on a commercial clam culture site and control area at the end of a two year growing period, immediately after sampling, and again 7 months later. Infaunal abundance was greatest under the clam culture protective netting but species composition was similar to controls. Harvesting with a suction dredge changed the sediment characteristics and reduced the numbers of individual animals and species. Seven months later the site had essentially returned to the unharvested condition.	Kaiser et al. (1996a)
Sand; razor clam and benthos	40 days	Loch Gairloch, Scotland	Compared control and experimentally harvested areas using a hydraulic dredge at 1 day and 40 days after dredging. On day one a non-selective reduction in the total numbers of all infaunal species was apparent but no differences were observed after forty days.	Hall et al. (1990)
Sand and muddy areas; Macro-zoobenthos	3years; ongoing	German Bite, Germany	Investigated macro-zoobenthos communities around a sunken ship that had been "closed" to fishing for three years. Compared this site with a heavily fished area. Preliminary results show an increase in polychaetes and the bivalve Tellina in the fished, sandy, area. The data does not yet allow for a firm conclusion regarding the unfished area but there is some (nonsignificant) increase in species numbers and some delicate, sensitive species occurred within the protected zone.	Arntz et al. (1994)

Source: Auster and Langton 1998.

Table 36. Gear that caught more than 1% of the commercial landings for each of the MAFMC managed species, from Maine to North Carolina, 1997.

Gear	Bluefish	Summer Flounder	Scup	Black Sea Bass	Atlantic Mackerel	*Loligo*	*Illex*	Butterfish	Ocean Quahog	Surfclam	Spiny Dogfish	Tilefish	Total
Haul Seines, Beach	2.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
Lines													
Hand, Other	3.2%	1.9%	22.1%	8.3%	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.1%	0.7%
Troll Other	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%
Long set with	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.4%	86.8%	2.2%
Gill Nets													
Other	37.6%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	17.4%	0.0%	3.9%
Sink, Other	15.8%	0.3%	0.1%	0.2%	1.0%	0.0%	0.0%	0.5%	0.0%	0.0%	65.0%	0.0%	10.7%
Drift, Other	11.9%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.4%	0.0%	0.0%	4.9%	0.0%	1.2%
Pots and Traps													
Floating, Shallow	0.9%	0.5%	3.9%	0.3%	1.5%	1.4%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	0.5%
Fish	0.0%	0.0%	4.5%	54.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%
Lobster, Inshore	0.0%	0.0%	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pound Nets, Fish	4.9%	2.1%	0.4%	0.2%	0.1%	0.1%	0.0%	2.4%	0.0%	0.0%	0.0%	0.0%	0.3%
Pound Nets, Other	0.5%	8.8%	0.0%	0.0%	0.0%	1.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.5%
Otter Trawls													
Bottom Fish	19.0%	84.9%	67.6%	32.6%	92.8%	97.3%	100.0%	94.9%	0.0%	0.0%	7.1%	4.1%	42.1%
Midwater	0.0%	0.0%	0.0%	0.0%	4.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%
Dredge, Surfclam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	36.5%
Unknown	3.7%	1.1%	1.4%	2.1%	0.0%	0.0%	0.0%	0.4%	0.0%	0.0%	0.2%	8.6%	0.4%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: State and Federal reported landings.

Table 37. Designated summer flounder, scup, and black sea bass EFH habitat type classification and proposed fishing gear impacts as adapted from Auster and Langton (1998).

EFH Habitat Type	Impacting Gear	Cited Impact	Habitat Complexity (1-16, 16= most complex)	Quantity of Habitat Type within EFH	Fishing Effort in EFH	Proposed Gear Impacts
pelagic waters	--	--	1	NCM*	NCM*	No impact
demersal waters	--	--	1	NCM*	NCM*	No impact
saltmarsh creeks (cited as subtidal shallows and channels)	not cited	long-term changes in benthic community show no long-term changes in abundance for most species, with losses in coelenterates and bivalves and increases in polychaetes over 100 years; concluded that major habitat shifts over 55 years are a result of human influence	12-16	NCM*	NCM*	Potential Adverse Impact
seagrass beds	scallop dredge, clam rake, clam kicking, trawl, mechanical clam harvesting	25% - 89% reduced seagrass biomass; long-term recovery (in years)	12-16	NCM*	NCM*	Potential Adverse Impact
mudflats	suction dredge	changed sediment characteristics and reduced numbers of species and individuals; site returned to unharvested condition (in months)	1-2	NCM*	NCM*	Potential Adverse Impact
open bay areas (cited as intertidal sand)	lugworm harvesting (digs 40 cm gullies)	reduction of benthic species; slow recovery for long-lived bivalves; most short-lived species showed no decline	2-4	NCM*	NCM*	Potential Adverse Impact
sands (cited as sand-mud, megaripples, flat substrate, sand-silt mud, soft sediment, muddy sand, coarse sand, fine sand, gravel-sand, hard sandy substrate, sandy mud)	otter trawl, scallop dredge, beam trawl, hydraulic clam dredge, shrimp trawl	decrease in epifauna and macrofauna with increase in fishing effort; reduction in diversity and abundance in taxa in stable sediment not in mobile; low dredge and culling mortality of surfclams and ocean quahogs; shift in species; predators move in after fishing; physical damage to species; burial of new recruits; removed sediment smoothed sand waves; flattened topography and mounds; no impact on megaripple in mobile sediments; physical damage to seafloor; sand ripples disturbed; recovery in weeks to months	1-4	NCM*	NCM*	Potential Adverse Impact
mud (cited as sand-silt-mud, soft sediment, muddy sand, mud)	scallop dredge, otter trawl w/chain sweeps and roller gear	decrease in epifauna; disrupted amphipod tube mats; physical damage to organisms; detached macrofauna; flattened topography; evidence of furrows, scour, and depressions; loss of surficial sediments; lowered nutrient quality of sediments; correlation between quality of sediment and recovery of organisms; variable recovery rates in months	1-2	NCM*	NCM*	Potential Adverse Impact

*Not Currently Measured

Table 37 (continued). Designated summer flounder, scup, and black sea bass EFH habitat type classification and proposed fishing gear impacts as adapted from Auster and Langton (1998).

EFH Habitat Type	Impacting Gear	Cited Impact	Habitat Complexity (1-16, 16= complex)	Quantity of Habitat Type within EFH	Fishing effort in EFH	Proposed Gear Impacts
shell and shellfish beds (cited as sand-shell, mussel bed, cobble-shell, horse mussels)	otter trawl, scallop dredge	reduce habitat complexity; smoothed bedforms; removed cover of hydrozoans; reduction in density of species; dispersed shell aggregates; disconnected mussels; reduced epibenthos; shift in species; burial of new recruits; reduction of cover; physical damage to organisms; change in sediment characteristics; changes in community structure	4-8	NCM*	NCM*	Potential Adverse Impact
structured habitat (cited as sponge, gravel-boulder, boulder-gravel, sponge-coral hard bottom, bryozoan bed)	roller rigged trawls, shrimp trawl, otter trawl	reduced density of organisms; damage to organisms; reduced epifauna; removed boulders; reduced density of structural component of habitat	4-15	NCM*	NCM*	Potential Adverse Impact
rough bottom (cited as gravel pavement, gravel-sand-mud, gravel-coarse sand, gravel and shell, gravel and sand)	general fishing, otter trawl scallop dredge, beam trawl	reduction in emergent epifauna; decline in biomass, individuals, species richness, and diversity; predators moved in after fishing; observe physical changes to sea floor; buried gravel below sand; suspension of fine sediment; trawl tracks replaced sediment	5-10	NCM*	NCM*	Potential Adverse Impact

*Not Currently Measured

Table 38. Summer flounder commercial landings ('000 lbs) by state, 1940-1999.

Year	ME	NH	MA	RI	CT	NY	NJ	DE	MD+	VA+	NC	Total
1940	0	0	2,847	258	149	1,814	3,554	3	444	1,247	498	10,814
1941	na	na	na	na	na	na	na	na	183	764	na	947
1942	0	0	193	235	126	1,286	987	2	143	475	498	3,945
1943	0	0	122	202	220	1,607	2,224	11	143	475	498	5,502
1944	0	0	719	414	437	2,151	3,159	8	197	2,629	498	10,212
1945	0	0	1,730	467	270	3,182	3,102	2	460	1,652	1,204	12,297
1946	0	0	1,579	625	478	3,494	3,310	22	704	2,889	1,204	14,305
1947	0	0	1,467	333	813	2,695	2,302	46	532	1,754	1,204	11,146
1948	0	0	2,370	406	518	2,308	3,044	15	472	1,882	1,204	12,219
1949	0	0	1,787	470	372	3,560	3,025	8	783	2,361	1,204	13,570
1950	0	0	3,614	1,036	270	3,838	2,515	25	543	1,761	1,840	15,442
1951	0	0	4,506	1,189	441	2,636	2,865	20	327	2,006	1,479	15,469
1952	0	0	4,898	1,336	627	3,680	4,721	69	467	1,671	2,156	19,625
1953	0	0	3,836	1,043	396	2,910	7,117	53	1,176	1,838	1,844	20,213
1954	0	0	3,363	2,374	213	3,683	6,577	21	1,090	2,257	1,645	21,223
1955	0	0	5,407	2,152	385	2,608	5,208	26	1,108	1,706	1,126	19,726
1956	0	0	5,469	1,604	322	4,260	6,357	60	1,049	2,168	1,002	22,291
1957	0	0	5,991	1,486	677	3,488	5,059	48	1,171	1,692	1,236	20,848
1958	0	0	4,172	950	360	2,341	8,109	209	1,452	2,039	892	20,524
1959	0	0	4,524	1,070	320	2,809	6,294	95	1,334	3,255	1,529	21,230
1960	0	0	5,583	1,278	321	2,512	6,355	44	1,028	2,730	1,236	21,087
1961	0	0	5,240	948	155	2,324	6,031	76	539	2,193	1,897	19,403
1962	0	0	3,795	676	124	1,590	4,749	24	715	1,914	1,876	15,463
1963	0	0	2,296	512	98	1,306	4,444	17	550	1,720	2,674	13,617
1964	0	0	1,384	678	136	1,854	3,670	16	557	1,492	2,450	12,237
1965	0	0	431	499	106	2,451	3,620	25	734	1,977	272	10,115
1966	0	0	264	456	90	2,466	3,830	13	630	2,343	4,017	14,109
1967	0	0	447	706	48	1,964	3,035	0	439	1,900	4,391	12,930
1968	0	0	163	384	35	1,216	2,139	0	350	2,164	2,602	9,053
1969	0	0	78	267	23	574	1,276	0	203	1,508	2,766	6,695
1970	0	0	41	259	23	900	1,958	0	371	2,146	3,163	8,861
1971	0	0	89	275	34	1,090	1,850	0	296	1,707	4,011	9,352
1972	0	0	93	275	7	1,101	1,852	0	277	1,857	3,761	9,223
1973	0	0	506	640	52	1,826	3,091	0	495	3,232	6,314	16,156
1974	0	0	169	2,552	26	2,487	3,499	0	709	3,111	10,028	22,581
1975	0	0	1,768	3,093	39	3,233	4,314	5	893	3,428	9,539	26,311
1976	0	0	4,020	6,790	79	3,203	5,647	3	697	3,303	9,627	33,368
1977	0	0	1,478	4,058	64	2,147	6,566	5	739	4,540	10,332	29,927
1978	0	0	1,439	2,238	111	1,948	5,414	1	676	5,940	10,820	28,586
1979	5	0	1,175	2,825	30	1,427	6,279	6	1,712	10,019	16,084	39,561

Table 38(continued). Summer flounder commercial landings ('000 lbs) by state, 1940-1999.

Year	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA+	NC	Total
1980	4	0	367	1,277	48	1,246	4,805	1	1,324	8,504	13,643	31,216
1981	3	0	598	2,861	81	1,985	4,008	7	403	3,652	7,459	21,056
1982	18	0	1,665	3,983	64	1,865	4,318	8	360	4,332	6,315	22,928
1983	84	0	2,341	4,599	129	1,435	4,826	5	937	8,134	7,057	29,548
1984	2	0	1,488	4,479	131	2,295	6,364	9	813	9,673	12,510	37,765
1985	3	0	2,249	7,533	183	2,517	5,634	4	577	5,037	8,614	32,352
1986	0	0	2,954	7,042	160	2,738	4,017	4	316	3,712	5,924	26,866
1987	8	0	3,327	4,774	609	2,641	4,451	4	319	5,791	5,128	27,052
1988	5	0	2,421	4,719	741	3,439	6,006	7	514	7,756	6,770	32,377
1989	9	0	1,878	3,076	513	1,463	2,862	3	202	3,674	4,206	17,886
1990	3	0	629	1,408	343	405	1,458	2	139	2,147	2,728	9,262
1991	0	0	1,122	1,673	421	731	2,341	4	234	3,713	3,516	13,755
1992	0	0	1,383	2,532	495	1,239	2,871	12	319	5,172	2,576	16,599
1993	6	0	954	1,982	225	844	2,463	0	274	2,968	3,087	12,803
1994	4	0	1,031	2,649	371	1,269	2,356	4	180	3,119	3,574	14,557
1995	5	0	1,128	2,325	319	1,248	2,319	4	175	3,312	4,583	15,418
1996	8	0	801	1,766	319	1,248	2,369	8	266	2,304	4,227	13,316
1997	3	0	745	1,566	257	823	1,321	5	215	2,370	1,501	8,806
1998	6	0	709	1,716	263	823	1,863	11	224	2,616	2,988	11,219
1999	6	0	805	1,637	245	804	1,918	8	234	2,196	2,870	10,723
40-99 Mean	3	0	1,994	1,876	253	2,085	3,860	18	574	3,099	4,066	17,595
40-99 %	0	0	11	11	1	12	22	0	3	18	23	100
90-99 Mean	4	0	931	1,925	326	943	2,128	6	226	2,992	3,165	12,646
90-99 %	0	0	7	15	3	7	17	0	0	24	25	100

na = not available; + = NMFS did not identify flounders to species prior to 1957 for both MD and VA and thus the numbers represent all unclassified flounders.

NOTE: numbers may not total due to rounding.

Source: 1940-1977 USDC 1984; 1978- 1994 unpublished NMFS General Canvass data;1995-1999 Weighout Data.

Table 39. Summer flounder commercial landings by gear, ME-NC, 1990-1999 combined.

Gear	1000 Pounds	Percent
Haul Seines, Beach	50	*
Haul Seines, Long(Danish)	*	*
Trot Lines, with Bait	*	*
Purse Seines, Menhaden	*	*
Pound Nets, Crab	2	*
Otter Trawl Bottom, Crab	1	*
Otter Trawl Bottom, Fish	117,155	93
Otter Trawl Bottom, Scallop	409	*
Otter Trawl Bottom, Shrimp	154	*
Otter Trawl Bottom, Other	257	*
Otter Trawl Midwater	*	*
Trawl Midwater, Paired	80	*
Trawl Bottom, Paired	3	*
Scottish Seine	9	*
Pound Nets, Fish	1,556	1
Pound Nets, Other	39	*
Floating Traps (Shallow)	357	*
Fyke And Hoop Nets, Fish	12	*
Pots and Traps, Combined	*	*
Pots and Traps, Conch	1	*
Pots And Traps, Crab, Blue	2	*
Pots And Traps, Eel	*	*
Pots And Traps, Fish	39	*
Pots And Traps, Lobster Inshore	32	*
Pots And Traps, Lobster Offshore	*	*
Pots and Traps, Turtle	5	*
Pots and Traps, Other	2	*
Pots and Traps, Box Trap	*	*
Gill Nets, Other	78	*
Gill Nets, Sink, Other	304	*
Gill Nets, Shad	*	*
Gill Nets, Drift, Other	38	*
Gill Nets, Drift, Runaround	3	*
Gill Nets, Stake	31	*
Trammel Nets	*	*
Troll and Handline	*	*
Lines Hand, Other	1,155	1
Lines Troll, Other	57	*
Lines Long Set With Hooks	13	*
Dredge, Crab	1	*
Dredge, Clam, Hydraulic	*	*
Dredges, Surf Clam	*	*
Dredges, Conch	4	*
Dredges Scallop, Sea	2,524	2
Tongs and Grabs, Clam	6	*
Unknown Combined Gears	1,715	1
ALL GEAR	126,099	100

* = less than 0.5 %
Source: NMFS Weighout Data.

Table 40. Summer flounder commercial landings by state and gear, 1990-1999 combined.

Gear	ME % of Total	NH % of Total	MA % of Total	RI % of Total	CT % of Total	NY % of Total	NJ % of Total	DE % of Total	MD % of Total	VA % of Total	NC % of Total
Haul Seines, Beach	0	0	0	0	0	*	0	0	*	0.16	*
Haul Seines, Long(Danish)											*
Trot Lines with Bait										*	
Purse Seines, Menhaden							*				
Otter Trawl Bottom, Crab											*
Otter Trawl Bottom, Fish	99.65	93.39	89.26	94.26	68.57	89.3	96.53	0.24	79.61	88.94	99.09
Otter Trawl Bottom, Scallop			*				0.47		*	1.02	*
Otter Trawl Bottom, Shrimp	0.06	6.61	*							*	0.48
Otter Trawl Bottom, Other									6.55	0.36	
Otter Trawl Midwater				*	*						
Trawl Midwater, Paired			0.86								
Trawl Bottom, Paired	0.27		*	*		*					
Scottish Seine			0.1								
Pound Nets, Fish			*	*	0.09	3.07	0.18		4.41	3.75	*
Pound Nets, Other			0.33			0.1					
Floating Traps (Shallow)				1.85							
Fyke And Hoop Nets, Fish				*	*	*		2.37	0.41	*	
Pots and Traps, Combined										*	
Pots and Traps, Conch			*						*		
Pots And Traps, Crab, Blue				*						*	*
Pots And Traps, Eel						*					
Pots And Traps, Fish			0.17	0.09		*	*	0.32	0.03	*	*
Pots And Traps, Lobster Inshore			0.11	*	0.06	*	0.06				
Pots And Traps, Lobster Offshore				*	*		*		*		
Pots and Traps, Turtle											*
Pots and Traps, Other			*								
Pots and Traps, Box Trap										*	
Gill Nets, Other					*	*		25.71	*		0.2
Gill Nets, Sink, Other			0.11	0.73		0.56	0.09	12.56	0.62	0.2	
Gill Nets, Shad									*		
Gill Nets, Drift, Other				*			0.08	7.65	0.24	*	
Gill Nets, Drift, Runaround							*				*
Gill Nets, Stake					*			22.49		0.06	
Trammel Nets							*				
Troll and Hand Lines				*							
Lines Hand, Other			5.3	1.84	1.26	1.6	0.18	28.67	1.1	0.1	*
Lines Troll, Other			*	0.29							*
Lines Long Set With Hooks	*		0.11	*		*	*		*		
Dredges, Surf Clam				*					*		
Dredges, Clam, Hydraulic				*							
Dredges, Conch							*			*	
Dredges, Crab										*	
Dredges Scallop, Sea			3.32	0.56	1.42	*	2.38		*	5.05	*
Tongs and Grabs, Clam										*	
Unknown Combined Gears			0.27	0.27	28.55	5.3	*		6.94	0.26	*
ALL GEAR	99.98	100	99.94	99.89	99.95	99.93	99.97	100.01	99.91	99.9	99.77

* = less than 0.05 % Source: NMFS Weighout data.

Table 41. Summer flounder commercial landings ('000 lbs) by state by month, all gear, 1990-1999 combined.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
ME	6	11	15	9	*	*	*	*	*	*	*	*	41
NH	*	-	-	-	-	-	-	-	-	*	*	*	*
MA	725	427	601	279	499	1,322	2,296	1,270	753	816	172	103	9,263
RI	3,835	2,917	2,269	1,119	1,591	786	696	951	1,480	1,078	1,202	1,329	19,253
CT	414	205	79	48	73	60	122	149	118	21	25	33	1,347
NY	1,102	858	606	606	1,027	607	452	1,180	1,407	678	307	198	9,028
NJ	5,399	1,555	486	209	1,463	931	489	1,291	5,710	2,360	531	854	21,278
DE	-	*	9	12	1	2	2	3	2	1	*	4	36
MD	168	129	137	239	129	139	291	298	269	287	85	89	2,260
VA	9,183	3,940	2,466	1,490	334	239	242	361	661	4,283	3,878	2,838	29,915
NC	9,228	6,038	3,388	1,816	320	114	64	152	534	1,624	2,785	5,586	31,649
Total	30,060	16,080	10,056	5,827	5,437	4,200	4,654	5,655	10,934	11,148	8,985	11,034	124,070
% by month	24.2	13.0	8.1	4.7	4.4	3.4	3.8	4.6	8.8	9.0	7.2	8.9	100.0

Source: NMFS Weighout Data.

Table 42. Commercial and recreational landings of summer flounder ('000 lbs), Maine to North Carolina, 1980-1999.

Year	Comm	Rec	Total	% Comm	% Rec
1980	31,215	38,222	69,437	45.0%	55.0%
1981	21,056	10,081	31,137	67.6%	32.4%
1982	22,928	18,233	41,161	55.7%	44.3%
1983	29,549	27,970	57,518	51.4%	48.6%
1984	37,765	18,765	56,530	66.8%	33.2%
1985	32,353	12,490	44,843	72.1%	27.9%
1986	26,866	17,861	44,727	60.1%	39.9%
1987	27,053	12,167	39,220	69.0%	31.0%
1988	32,377	14,624	47,001	68.9%	31.1%
1989	17,913	3,158	21,071	85.0%	15.0%
1990	9,257	5,134	14,392	64.3%	35.7%
1991	13,754	7,960	21,714	63.2%	36.8%
1992	16,599	7,148	23,746	69.9%	30.1%
1993	12,802	8,831	21,633	59.2%	40.8%
1994	14,558	9,328	23,886	60.9%	39.1%
1995	15,419	5,421	20,840	74.0%	26.0%
1996	12,955	9,820	22,775	56.9%	43.1%
1997	8,807	11,866	20,673	42.6%	57.4%
1998	11,219	12,477	23,696	47.3%	52.7%
1999	10,722	8,366	19,088	56.2%	43.8%
Mean 80-99	20,760	13,240	34,000	38.9%	61.1%
Mean 90-99	12,609	8,635	21,244	40.6%	59.4%

Source: NMFS Weighout Data and MRFSS Data.

Table 43. Summer flounder recreational catch and landings by year, Maine to North Carolina, 1980-1999. The number of fish released is presented as a proportion of the total catch (% Rel).

Year	Catch ('000 fish)	Landings ('000 fish)	Landings ('000 lbs)	Landings Weight (lbs)	% Rel
1980	28,464	22,202	38,222	1.7	22
1981	13,579	9,567	10,081	1.1	30
1982	23,562	15,473	18,233	1.2	34
1983	32,062	20,996	27,970	1.3	35
1984	29,785	17,475	18,765	1.1	41
1985	13,526	11,066	12,490	1.1	18
1986	25,292	11,621	17,861	1.5	54
1987	21,023	7,865	12,167	1.5	63
1988	17,171	9,960	14,624	1.5	42
1989	2,677	1,717	3,158	1.8	36
1990	9,101	3,794	5,134	1.4	58
1991	16,075	6,068	7,960	1.3	62
1992	11,913	5,002	7,148	1.4	58
1993	22,905	6,494	8,831	1.4	72
1994	17,725	6,703	9,328	1.4	62
1995	16,308	3,326	5,421	1.6	80
1996	18,994	6,997	9,820	1.4	63
1997	20,027	7,167	11,866	1.7	64
1998	22,086	6,979	12,477	1.8	68
1999	21,378	4,107	8,366	2.0	81

Source: NMFS Weighout Data.

Table 44. Number of summer flounder recreational fishing trips, recreational harvest limit, and recreational landings from 1990 to 1999.

Year	Number of Fishing Trips[a]	Recreational Harvest Limit (million lb)	Recreational Landings of Summer Flounder (million lb)[b]
1990	3,633,324	None	5.13
1991	4,645,993	None	7.96
1992	3,751,815	None	7.15
1993	4,829,252	8.38	8.83
1994	5,761,918	10.67	9.33
1995	4,742,194	7.76	5.42
1996	5,086,347	7.41	9.82
1997	5,620,055	7.41	11.87
1998	5,296,982	7.41	12.48
1999	4,230,627	7.41	8.37

[a] Number of fishing trips as reported by anglers in the intercept survey indicating that the primary species group sought was summer flounder, North Atlantic, Mid-Atlantic, and South Atlantic regions combined. Estimates are not expanded.
[b] From Maine to North Carolina. Source: MRFSS, Data.

Table 45. Recreational summer flounder landings (in number) by state, 1990-1999.

	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	NC	Total	
1990	0	25,688	31,587	40,720	17,707	975,947	1,460,301	135,538	173,874	420,960	511,263	3,793,585	7.06%
1991	0	1,872	47,237	76,554	65,545	1,009,831	3,034,975	173,395	282,623	1,165,821	209,794	6,067,647	11.29%
1992	0	-	55,828	72,514	109,418	458,211	2,799,076	286,281	321,133	692,865	206,781	5,002,107	9.31%
1993	98	247	136,801	134,501	77,216	1,208,119	323,519	368,014	241,659	711,178	380,682	3,582,034	6.67%
1994	0	59	164,939	174,284	316,007	1,855,451	2,826,431	230,479	81,715	665,152	388,172	6,702,689	12.47%
1995	0	99	105,896	119,533	188,531	579,239	1,303,958	99,608	139,697	639,609	149,546	3,325,716	6.19%
1996	0	-	89,002	357,247	282,054	788,024	3,324,028	480,946	153,580	1,175,389	346,717	6,996,987	13.02%
1997	0	0	220,234	254,024	243,842	1,206,254	3,742,162	201,443	64,226	946,688	287,951	7,166,824	13.34%
1998	-	-	383,447	394,907	261,401	1,230,402	2,728,286	218,933	206,057	1,164,527	391,136	6,979,096	12.99%
1999	0	-	175,457	432,087	215,716	760,828	1,506,723	180,920	226,983	379,048	237,394	4,115,156	7.66%
Total	98	27,965	1,410,428	2,056,371	1,777,437	10,072,306	23,049,459	2,375,557	1,891,547	7,961,237	3,109,436	53,731,841	100.00%
% of Total	0.00%	0.05%	2.62%	3.83%	3.31%	18.75%	42.90%	4.42%	3.52%	14.82%	5.79%	100.00%	

Source: MRFSS Data.

Table 46. Summer flounder recreational landings (a+b1), in number, by distance from shore, Maine through North Carolina, 1990-1999.

YEAR	NORTH ATLANTIC			MID-ATLANTIC			NORTH CAROLINA		
		OCEAN			OCEAN			OCEAN	
	(<= 3 MI)	(> 3 MI)	INLAND	(<= 3 MI)	(> 3 MI)	INLAND	(<= 3 MI)	(> 3 MI)	INLAND
1990	59,729	2,827	53,146	1,125,375	191,766	1,849,480	211,992	188	299,083
1991	40,420	9,210	141,578	2,306,303	191,600	3,168,742	95,321	1,216	113,256
1992	56,798	33,127	147,835	1,675,383	105,521	2,776,661	82,059	2,681	122,040
1993	150,140	22,937	175,796	1,973,039	147,756	3,643,693	139,697	2,415	238,571
1994	141,623	16,426	497,242	1,557,061	213,015	3,889,152	205,294	488	182,390
1995	110,088	20,495	283,476	599,793	113,636	2,048,682	72,566	1,044	75,936
1996	381,098	13,989	333,217	1,871,806	385,680	3,664,481	90,704	2,104	253,909
1997	347,952	32,630	337,518	2,186,456	623,852	3,350,465	79,985	425	207,541
1998	366,636	53,433	619,686	1,025,210	374,116	4,148,879	76,673	433	314,030
1999	307,864	36,413	477,841	876,148	443,759	1,728,178	78,370	326	158,095
90-99 MEAN	196,235	24,149	306,734	1,519,657	279,070	3,026,841	113,266	1,132	196,485
% MEAN	37.23	4.58	58.19	31.49	5.78	62.73	36.43	0.36	63.20

Source: MRFSS Data.

Table 47. Summer flounder recreational landings (a+b1), in number, by fishing mode, Maine through North Carolina, 1990-1999.

YEAR	NORTH ATLANTIC			MID-ATLANTIC			NORTH CAROLINA		
	SHORE	PARTY/ CHARTER	PRIVATE/ RENTAL	SHORE	PARTY/ CHARTER	PRIVATE/ RENTAL	SHORE	PARTY/ CHARTER	PRIVATE/ RENTAL
1990	16,224	799	98,678	95,802	412,429	2,658,390	149,872	14	361,377
1991	9,434	8,375	173,399	505,091	589,002	4,572,552	50,878	231	158,685
1992	25,623	954	211,183	199,947	374,214	3,983,404	49,903	77	156,801
1993	37,490	14,110	297,273	186,643	999,299	4,578,547	118,093	55	262,535
1994	46,806	24,851	583,633	216,969	808,740	4,633,519	183,408	2,772	201,993
1995	19,269	6,991	387,799	173,040	259,517	2,329,554	49,595	841	99,110
1996	22,400	5,051	700,852	134,104	650,526	5,137,337	50,425	4,301	291,991
1997	27,467	21,689	668,945	195,039	907,185	5,058,548	32,560	1,762	253,628
1998	43,772	25,952	970,032	242,872	332,920	4,972,412	29,671	1,904	359,561
1999	33,978	19,376	768,764	156,554	281,221	2,610,310	22,914	211	213,666
90-99 MEAN	28,246	12,815	486,056	210,606	561,505	4,053,457	73,732	1,217	235,935
% MEAN	5.4	2.4	92.2	4.4	11.6	84.0	23.7	0.4	75.9

Source: MRFSS Data

Table 48. The percentage (%) contribution of summer flounder to the total catch by party charter vessels from Maine through North Carolina, 1996-1999 combined.

STATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
CT	0.00	0.00	0.00	0.00	1.07	2.29	3.18	1.97	0.68	0.00	0.00	0.00	1.46
DE				0.02	7.86	12.54	3.92	11.66	6.72	1.74	0.64	0.00	5.77
ME		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.02
MD	0.00	0.00	0.00	0.03	0.31	0.80	0.31	0.26	0.24	0.07	0.01	0.00	0.25
MA	0.00	0.00	0.00	0.00	0.04	0.45	2.38	0.54	0.17	0.03	0.00	0.00	0.56
NH				0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
NJ	0.00	0.00	0.00	0.10	6.19	14.28	22.39	27.03	15.34	4.76	0.22	0.10	12.59
NY	0.00	0.00	0.16	0.46	51.34	54.77	60.69	47.14	17.10	3.29	0.55	0.00	33.54
NC	0.00	0.00	0.00	0.00	1.29	1.26	1.94	1.72	0.19	0.18	0.00		1.32
RI	0.00	0.00	0.00	0.00	1.46	16.14	20.03	1.10	1.36	0.03	0.18	0.00	2.78
VA		0.00	0.00	8.06	1.90	1.65	0.76	1.02	0.43	0.66	4.91	0.00	1.61
Total	0.00	0.00	0.02	0.19	13.74	19.61	23.63	17.57	12.51	3.51	0.49	0.00	13.19

Source: Vessel Trip Report Data.

Table 49. Scup commercial landings ('000 lbs) by year and state.

Year	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	NC	Total
1983	0		1,480	5,693	108	2,431	5,591		28	1,182	665	17,178
1984	.		1,191	6,435	70	1,992	4,886		12	1,484	1,054	17,124
1985	0		853	7,899	90	1,897	3,290		36	163	596	14,824
1986	0		1,364	6,585	146	1,969	4,176		30	600	378	15,248
1987	10		1,165	4,766	663	2,008	4,004		0	512	248	13,376
1988	20		707	6,245	791	1,514	2,940		3	281	138	12,639
1989	70	0	686	3,081	196	1,328	2,682		2	99	33	8,177
1990	9		976	3,938	364	1,664	2,215		9	165	185	9,525
1991	34		749	6,397	633	2,696	4,320		34	123	153	15,139
1992			878	5,900	426	2,298	3,252		37	161	279	13,231
1993		0	653	2,937	228	1,607	4,016		23	160	116	9,740
1994	0		781	3,338	313	1,517	3,209		15	203	306	9,682
1995			684	2,310	197	1,127	2,391	3	2	45	24	6,783
1996	0		962	1,711	219	832	2,515	0	45	158	59	6,501
1997			1,492	1,082	110	830	1,315	0	2	4	1	4,836
1998	0		960	795	98	615	1,671	0	12	9	15	4,175
1999			662	1,281	96	459	796		1	28	0	3,323
83-99 Mean	13	0	955	4,141	279	1,576	3,133	1	17	316	250	10,682
83-99 %	0.12%	0.00%	8.94%	38.77%	2.61%	14.75%	29.34%	0.01%	0.16%	2.96%	2.34%	100.00%
90-99 Mean	9	0	880	2,969	268	1,365	2,570	1	18	106	114	8,298
90-99 %	0.00%	0.00%	10.60%	35.78%	3.23%	16.44%	30.97%	0.01%	0.22%	1.27%	1.37%	100.00%

Source: NMFS Weighout Data.

Table 50. Scup commercial landings, by gear, Maine to Cape Hatteras, North Carolina, 1990-1999 combined.

Gear	1,000 Pounds	Percent
Haul Seines, Beach	5	0.01
Haul Seines, Long(Danish)	*	*
Purse Seines, Menhaden	*	*
Otter Trawl Bottom, Fish	62,225	75.03
Otter Trawl Bottom, Scallop	41	0.05
Otter Trawl Bottom, Shrimp	3	*
Otter Trawl Bottom, Other	46	0.06
Otter Trawl Midwater	13	0.02
Trawl Midwater, Paired	1,083	1.31
Trawl Bottom, Paired	12	0.01
Scottish Seine	10	0.01
Pound Nets, Fish	296	0.36
Pound Nets, Other	513	0.62
Floating Traps (Shallow)	8,204	9.89
Fyke And Hoop Nets, Fish	1	*
Pots And Traps, Conch	18	0.02
Pots And Traps, Crab, Blue	2	*
Pots And Traps, Fish	3,134	3.78
Pots And Traps, Lobster Inshore	252	0.3
Pots And Traps, Lobster Offshore	4	*
Pots And Traps, Other	144	0.17
Gill Nets, Set, Salmon	*	*
Gill Nets, Other	1	*
Gill Nets, Sink, Other	117	0.14
Gill Nets, Drift, Other	19	0.02
Gill Nets, Drift, Runaround	22	0.03
Gill Nets, Stake	*	*
Trammel Nets	1	*
Lines Hand, Other	5,507	6.64
Lines Troll, Other	123	0.15
Lines Long Set With Hooks	184	0.22
Dredge, Surfclam	*	*
Dredges Scallop, Sea	14	0.02
Unknown Combined Gears	941	1.13

* = less than 1%

Source: NMFS Weighout Data.

Table 51. Scup commercial landings, by state and gear type, 1990-1999 combined.

Gear	ME % of Total	NH % of Total	MA % of Total	RI % of Total	CT % of Total	NY % of Total	NJ % of Total	DE % Total	MD % of Total	VA % of Total	NC % of Total
Haul Seines, Beach						0				*	
Haul Seines, Long(Danish)			0								
Purse Seines, Menhaden							0				
Otter Trawl Bottom, Fish	100	100	12.61	65.79	57.82	89.2	99.41		64.11	96.61	99.45
Otter Trawl Bottom, Scallop			0				0.12		0.17	0.68	0.28
Otter Trawl Bottom, Shrimp			0								0.26
Otter Trawl Bottom, Other									24.13	0.28	
Otter Trawl Midwater				*							
Trawl Midwater, Paired			12.01	0.09							
Trawl Bottom, Paired				*		*					
Scottish Seine			0.12								
Pound Nets, Fish			0	*	*	1.94	0.08			0.77	
Pound Nets, Other			5.8			*					
Floating Traps (Shallow)				27.63							
Fyke And Hoop Nets, Fish				0	*	0			0.08		
Pots And Traps, Conch			0.21			0			*		
Pots And Traps, Conch			0.21			0			*		
Pots And Traps, Crab, Blue							0			0.19	
Pots And Traps, Fish			17.92	4.53	5.15	0.09	0.22	97.88	1.71	0.05	
Pots And Traps, Lobster Inshore			*	0.09	0.75	1.5	0				
Pots And Traps, Lobster Offshore			*	0	*	*	0				
Pots And Traps, Other			1.2	0.13		0				0	
Gill Nets, Set, Salmon						0					
Gill Nets, Other					*				*		
Gill Nets, Sink, Other			*	0.27		0.12	*	0.07	1.15	0.47	
Gill Nets, Drift, Other				0			*		5.25	0.26	
Gill Nets, Drift, Runaround							0.09				
Gill Nets, Stake					0			0.07		0	
Trammel Nets							0				
Lines Hand, Other			45.86	1.02	8.68	6.84	*	1.97	1.38	*	
Dredge Surfclam				0							
Dredges Scallop, Sea			0.13	0	0		0			0.21	
Unknown Combined Gears			2.21	0	27.51		*		2	0.06	

Source: NMFS Weighout Data.

Table 52. Distribution (%) of scup commercial landings by month and state, all gear, 1990-1999 combined.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total*
ME	2.91	4.47	43	40.82	0.03	0	0.05	0	0.05	0	1.02	7.65	100
NH	0	0	0	0	0	0	0	0	0		100	0.16	100.16
MA	0.17	0.09	0.15	1.62	23.38	23.36	6.84	11.96	14.08	7.08	2.13	0	90.86
RI	5.48	3.24	4.03	15.02	31.85	3.16	2.01	2.46	2.74	6.01	15.17	8.57	99.74
CT	0.74	0.89	0.5	2.42	2.37	2.07	2.22	3.59	2.75	3.58	3.93	1.75	26.81
NY	6.82	6.15	8.26	13.33	7.53	7.7	5.82	3.97	4.45	7.04	14.82	11.19	97.08
NJ	20.1	25.65	28.26	14.9	0.73	0.03	0.01	0.04	0.18	1.07	2.48	6.54	99.99
DE	0	0	0.07	0.07	0	0	0	0	0	1.89	1.15	0.3	3.48
MD	4.28	12.87	36.03	31.15	0.52	1.34	0.01	0.23	0.62	7.2	0.95	4.79	99.99
VA	12.33	16.71	44.78	18.68	0.61	0.19	0.4	0.52	1.31	1.07	0.59	2.82	100.01
NC	2.74	17.55	43.97	31.66	0.51	0.05	0.02	0.08	0	0.02	0.41	2.99	100
Total	9.95	11.08	13.39	13.74	16.07	5.16	2.58	3.06	3.51	4.72	9.38	7.39	100.00

* Total by state does not include landings with month unknown.

Source: NMFS Weighout Data.

Table 53. Scup commercial and recreational landings ('000 lbs), 1981-1999.

Year	Comm*	Rec	Total	% Comm	% Rec
1981	21,729	5,814	27,543	79	21
1982	19,188	5,206	24,394	79	21
1983	17,184	6,252	23,436	73	27
1984	17,129	2,416	19,545	88	12
1985	14,829	6,093	20,922	71	29
1986	15,252	11,605	27,421	56	42
1987	13,380	6,197	20,051	67	31
1988	12,628	4,267	17,372	73	25
1989	8,192	5,557	14,326	57	39
1990	9,518	4,140	14,224	67	29
1991	15,140	8,087	23,697	64	34
1992	13,184	4,412	18,210	72	24
1993	9,740	3,197	13,613	72	23
1994	9,682	2,628	12,310	79	21
1995	6,783	1,344	8,127	83	17
1996	6,501	2,156	8,657	75	25
1997	4,837	1,198	6,035	80	20
1998	4,174	875	5,049	83	17
1999	3,323	1,886	5,209	64	36
81-99 Mean	11,705	4,386	16,091	73	27
90-99 Mean	8,288	2,992	11,280	73	27

* Commercial landings include additional landings data from Massachusetts.

Source: NMFS Weighout Data and MRFSS Data.

Table 54. Number of scup recreational fishing trips, recreational harvest limit, and recreational landings from 1991 to 1999.

Year	Number of Fishing Trips[a]	Recreational Harvest Limit (million lb)	Recreational Landings of Scup (million lb)[b]
1991	763,284	None	8.09
1992	495,201	None	4.41
1993	252,017	None	3.20
1994	221,074	None	2.63
1995	153,008	None	1.34
1996	145,814	None	2.16
1997	118,266	1.95	1.20
1998	105,283	1.55	0.88
1999	133,703	1.24	1.89

[a]Number of fishing trips as reported by anglers in the intercept survey indicating that the primary species group sought was scup, North Atlantic, Mid-Atlantic, and South Atlantic regions combined. Source: MRFSS, Data.
[b]From Maine to North Carolina.
N/A = Data not available.

Table 55. Recreational scup landings (a+b1; in number), 1990-1999.

YEAR	MA	RI	CT	NY	NJ	DE	MD	VA	NC	Total
1990	1,424,812	1,127,694	656,489	4,211,755	286,670	52,978	52,615	228,806	1,176	8,042,995
1991	3,639,672	2,067,313	2,115,997	4,103,253	786,139	440,195	17,597	101,644	7,276	13,279,086
1992	1,083,700	1,136,255	1,703,070	3,231,503	511,676	20,051	2,700	38,129	37,097	7,764,181
1993		919,826	614,635	1,801,189	99,251	5,090	2,167,121	40,403	15,507	5,663,022
1994	1,043,554	718,486	249,047	1,034,748	1,144,715	33,768	197	19,774	25,953	4,270,242
1995	746,788	691,111	116,856	187,550	639,437	933		31,961	4,393	2,419,029
1996	724,037	879,486	639,222	659,310	62,366	384		3,824	3,577	2,972,206
1997	810,383	286,452	142,669	622,536	44,072	5,837		0	4,484	1,916,433
1998	322,487	234,821	189,812	444,065	10,235	4,685	0	1,202	3,828	1,211,135
1999	1,029,089	718,660	373,943	874,539	251,821	492	2,105	0		3,250,649
Total	10,824,522	8,780,104	6,801,740	17,170,448	3,836,382	564,413	2,242,335	465,743	103,291	50,788,978
% of Total	21.3	17.3	13.4	33.8	7.6	1.1	4.4	0.9	0.2	100.0

Source: MRFSS Data.

Table 56. Scup recreational landings (a+b1; in number), by distance from shore, Maine through North Carolina.

	NORTH ATLANTIC			MID-ATLANTIC			NORTH CAROLINA		
		OCEAN			OCEAN			OCEAN	
YEAR	(<= 3 MI)	(> 3 MI)	INLAND	(<= 3 MI)	(> 3 MI)	INLAND	(<= 3 MI)	(> 3 MI)	INLAND
1990	1,045,278	310,085	1,853,631	1,788,815	353,236	2,690,772	916	0	260
1991	1,407,716	363,483	6,051,783	1,703,760	328,121	3,416,947	6,658	0	617
1992	880,955	120,726	2,921,344	1,161,722	53,503	2,588,834	29,257	345	7,495
1993	618,869	912,241	2,170,471	299,608	47,155	1,599,169	9,108	2,319	4,079
1994	660,064	319,271	1,031,752	212,024	332,049	1,689,128	19,177	3,324	3,452
1995	595,008	334,914	624,832	195,546	455,548	208,787	399	2,442	1,551
1996	695,772	155,853	1,391,121	24,607	41,737	659,541	0	1,726	1,851
1997	465,804	127,078	646,622	4,819	40,124	627,503	2,612	1,872	0
1998	200,578	124,811	421,732	8,685	3,706	447,797	202	3,287	339
1999	605,613	26,684	1,489,396	69,947	253,415	805,596	0	0	0
90-99 MEAN	717,566	279,515	1,860,268	546,953	190,859	1,473,407	7,592	2,188	2,456
% MEAN	25.11	9.78	65.10	24.74	8.63	66.63	62.05	17.88	20.07

Source: MRFSS Data.

Table 57. Scup recreational landings (a+b1, in number), by fishing mode, Maine through North Carolina.

	NORTH ATLANTIC			MID-ATLANTIC			NORTH CAROLINA		
YEAR	SHORE	PARTY/ CHARTER	PRIVATE/ RENTAL	SHORE	PARTY/ CHARTER	PRIVATE/ RENTAL	SHORE	PARTY/ CHARTER	PRIVATE/ RENTAL
1990	322,304	686,131	2,200,559	111,521	616,657	4,104,645	916	0	260
1991	914,936	1,311,293	5,596,754	704,397	938,749	3,805,683	5,795	0	1,480
1992	493,321	232,538	3,197,167	481,041	784,831	2,538,188	29,288	0	7,809
1993	216,184	1,360,916	2,124,482	67,356	401,135	1,477,441	985	407	14,114
1994	75,722	390,826	1,544,538	152,643	524,066	1,556,492	1,558	3,324	21,072
1995	133,903	356,762	1,064,089	88,494	480,628	290,759	0	0	4,393
1996	117,112	335,328	1,790,306	3,483	115,536	606,865	0	750	2,827
1997	117,095	282,815	839,593	24,021	168,216	480,208	251	2,035	2,198
1998	70,818	138,913	537,389	46,239	25,003	388,946	0	1,016	2,813
1999	135,676	431,712	1,554,305	62,201	390,284	676,473	0	0	0
90-99 MEAN	259,707	552,723	2,044,918	174,140	444,511	1,592,570	3,879	753	5,697
% MEAN	9.09	19.34	71.57	7.88	20.10	72.02	37.56	7.29	55.15

Source: MRFSS Data.

Table 58. The percentage (%) contribution of scup to the total catch by party charter vessels, 1996-1999.

STATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
CT	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.04	0.62	0.55	1.30		0.29
DE				0.00	0.00	0.00	0.00	1.54	0.09	0.04	0.00	0.00	0.26
ME	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.01	0.01	5.64	0.00	0.00	0.48
MD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	6.94	1.24	0.28	1.11
MA	0.00	0.00	0.00	0.02	21.55	38.40	14.83	9.17	25.07	19.16	0.04	0.00	16.62
NH				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NJ	1.26	0.75	0.86	0.00	0.02	0.02	0.06	0.31	4.04	19.87	22.81	1.55	5.19
NY	0.00	0.00	0.00	0.00	0.20	0.64	1.41	3.68	34.86	47.70	22.19	2.46	14.64
NC	0.00	0.00	0.00	0.00	0.00	0.08	1.57	2.37	0.03	0.96	0.00	0.00	1.07
RI	0.00	0.00	0.00	0.00	0.00	0.42	9.78	1.12	21.92	35.91	23.39	3.38	5.53
VA		0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.04	0.14	0.00	0.00	0.09
Total	0.83	0.48	0.45	0.00	4.37	5.60	2.00	2.39	14.24	25.06	20.32	1.27	7.80

Source: Vessel Trip Report Data.

Table 59. Commercial landings ('000 lbs) of black sea bass, 1950-1999.

YEAR	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	NC*	Total
1950	0	0	49	327	100	1,898	4,564	2	395	5,311	n/a	12,646
1951	0	0	104	725	61	2,792	5,658	0	321	8,772	n/a	18,433
1952	0	0	134	656	52	1,680	9,207	1	279	9,778	n/a	21,787
1953	0	0	81	459	40	1,096	5,829	0	214	6,657	n/a	14,376
1954	0	0	132	304	60	1,261	5,029	0	166	4,383	n/a	11,335
1955	0	0	141	437	143	936	4,134	0	229	5,291	n/a	11,311
1956	0	0	74	413	24	510	4,207	0	230	6,111	n/a	11,569
1957	0	0	119	334	216	809	3,636	0	205	4,202	n/a	9,521
1958	0	0	81	376	48	842	4,227	0	252	5,730	n/a	11,556
1959	0	0	62	183	37	612	3,739	0	157	3,268	n/a	8,058
1960	0	0	64	210	36	524	2,206	0	128	3,669	n/a	6,837
1961	0	0	51	170	42	313	1,497	0	139	3,211	n/a	5,423
1962	0	0	48	146	30	524	2,621	0	339	4,127	287	8,122
1963	0	0	17	114	29	576	2,812	0	304	4,316	204	8,372
1964	0	0	10	151	28	501	2,195	0	293	3,752	120	7,050
1965	0	0	11	98	24	382	2,146	0	243	4,771	274	7,949
1966	0	0	2	90	19	221	961	0	212	1,886	217	3,608
1967	0	0	6	48	1	110	816	0	154	1,410	n/a	2,545
1968	0	0	9	42	1	67	539	0	124	1,598	259	2,639
1969	0	0	7	34	0	69	392	0	147	1,770	n/a	2,419
1970	0	0	20	55	1	70	308	0	202	1,482	n/a	2,138
1971	0	0	19	39	1	55	308	30	140	658	102	1,352
1972	0	0	40	46	0	44	423	40	228	782	70	1,673
1973	0	0	54	34	1	105	694	80	207	1,282	75	2,532
1974	0	0	132	69	1	98	778	80	237	860	96	2,351
1975	0	0	144	174	4	131	1,176	180	349	1,546	347	4,051
1976	0	0	174	250	4	272	1,464	150	296	822	288	3,720
1977	0	0	104	176	2	232	1,487	220	459	1,696	1,065	5,441
1978	0	0	135	177	6	168	829	160	427	1,762	909	4,573
1979	0	0	137	234	1	123	600	60	356	1,226	682	3,419
1980	0	0	91	162	1	204	471	48	203	975	633	2,788
1981	0	0	132	168	3	123	423	57	203	806	598	2,513
1982	0	0	176	312	3	61	679	80	152	749	413	2,625
1983	7	0	254	674	10	77	856	70	181	1,038	170	3,337
1984	0	0	420	563	12	161	826	84	245	1,392	630	4,333
1985	0	0	312	671	13	132	643	92	221	606	731	3,421
1986	0	0	418	608	4	209	798	178	435	1,044	498	4,192
1987	0	0	323	358	77	246	1,110	196	493	1,205	160	4,168
1988	2	0	477	221	59	121	1,180	132	395	793	725	4,105
1989	4	0	351	208	11	77	841	149	296	648	350	2,935
1990	2	0	436	198	14	72	990	150	343	886	415	3,506
1991	0	0	244	74	9	92	1,034	189	481	499	184	2,806
1992	0	0	43	141	5	112	1,245	194	468	580	221	3,009
1993	0	0	39	222	5	125	1,381	86	362	763	178	3,161
1994	0	0	21	87	4	122	957	70	220	390	169	2,040
1995	0	0	42	89	9	193	797	166	303	363	102	2,064
1996	0	0	40	157	17	260	1,222	166	546	790	162	3,360
1997	0	0	91	178	12	262	705	152	513	506	185	2,604
1998	0	0	281	135	9	136	579	127	315	827	156	2,565
1999	0	0	574	176	15	209	501	168	486	740	106	2,975
50-99 Mean	0	0	139	239	26	400	1,834	71	286	2,355	337	5,586
50-99 %	0.0%	0.0%	2.5%	4.3%	0.5%	7.2%	32.8%	1.3%	5.1%	42.1%	6.0%	100.0%
90-99 Mean	0	0	181	146	10	158	941	147	404	634	188	2,809
90-99 %	0.0%	0.0%	6.4%	5.2%	0.4%	5.6%	33.5%	5.2%	14.4%	22.6%	6.7%	100.0%

*Landings north of Cape Hatteras, NC.
n/a=not available

Table 60. Black sea bass commercial landings by gear, Maine to Cape Hatteras, North Carolina, 1990 - 1999 combined.

Gear	1,000 Pounds	Percent
Unknown Combined Gear	207	0.73
Haul Seines, Beach	1	*
Haul Seines, Long	*	*
Gill Net, Drift, Large Pelagic	*	*
Pots and Traps, Eel	*	*
Pots and Traps, Offshore Wire	*	*
Otter Trawl Bottom, Crab	*	*
Otter Trawl Bottom, Fish	11,353	40.32
Otter Trawl Bottom, Scallop	46	0.16
Otter Trawl Bottom, Shrimp	*	*
Otter Trawl Bottom, Other	18	0.06
Otter Trawl Midwater	*	*
Trawl Midwater, Paired	9	0.03
Trawl Bottom, Paired	*	*
Scottish Seine	*	*
Pound Nets, Fish	23	0.08
Pound Nets, Other	4	0.02
Floating Traps (Shallow)	144	0.51
Pots And Traps, Combined	*	*
Pots And Traps, Conch	24	0.09
Pots And Traps, Crab, Blue	21	0.08
Pots And Traps, Fish	12,878	45.74
Pots And Traps, Lobster Inshore	259	0.92
Pots And Traps, Lobster Offshore	256	0.91
Pots And Traps, Other	204	0.73
Dredges, Crab	*	*
Gill Nets, Sea Bass	8	0.03
Gill Nets, Other	6	0.02
Gill Nets, Sink, Other	105	0.37
Gill Net, Shad	*	*
Gill Nets, Drift, Other	26	0.09
Gill Nets, Drift, Runaround	3	0.01
Gill Nets, Stake	*	*
Trammel Nets	*	*
Troll And Handline	*	*
Lines Hand, Other	2,475	8.79
Lines Troll, Other	20	0.07
Lines Long Set With Hooks	27	0.1
Dip Nets, Common	*	*
Dredge, Surfclam	*	*
Dredges Scallop, Sea	37	0.13

Source: NMFS Weighout Data.

Table 61. Black sea bass commercial landings, by state and gear type, 1990-1999 combined.

Gear	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
Unknown Combined Gears		1.55	*	16.14	0.07	1.36		0.8	*	*
Haul Seines, Beach					0				0	0.05
Haul Seines, Long										0
Gill Net, Drift, Large Pelagic		*	*							
Pots and Traps, Eel			0							
Pots and Traps, Offshore Wire								*		
Otter Trawl Bottom, Crab						0				
Otter Trawl Bottom, Fish	95.02	3.58	79.04	70.32	64.82	41.11		4.01	62.73	55.33
Otter Trawl Bottom, Scallop		0				0.09		0.05	0.55	*
Otter Trawl Bottom, Shrimp										0
Otter Trawl Bottom, Other								0.39	*	
Otter Trawl, Midwater			0							
Trawl Midwater, Paired		0.49								
Trawl Bottom, Paired					*					
Scottish Seine		*								
Pound Nets, Fish			*	0.05	1.35	0		*	0	0
Pound Nets, Other		0.22			*					
Floating Traps (Shallow)			9.91							
Pots And Traps, Combined.			*		0					
Pots And Traps, Conch		0.11			0			0.29	0.16	0
Pots And Traps, Crab, Blue						*			0.33	0
Pots And Traps, Fish		71.3	4.83	3.16	5.76	53.49	96.5	91.53	16.6	7.79
Pots And Traps, Lobster Inshore		*	1.95	1.37	12.02	0.4				
Pots And Traps, Lobster Offshore		0.11	0.56	0.69	2.38	1.92	0.88	0.31	0	
Pots And Traps, Other		9.87	0.06		0			0.41	0.13	
Dredges, Crab						0				
Gill Nets, Sea Bass								0.2		
Gill Nets, Other							*	0		0.28
Gill Nets, Sink, Other	0.65	1.04	0.55	*	0.52	0.09		1.27	0.16	
Gill Net, Shad								0		
Gill Nets, Drift, Other			0	0.21		0.11	*	0.19	0.11	0
Gill Nets, Drift, Runaround						*				
Gill Nets, Stake							0		0	
Trammel Nets						0				
Troll and Handline			0							
Lines Hand, Other		11.15	2.74	7.62	12.62	1.28	2.58	0.53	18.65	35.39
Lines Troll, Other			0.23							0.9
Lines Long Set With Hooks	4.33	0.48	*		0.43	0.05		0	0.05	0.18
Dip Nets, Common										0
Dredges Scallop, Sea		0.05	*	0.42		0.05		0	0.49	0

Source: NMFS Weighout Data.

Table 62. Distribution (%) of black sea bass commercial landings by month and state, all gear, 1990-1999 combined.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
ME	97.78	1.16	0.4					0.65					99.99
NH													
MA	0.08	0.23	0.15	0.15	32.51	31.60	5.72	3.31	8.28	16.33	1.58	0.08	100.02
RI	14.48	12.15	11.09	12.57	12.22	3.53	2.40	3.04	2.97	4.87	11.86	8.83	100.01
CT	14.52	9.68	11.29	8.06	6.45	3.23	3.23	3.23	6.45	9.68	8.06	16.13	100.01
NY	6.83	7.96	8.31	12.46	11.76	9.51	6.06	6.83	5.85	6.69	9.01	8.73	100.00
NJ	10.63	12.22	10.01	7.02	10.02	6.83	4.79	4.49	5.81	9.99	11.04	7.15	100.00
DE	0.37			0.87	15.67	6.97	4.60	2.24	4.73	7.96	13.81	42.79	100.01
MD	0.82	1.21	1.14	3.87	24.18	18.36	12.81	9.94	8.30	8.25	6.47	4.66	100.01
VA	14.39	16.82	22.83	12.93	7.57	3.62	3.07	2.04	2.61	5.67	4.85	3.60	100.00
NC	17.11	18.02	19.46	15.72	4.00	1.55	3.89	6.93	3.09	1.17	3.41	5.65	100.00
Total*	9.67	10.85	11.55	8.62	12.65	8.64	5.51	4.82	5.18	7.89	7.89	6.74	100.01

* = Total by state does not include landings with month unknown.

Source: NMFS Weighout Data.

Table 63. Black sea bass commercial and recreational landings ('000 lbs), 1981-1999.

Year	Comm	Rec	Total	% Comm	% Rec
1981	2,489	1,232	3,721	67%	33%
1982	2,595	9,894	12,489	21%	79%
1983	3,336	4,079	7,415	45%	55%
1984	4,332	1,447	5,779	75%	25%
1985	3,419	2,097	5,516	62%	38%
1986	4,191	12,392	16,583	25%	75%
1987	4,167	1,924	6,091	68%	32%
1988	4,142	2,869	7,011	59%	41%
1989	2,919	3,289	6,208	47%	53%
1990	3,501	2,761	6,262	56%	44%
1991	2,804	4,186	6,990	40%	60%
1992	3,007	2,706	5,713	53%	47%
1993	3,225	4,842	8,067	40%	60%
1994	2,039	2,948	4,987	41%	59%
1995	2,062	6,207	8,269	25%	75%
1996	3,360	3,993	7,353	46%	54%
1997	2,614	4,268	6,882	38%	62%
1998	2,563	1,152	3,715	69%	31%
1999	2,974	1,697	4,671	64%	36%
Total Mean	3,144	3,894	7,038	45%	55%
90-99 Mean	2,815	3,476	6,291	45%	55%

Source: NMFS Weighout Data and MRFSS Data.

Table 64. Number of black sea bass recreational fishing trips, recreational harvest limit, and recreational landings from 1990 to 1999.

Year	Number of Fishing Trips[a]	Recreational Harvest Limit (million lb)	Recreational Landings of BSB (million lb)[b]
1990	863,707	None	4.14
1991	N/A	None	4.19
1992	218,700	None	2.71
1993	296,370	None	4.84
1994	265,402	None	2.95
1995	315,165	None	6.21
1996	282,972	None	4.00
1997	313,052	None	4.27
1998	N/A	3.15	1.15
1999	N/A	3.15	1.70

[a] Number of fishing trips as reported by anglers in the intercept survey indicating that the primary species group sought was summer flounder, North Atlantic, Mid-Atlantic, and South Atlantic regions combined. Estimates are not expanded. Source: MRFSS, Data.
[b] From Maine to North Carolina.

N/A = Data not available.

Table 65. Recreational black sea bass landings (number) by state, 1990-1999.

Year	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	NC	Total
1990	-		31,236	7,865	825	356,918	1,505,745	112,567	494,356	1,343,904	415,334	4,268,750
1991		274	24,976	9,521	1,528	197,611	2,486,662	392,325	640,916	1,446,653	257,634	5,458,100
1992			5,918	12,211	7,990	163,554	1,579,431	195,915	758,596	783,130	362,038	3,868,783
1993			11,379	25,663	10,020	218,764	4,212,362	237,081	593,581	672,354	215,366	6,196,570
1994			6,676	16,769	-	218,184	1,913,993	66,712	273,541	912,975	162,011	3,570,861
1995		-	8,493	41,723	5,196	90,026	3,953,412	209,549	1,498,449	919,636	160,298	6,886,782
1996			16,757	43,232	5,404	78,897	2,320,501	58,878	286,687	799,323	154,603	3,764,282
1997		-	15,960	35,125	1,724	216,891	3,352,953	91,082	372,178	635,559	146,041	4,867,513
1998			7,332	25,637	3,491	12,391	272,808	52,089	354,203	398,010	133,059	1,259,020
1999		-	20,985	25,290	1,583	88,880	449,134	41,462	159,527	536,489	88,493	1,411,843
Total	-	274	149,712	243,036	37,761	1,642,116	22,047,001	1,457,660	5,432,034	8,448,033	2,094,877	41,552,504
% of Total	-	0.0	0.4	0.6	0.1	4.0	53.1	3.5	13.1	20.3	5.0	100.0

Source: MRFSS Data.

Table 66. Black sea bass recreational landings (a+b1), in number, by distance from shore, Maine through North Carolina.

YEAR	NORTH ATLANTIC			MID-ATLANTIC			NORTH CAROLINA		
	(<= 3 MI)	OCEAN (> 3 MI)	INLAND	(<= 3 MI)	OCEAN (> 3 MI)	INLAND	(<= 3 MI)	OCEAN (> 3 MI)	INLAND
1990	11,089	13,575	15,262	517,695	2,551,156	744,638	99,595	282,328	33,410
1991	10,514	1,840	23,945	901,566	3,145,033	1,117,568	97,309	139,602	20,723
1992	9,823	5,411	10,885	747,721	2,232,389	500,515	100,545	237,615	23,878
1993	15,354	7,623	24,084	2,229,831	3,040,787	663,525	70,551	123,438	21,377
1994	16,020	2,692	4,733	213,935	2,581,279	590,192	29,916	109,749	22,345
1995	35,376	11,425	8,611	274,115	5,408,822	988,136	36,370	109,318	14,610
1996	28,480	19,308	17,606	327,398	2,725,230	491,659	14,991	118,302	21,310
1997	10,919	25,578	16,311	320,046	4,065,634	282,981	25,296	91,287	29,457
1998	19,983	4,298	12,178	66,687	970,893	51,920	33,990	80,801	18,268
1999	24,055	6,409	17,395	188,658	975,512	111,322	35,433	43,609	9,451
90-99 MEAN	18,161	9,816	15,101	578,765	2,769,674	554,246	54,400	133,605	21,483
% MEAN	42.16	22.79	35.05	14.83	70.97	14.20	25.97	63.78	10.25

Source: MRFSS Data.

Table 67. Black sea bass recreational landings (a+b1, in number), by fishing mode, Maine through North Carolina.

	NORTH ATLANTIC			MID-ATLANTIC			NORTH CAROLINA		
YEAR	SHORE	PARTY/ CHARTER	PRIVATE/ RENTAL	SHORE	PARTY/ CHARTER	PRIVATE/ RENTAL	SHORE	PARTY/ CHARTER	PRIVATE/ RENTAL
1990	3,957	18,709	17,259	247,229	2,161,489	1,404,772	38,194	88,715	288,425
1991	2,536	1,722	32,041	242,387	2,532,676	2,389,105	5,755	51,750	200,129
1992	0	4,917	21,201	43,108	1,955,178	1,482,339	2,260	83,093	276,685
1993	0	7,584	39,478	48,197	4,529,975	1,355,970	6,479	42,105	166,781
1994	11,513	988	10,943	227,464	1,950,911	1,207,030	4,369	53,989	103,653
1995	2,945	27,467	25,000	262,710	5,103,314	1,305,049	10,325	66,448	83,525
1996	1,176	31,738	32,480	66,113	2,524,677	953,496	3,233	75,319	76,050
1997		28,745	24,064	7,847	3,893,581	767,234	490	28,009	117,542
1998	0	3,459	33,001	5,894	739,958	343,648	1,179	34,457	97,423
1999	363	10,215	37,280	17,390	576,558	681,543	1,477	34,580	52,435
90-99 Mean	2,499	13,554	27,275	116,834	2,596,832	1,189,019	7,376	55,847	146,264
% Mean	5.8	31.3	62.9	3.0	66.5	30.5	3.5	26.7	69.8

Source: MRFSS Data.

Table 68. The percentage (%) contribution of black sea bass to the total catch by party charter vessels, 1996-1999 combined.

STATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
CT	0.00	0.00	0.00	0.00	0.05	0.01	0.02	0.03	0.16	0.13	0.39		0.08
DE				0.00	64.87	32.61	4.40	4.89	24.59	42.57	0.00	0.00	10.73
ME	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.38	0.00	0.00	0.03
MD	0.00	0.00	0.00	7.44	91.16	87.38	15.26	2.30	19.68	80.09	96.59	88.53	38.08
MA	0.00	0.00	0.00	0.00	1.76	1.28	2.44	1.36	2.02	1.25	0.00	0.00	1.39
NH				0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01
NJ	11.13	10.71	5.03	1.45	30.59	28.03	15.39	16.73	38.83	57.97	51.94	14.64	28.74
NY	0.00	0.03	0.01	0.25	4.54	14.41	11.14	18.63	25.57	26.53	35.78	5.91	17.42
NC	0.00	1.84	0.00	22.93	43.97	27.36	39.30	35.17	34.97	24.93	14.55	0.00	32.65
RI	2.62	0.00	0.00	0.01	0.06	0.48	1.08	0.10	1.51	3.22	11.63	12.27	0.77
VA		0.00	0.54	43.14	67.56	17.89	16.31	10.52	85.13	91.19	92.87	89.38	47.37
Total	7.29	6.94	2.69	1.43	18.93	19.45	11.04	9.56	28.39	45.01	49.09	13.08	20.00

Source: Vessel Trip Report Data.

Table 69. Ex-vessel value, nominal price and 2000 adjusted price of summer flounder by year, 1991-2000, ME to NC, all gear combined.

Year	Nominal Value 1,000 $	Nominal Price Mean	Mean Price in constant 2000 $
1991	18,958	1.38	1.57
1992	23,001	1.39	1.57
1993	19,128	1.49	1.67
1994	24,203	1.66	1.83
1995	28,385	1.84	1.96
1996	21,109	1.63	1.69
1997	16,511	1.87	1.95
1998	19,843	1.77	1.89
1999	19,431	1.81	1.92
2000	18,471	1.65	1.65

Table 70. Total ex-vessel value of all finfish and shellfish landings, ex-vessel value of summer flounder, and summer flounder as a percentage of the total ex-vessel value by state, 1999 and 2000.

	1999			2000		
State	Total Ex-vessel Value Flounder ($1,000)	Summer Flounder Ex-vessel Value ($1,000)	Summer Flounder Percent	Total Ex-vessel ($1,000)	Summer Flounder Ex-vessel Value ($1,000)	Summer Value Percent
ME	323,809	17	0.01	354,055	22	0.01
NH	12,542	0	0.00	13,951	0	0.00
MA	260,239	1,620	0.62	288,262	1,444	0.50
RI	79,270	3,768	4.75	72,544	3,800	5.24
CT	38,090	580	1.52	31,227	644	2.06
NY	76,046	1,837	2.42	59,425	1,975	3.32
NJ	97,555	3,040	3.12	107,163	2,604	2.43
DE	6,893	17	0.24	6,707	26	0.39
MD	63,759	472	0.74	53,874	450	0.83
VA	108,253	3,067	2.83	118,336	3,131	2.65
NC	30,689	3,540	11.54	36,739	4,375	11.91
Total	1,097,146	17,958	1.64	1,142,283	18,471	1.62

Table 71. Landings, value, and price of summer flounder by state for 2000, all gear combined.

State	Landings (1,000 lbs)	Value ($1,000)	Price ($/lb)
ME	7	22	3.12
MA	789	1,444	1.83
RI	1,704	3,800	2.23
CT	245	644	2.63
NY	800	1,975	2.47
NJ	1,848	2,604	1.41
DE	12	26	2.14
MD	252	450	1.79
VA	2,207	3,131	1.42
NC	3,354	4,375	1.30
Total	11,217	18,471	1.65

Table 72. Landings, value, and price of summer flounder by month, 1991-2000 averaged, ME-NC, all gear combined.

Month	1,000 Lbs	Value $1,000	Adj. Price ($/lb)
Jan	30,836	45,635	1.48
Feb	18,026	30,954	1.72
Mar	10,185	22,670	2.23
Apr	6,171	13,342	2.16
May	6,040	12,655	2.10
Jun	4,497	10,274	2.28
Jul	5,209	11,615	2.23
Aug	5,741	13,210	2.30
Sep	11,024	17,652	1.60
Oct	10,271	13,751	1.34
Nov	8,645	11,880	1.37
Dec	9,769	17,025	1.74
All	126,416	220,662	1.75

Table 73. Average ex-vessel commercial landings of summer flounder, value and price by month and water area, ME to NC, 1999-2000 combined.

	State (<3 miles)			EEZ (>3 miles)		
Month	Pounds ('000 lbs)	Value ('000 $)	Average Price	Pounds ('000 lbs)	Value ('000 $)	Average Price
Jan	617	1,060	1.72	1,179	2,002	1.70
Feb	247	401	1.62	486	832	1.71
Mar	54	130	2.40	247	388	1.57
Apr	142	304	2.14	27	53	1.99
May	319	603	1.89	10	19	1.88
Jun	279	674	2.41	5	12	2.29
Jul	364	659	1.81	2	3	1.76
Aug	139	290	2.08	0	1	2.38
Sep	200	412	2.06	1	2	1.76
Oct	89	167	1.87	2	3	1.59
Nov	33	57	1.71	1	1	1.68
Dec	129	227	1.76	463	817	1.76
All	2,613	4,983	1.91	2,422	4,131	1.71

Table 74. Landings, ex-vessel value, and price of summer flounder by size category for 2000, ME-NC, all gear combined.

Size Category	Landings (1,000 lbs)	Value ($1,000)	Price ($/lb)
Peewee	<1	1	3.86
Small	18	25	1.40
Medium	4,391	6,124	1.39
Large	4,451	7,441	1.67
Jumbo	1,731	3,581	2.07
Unclassified	626	1,299	2.08

Table 75. Ex-vessel value, nominal price and 2000 adjusted price of scup by year, 1991-2000, ME to Cape Hatteras (NC), all gear combined.

Year	Nominal Value 1,000 $	Nominal Price Mean	Mean Price in constant 2000 $
1991	7,852	0.52	0.59
1992	7,693	0.58	0.66
1993	5,663	0.58	0.65
1994	6,510	0.67	0.74
1995	6,372	0.94	1.00
1996	7,118	1.10	1.14
1997	6,437	1.33	1.38
1998	6,067	1.45	1.55
1999	4,228	1.27	1.35
2000	3,333	1.25	1.25

Table 76. Total ex-vessel value of all finfish and shellfish landings, ex-vessel value of scup, and scup as a percentage of the total ex-vessel value by state, 1999 and 2000.

	1999			2000		
State	Total Ex-vessel Value ($1,000)	Scup Ex-vessel Value ($1,000)	Scup Percent	Total Ex-vessel Value ($1,000)	Scup Ex-vessel Value ($1,000)	Scup Percent
ME	323,809	0	0.00	354,055	0	0.00
NH	12,542	0	0.00	13,951	0	0.00
MA	260,239	774	0.30	288,262	448	0.16
RI	79,270	1,672	2.11	72,544	1,252	1.73
CT	38,090	177	0.47	31,227	175	0.56
NY	76,046	718	0.94	59,425	906	1.52
NJ	97,555	885	0.91	107,163	552	0.52
DE	6,893	0	0.00	6,707	<1	0.00
MD	63,759	<1	0.00	53,874	<1	0.00
VA	108,253	1	0.00	118,336	1	0.00
NC	30,689	<1	0.00	36,739	<1	0.00
Total	1,097,146	4,228	0.39	1,142,283	3,333	0.29

Table 77. Landings, value, and price of scup by state for 2000, all gear combined.

State	Landings (1,000 lbs)	Value ($1,000)	Price ($/lb)
MA	355	448	1.26
RI	1,017	1,252	1.23
CT	142	175	1.23
NY	632	906	1.43
NJ	511	552	1.08
DE	<1	<1	0.33
MD	<1	<1	0.32
VA	1	1	1.22
NC	<1	<1	0.58
Total	2,659	3,333	1.25

Table 78. Landings, value, and price of scup by month, 1991-2000 averaged, ME to Cape Hatteras (NC), all gear combined.

Month	1,000 Lbs	Value $1,000	Adj. Price ($/lb)
Jan	8,157	7,053	0.86
Feb	8,821	6,324	0.72
Mar	9,765	7,280	0.75
Apr	9,869	7,190	0.73
May	11,729	8,475	0.72
Jun	3,841	4,445	1.16
Jul	2,120	3,092	1.46
Aug	2,296	3,623	1.58
Sep	2,704	3,655	1.35
Oct	3,172	3,947	1.24
Nov	6,062	5,361	0.88
Dec	4,969	4,133	0.83
All	73,503	64,579	0.88

Table 79. Average ex-vessel commercial landings of scup, value and price by month and water area, ME to NC, 1999-2000 combined.

	State (<3 miles)			EEZ (>3 miles)		
Month	Pounds ('000 lbs)	Value ('000 $)	Average Price	Pounds ('000 lbs)	Value ('000 $)	Average Price
Jan	3	4	1.29	0	0	0.00
Feb	3	4	1.36	6	5	0.74
Mar	3	4	1.64	<1	<1	1.95
Apr	45	62	1.38	0	0	0.00
May	547	591	1.08	<1	<1	1.20
Jun	229	386	1.68	<1	<1	1.15
Jul	302	470	1.55	0	0	0.00
Aug	264	431	1.63	<1	2	1.87
Sep	281	427	1.52	<1	<1	1.50
Oct	10	22	2.36	<1	<1	2.00
Nov	61	87	1.42	<1	<1	1.16
Dec	4	7	1.82	<1	<1	0.28
All	1,752	2,494	1.42	8	8	0.93

Table 80. Landings, ex-vessel value , and price of scup by size category for 2000, ME to Cape Hatteras (NC), all gear combined.

Size Category	Landings (1,000 lbs)	Value ($1,000)	Price ($/lb)
Pins	<1	<1	0.45
Small	37	40	1.07
Medium	768	845	1.10
Large	1,025	1,386	1.35
Large/Mix	312	335	1.07
Jumbo	90	142	1.58
Unclassified	425	585	1.37

Table 81. Ex-vessel value, nominal price and 2000 adjusted price of black sea bass by year, 1991-2000, ME to Cape Hatteras (NC), all gear combined.

Year	Nominal Value 1,000 $	Nominal Price Mean	Mean Price in constant 2000 $
1991	3,516	1.25	1.43
1992	3,158	1.05	1.19
1993	3,240	1.03	1.14
1994	2,386	1.17	1.29
1995	3,042	1.48	1.57
1996	3,896	1.16	1.20
1997	3,909	1.50	1.56
1998	4,341	1.69	1.81
1999	5,037	1.69	1.79
2000	4,758	1.79	1.79

Table 82. Total ex-vessel value of all finfish and shellfish landings, ex-vessel value of black sea bass, and black sea bass as a percentage of the total ex-vessel value by state, 1999 and 2000.

	1999			2000		
State	Total Ex-vessel Value ($1,000)	Black Sea Bass Ex-vessel Value ($1,000)	Black Sea Bass Percent	Total Ex-vessel Value ($1,000)	Black Sea Bass Ex-vessel Value ($1,000)	Black Sea Bass Percent
ME	323,809	0	0.00	354,055	<1	0.00
NH	12,542	0	0.00	13,951	0	0.00
MA	260,239	961	0.37	288,262	969	0.34
RI	79,270	331	0.42	72,544	190	0.26
CT	38,090	28	0.07	31,227	26	0.08
NY	76,046	453	0.60	59,425	256	0.43
NJ	97,555	781	0.80	107,163	1033	0.96
DE	6,893	275	4.00	6,707	89	1.33
MD	63,759	760	1.19	53,874	475	0.88
VA	108,253	1,195	1.10	118,336	1335	1.13
NC	30,689	456	1.49	36,739	385	1.05
Total	1,097,146	5,240	0.48	1,142,283	4,758	0.42

Table 83. Landings, value, and price of black sea bass by state for 2000, all gear combined.

State	Landings (1,000 lbs)	Value ($1,000)	Price ($/lb)
ME	<1	<1	1.44
MA	626	969	1.55
RI	101	190	1.87
CT	15	26	1.80
NY	135	256	1.90
NJ	587	1,033	1.76
DE	55	89	1.61
MD	305	475	1.56
VA	648	1,335	2.06
NC	185	385	2.08
Total	2,658	4,758	1.79

Table 84. Landings, value, and price of black sea bass by month, 1991-2000 averaged, ME to Cape Hatteras (NC), all gear combined.

Month	Landings (1,000 lbs)	Value ($1,000)	Adjusted Price ($/lb)
Jan	1,963	2,987	1.52
Feb	2,868	3,614	1.26
Mar	3,101	4,107	1.32
Apr	2,301	3,252	1.41
May	3,609	5,013	1.39
Jun	2,311	3,238	1.40
Jul	1,658	2,722	1.64
Aug	1,189	2,012	1.69
Sep	1,263	2,112	1.67
Oct	2,464	3,702	1.50
Nov	1,881	2,857	1.52
Dec	1,692	2,731	1.61
All	26,300	38,346	1.46

Table 85. Average ex-vessel commercial landings of black sea bass, value and price by month and water area, ME to NC, 1999-2000 combined.

	State (<3 miles)			EEZ (>3 miles)		
Month	Landings (1,000 lbs)	Value ($1,000)	Average Price	Landings (1,000 lbs)	Value ($1,000)	Average Price
Jan	<1	2	3.58	<1	2	1.75
Feb	<1	1	2.67	5	7	1.51
Mar	1	2	1.76	3	5	1.43
Apr	1	2	1.32	5	10	2.20
May	185	290	1.57	<1	1	1.76
Jun	117	158	1.35	3	4	1.45
Jul	67	141	2.10	5	10	1.96
Aug	4	8	2.14	12	32	2.60
Sep	2	3	1.28	7	21	3.07
Oct	181	260	1.44	<1	1	1.81
Nov	7	15	2.20	0	0	0.00
Dec	6	9	1.59	0	0	0.00
All	571	890	1.56	41	92	2.22

Table 86. Landings, ex-vessel value , and price of black sea bass by size category for 2000, ME to Cape Hatteras (NC), all gear combined.

Size Category	Landings (1,000 lbs)	Value ($1,000)	Price ($/lb)
Extra Small	<1	<1	1.03
Small	513	536	1.05
Medium	643	948	1.47
Large	833	1,700	2.04
Jumbo	502	1,315	2.62
Unclassified	166	259	1.56

Table 87. Summary of number of vessels holding federal commercial and/or recreational permit combinations for summer flounder, scup, and black sea bass.

Comm. Permit Combinations	Recreational Permit Combinations								
	No. Rec. Permit	FLK Only	SCP Only	FLK/ Scup	BSB Only	FLK/ BSB	SCP/ BSB	FLK/ SCP/ BSB	Row Total
No. Comm. Permit	0	54	12	34	9	66	15	356	546
FLK Only	286	5	4	1	2	0	1	5	304
SCP Only	69	3	0	1	0	3	0	7	83
BSB	96	1	0	0	0	0	1	1	99
FLK/ SCP	178	3	0	6	3	5	2	8	205
FLK/ BSB	40	0	0	0	0	2	1	0	43
SCP/ BSB	172	8	0	1	0	1	2	24	208
FLK/ SCP/ BSB	462	3	1	1	0	0	0	14	481
Column Total	1303	77	17	44	14	77	22	415	1969

Table 88. Other permit year 2000 federal northeast region permits held by summer flounder, scup, and black sea bass commercial and recreational vessels.

	Commercial Only (n= 1,303)		Party/Charter Only (n= 546)		Commercial and Party/Charter (n= 120)	
Northeast Permits	Vessels (No.)	Percent of Total	Vessels (No.)	Percent of Total	Vessels (No.)	Percent of Total
Surfclam	620	47.6	84	15.4	24	20
Ocean Quahog	574	44.1	80	14.7	19	15.8
Scallop	253	19.4	0	0	4	3.3
Non-trap Lobster	594	45.6	8	1.5	10	8.3
Lobster Trap	355	27.2	43	7.9	24	20
Party/ Charter Lobster	2	0.2	14	2.6	2	1.7
Party/ Charter Multi-Species	433	33.2	440	80.6	52	43.3
Comm. Multi-species	711	54.6	63	11.5	52	43.3
Party/ Charter Squid/ Mackerel/ Butterfish	4	0.3	423	77.5	76	63.3
Comm. Squid/ Mackerel/ Butterfish	1071	82.2	220	39.6	86	71.7
Comm. Bluefish	1062	81.5	425	77.8	100	83.3
Party/ Charter Bluefish	14	1.1	84	15.4	88	73.3

Table 89. Top ports of landing (in pounds), based on NMFS 1999 weighout data. Since this table includes only the "top ports," it may not include all of the landings for the year.

PORT	POUNDS FLK	# FLK Vessels	Pounds SCP	# SCP Vessels	Pounds BSB	# BSB Vessels
STONINGTON, CT	188,498		52,799		8,207	
OCEAN CITY, MD	166,866	21	C	C	407,245	27
CHATHAM, MA	24,883	17	78,894	28	166,154	33
NEW BEDFORD, MA	318,553	139	264,495	31	85,143	42
BARNSTABLE, MA	126,224	31	47,083	25	10,758	27
OTHER DUKES, MA	157,619	30	34,376	23	118,436	29
NANTUCKET, MA	117,688	30	0	0	C	C
OTHER MASS	4,349	4	162,007	5	133,270	7
BAYBORO, NC	106,628	4	0	0	C	C
BEAUFORT, NC	576,122	25	0	0	21,317	13
ENGELHARD, NC	361,185	17	0	0	16,722	13
ORIENTAL, NC	312,304	19	0	0	783	6
WANCHESE, NC	1,020,351	53	0	0	85,612	56
VANDEMERE, NC	137,494	7	0	0	C	C
BELFORD, NJ	358,957	19	1,602	15	2,972	28
WILDWOOD, NJ	68,481	6	C	C	60,352	7
CAPE MAY, NJ	740,914	72	644,603	27	277,209	55
PT. PLEASANT, NJ	649,293	39	118,352	24	30,643	43
SEA ISLE CITY, NJ	6,891	5	C	C	107,018	7
FREEPORT, NY	30,012	24	63,675	9	18,825	17
GREENPORT, NY	70,182	22	54,358	14	13,247	14
HAMPTON BAY, NY	328,952	57	159,843	45	64,538	48
MONTAUK, NY	316,141	74	133,484	68	102,809	103
LITTLE COMPTON, RI	70,815	14	214,078	11	11,210	14
NEWPORT, RI	198,165	46	317,833	29	16,353	36
POINT JUDITH, RI	1,147,339	130	671,995	105	137,857	143
TIVERTON, RI	143,506	31	36,966	18	5,026	23
CHINCOTEAGUE, VA	391,248	29	323	5	84,125	24
HAMPTON, VA	719,640	39	C	C	219,437	33
NEWPORT NEWS, VA	887,148	59	C	C	72,343	42
VIRGINIA BEACH, VA	C	C	C	C	362,665	23

C = Confidential

Table 90. Ports with 10% or more revenue dependence on summer flounder, scup, and/or black sea bass, 1999.

Port	State	County	All Species Value ($)	Percent (%) Summer Flounder	Percent (%) Scup	Percent (%) Black Sea Bass	Percent (%) Summer Flounder, Scup, Black Sea Bass Mix
Falmouth	MA	Barnstable	118,464	47.69%	0.59%	0.23%	48.51%
Other Dukes	MA	Dukes	2,196,255	13.36%	2.02%	9.99%	25.37%
Nantucket	MA	Nantucket	510,147	46.22%	-	Confidential	Confidential
Other MA	MA	Not-Specified	2,578,272	0.35%	7.60%	7.37%	15.32%
Little Compton	RI	Newport	1,853,977	6.35%	18.16%	1.36%	25.88%
Newport	RI	Newport	8,740,253	4.97%	4.77%	0.37%	10.12%
Tiverton	RI	Newport	3,807,282	7.94%	1.74%	0.23%	9.90%
New Shoreham	RI	Washington	113,282	39.8%	-	-	39.82%
S. Kingstown	RI	Washington	207,760	Confidential	Confidential	Confidential	Confidential
Westerley	RI	Washington	161,815	Confidential	Confidential	Confidential	Confidential
Clinton	CT	Middlesex	164,988	Confidential	15.78%	0.22%	33.00%
East Lyme	CT	New London	199,495	7.83%	16.32%	0.17%	24.32%
Freeport	NY	Nassau	1,492,839	4.24%	7.12%	2.48%	13.84%
Ammagansett	NY	Suffolk	181,625	Confidential	Confidential	Confidential	Confidential
Hampton Bay	NY	Suffolk	8,471,407	8.33%	2.85%	1.37%	12.54%
Mattituck	NY	Suffolk	233,472	32.78%	11.98%	1.21%	45.97%
Montauk	NY	Suffolk	11,499,567	6.64%	1.76%	2.14%	10.54%
Cape May	NJ	Cape May	22,398,888	4.30%	3.17%	1.90%	9.34%
Sea Isle City	NJ	Cape May	1,646,613	0.73%	Confidential	10.38%	Confidential

Table 90 (continued). Ports with 10% or more revenue dependence on summer flounder, scup, and/or black sea bass, 1999.

Port	State	County	All Species Value ($)	Percent (%) Summer Flounder	Percent (%) Scup	Percent (%) Black Sea Bass	Percent (%) Summer Flounder, Scup, Black Sea Bass Mix
Other Essex	NJ	Essex	906,139	10.47%	-	0.20%	10.66%
Belford	NJ	Monmouth	2,993,513	23.74%	0.08%	0.16%	23.98%
Indian River	DE	Sussex	574,019	Confidential	Confidential	Confidential	Confidential
Lewes	DE	Sussex	119,757	-	-	Confidential	Confidential
Ocean City	MD	Worcester	6,192,175	5.41%	0.01%	9.76%	15.18%
Chincoteague	VA	Accomac	2,138,891	30.00%	0.01%	6.21%	36.21%
Hampton	VA	City of Hampton	8,670,343	10.87%	0.01%	3.69%	14.57%
VA Beach/Lynn Haven	VA	City of VA Beach	4,347,932	0.36%	Confidential	14.60%	Confidential
Atlantic	NC	Carteret	1,003,298	12.14%	-	0.06%	12.20%
Beaufort	NC	Carteret	3,653,821	18.95%	-	1.00%	19.96%
Other Carteret	NC	Carteret	224,897	Confidential	-	Confidential	Confidential
Wanchese	NC	Dare	9,748,684	13.26%	-	2.00%	15.27%
Engelhard	NC	Hyde	4,244,478	10.87%	-	0.71%	11.58%
Bayboro	NC	Pamlico	507,960	24.85%	-	Confidential	Confidential
Lowland	NC	Pamlico	522,277	19.16%	-	-	19.16%
Oriental	NC	Pamlico	3,518,360	11.82%	-	0.04%	11.85%
Vandemere	NC	Pamlico	1,516,704	10.02%	-	0.01%	10.03%

Table 91. Trip expenses (per trip) for small trawlers in the Northeast, whose primary gear was otter trawl, 1996.

	Breakdown of Trip Expenses per Trip								
	Fuel per Trip [a] ($/ trip)	Oil per Trip [a] ($/ trip)	Ice per Trip [a] ($/ trip)	Food, Water per Trip [a] ($/ trip)	Lumpers Fees per Trip [a] ($/ trip)	Supplies per Trip [a] ($/ trip)	Consignment Fees per Trip [a] ($/ trip)	Other Trip Expenses [a] ($/ trip)	Total Operating Costs per Trip in 1996 [a] ($/ trip)
Maximum	454	40	136	75	60	200	250	150	722
Minimum	30	2	2	3	10	2	3	5	30
Range	424	38	134	72	50	198	247	145	692
Mode	100	10	10	10	20	10	- [b]	10	250
Median	100	10	20	20	30	29	40	15	210
Mean	132	14	39	27	33	52	76	38	267
Standard Error of the Mean	16.35	1.82	7.68	3.97	6.09	10.33	26.40	18.12	30.03
Standard Dev.	93.90	10.12	39.17	21.36	18.27	55.64	79.21	51.24	177.64
Skewness	1.99	1.16	1.15	1.00	0.25	1.55	1.57	1.93	1.19
Count	*33*	*31*	*26*	*29*	*9*	*29*	*9*	*8*	*35*
# of Trimmed Responses [a]	*2*	*4*	*2*	*4*	*1*	*2*	*1*	*1*	-

[a] Cost Data were trimmed to exclude unusual values (i.e. values greater or lower than the Mean o 1 standard deviation respectively).

[b] In cases where all values reported were distinct, there is no modal value; we then report this as blank ("-"). The proper interpretation of such a ("-") cell is that all values within tha range are equally likely.

Source: Lallemand et al. 1998.

Table 92. Trip expenses (per day) for small trawlers in the Northeast, whose primary gear was otter trawl, 1996.

	Breakdown of Trip Expenses per Day								
	Fuel per day [a] ($/ day)	Oil per day [a] ($/ day)	Ice per day [a] ($/ day)	Food, Water per day [a] ($/ day)	Lumpers Fees per day [a] ($/ day)	Supplies Per day [a] ($/ day)	Consignment Fees per day [a] ($/ day)	Other Trip Expenses per day [a] ($/ day)	Total Operating Costs per day in 1996 [a] ($/ day)
Maximum	160	25	60	56	40	100	82	80	304
Minimum	50	3	3	3	10	2	16	5	101
Range	110	22	57	53	30	98	65	75	203
Mode	100	10	10	10	20	10	- [b]	- [b]	255
Median	100	10	20	20	20	23	45	15	190
Mean	97	11	26	23	23	33	48	26	191
Standard Error of the Mean	4.77	1.10	3.79	2.79	3.82	5.68	7.71	9.35	10.56
Standard Dev.	25.69	5.93	18.56	15.27	10.11	28.95	21.81	26.44	58.78
Skewness	0.39	1.10	0.50	0.65	0.75	1.07	0.25	1.63	0.19
Count	29	29	24	30	7	26	8	8	31
# of Trimmed Responses [a]	6	6	4	3	3	5	2	1	4

[a] Cost Data were trimmed to exclude unusual values (i.e. values greater or lower than the Mean o 1 standard deviation respectively).

[b] In cases where all values reported were distinct, there is no modal value; we then report this as blank ("-"). The proper interpretation of such a ("-") cell is that all values within the range are equally likely.

Source: Lallemand et al. 1998.

Table 93. Trip expenses (per year) for small trawlers in the Northeast, whose primary gear was otter trawl, 1996.

	Breakdown of Trip Expenses per Year								
	Fuel Per year [a] ($/ year)	Oil per year [a] ($/ year)	Ice Per year [a] ($/ year)	Food, Water per year [a] ($/ year)	Lumpers Fees per year [a] ($/ year)	Supplies Per year [a] ($/ year)	Consignment Fees per year [a] ($/ year)	Other Trip Expenses per year [a] ($/ year)	Total Operating Costs per year in 1996 [a] ($/ year)
Maximum	36,000	4,980	8,410	11,832	8,960	17,500	14,790	18,560	65,000
Minimum	6,930	288	231	385	2,145	154	4,290	770	11,328
Range	29,070	4,692	8,179	11,447	6,815	17,346	10,500	17,790	53,672
Mode	13,930	1,990	1,990	2,490	- [b]	1,990	- [b]	- [b]	40,670
Median	15,600	1,550	2,940	3,000	3,980	3,638	9,730	2,818	33,824
Mean	17,368	1,862	3,392	4,300	4,635	6,281	9,628	5,200	34,317
Standard Error of the Mean	1,310.44	242.09	514.60	602.01	935.62	1,068.85	1,528.99	2,245.47	2,292.18
Standard Dev.	7,056.95	1,347.92	2,467.91	3,351.85	2,475.41	5,655.82	3,745.24	6,351.14	12,762.35
Skewness	1.07	0.96	0.65	0.83	0.93	0.89	-0.08	1.75	0.19
Count	29	31	23	31	7	28	6	8	31
# of Trimmed Responses [a]	6	4	5	2	3	3	4	1	4

[a] Cost Data were trimmed to exclude unusual values (i.e. values greater or lower than the Mean o 1 standard deviation respectively).

[b] In cases where all values reported were distinct, there is no modal value; we then report this as blank ("-"). The proper interpretation of such a ("-") cell is that all values within the range are equally likely.

Source: Lallemand et al. 1998

Table 94. Number of trips by month for small trawlers in the Northeast, whose primary gear was otter trawl, 1996.

	Number of Trips by month												
	January	February	March	April	May	June	July	August	September	October	November	December	Total number of Trips in 1996
Maximum	25.0	25.0	20.0	20.0	30.0	25.0	28.0	25.0	25.0	25.0	21.0	25.0	250.0
Minimum	1.0	1.5	2.0	2.0	2.0	1.0	1.0	2.0	2.0	1.0	1.0	1.0	22.0
Range	24.0	23.5	18.0	18.0	28.0	24.0	27.0	23.0	23.0	24.0	20.0	24.0	228.0
Mode	15.0	12.0	10.0	20.0	20.0	25.0	20.0	20.0	20.0	20.0	15.0	15.0	200.0
Median	11.0	11.0	12.0	13.5	19.0	16.0	20.0	20.0	19.0	15.0	13.0	12.0	166.0
Mean	11.3	11.4	11.9	12.7	15.1	15.7	15.9	16.4	15.2	13.9	12.3	11.6	150.0
Standard Error of the Mean	1.18	1.18	0.97	1.07	1.40	1.36	1.42	1.35	1.44	1.30	1.13	1.02	11.16
Standard Dev.	6.58	6.49	5.31	6.26	8.04	8.07	8.27	7.65	8.03	7.22	6.27	5.97	66.01
Skewness	0.33	0.42	(0.26)	(0.40)	(0.37)	(0.38)	(0.52)	(0.63)	(0.44)	(0.47)	(0.40)	(0.16)	(0.45)
Count	31	30	30	34	33	35	34	32	31	31	31	34	35

Source: Lallemand et al. 1998.

Table 95. Days absent by month for small trawlers in the Northeast, whose primary gear was otter trawl, 1996.

	Days Absent by month												
	January	February	March	April	May	June	July	August	September	October	November	December	Total Day Absent in 1996
Maximum	25.0	25.0	20.0	30.0	30.0	25.0	28.0	25.0	25.0	25.0	21.0	25.0	257.5
Minimum	1.0	2.0	4.0	3.0	2.0	3.0	(1.0)	2.0	3.0	3.0	2.0	1.0	22.0
Range	24.0	23.0	16.0	27.0	28.0	22.0	29.0	23.0	22.0	22.0	19.0	24.0	235.5
Mode	15.0	12.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	15.0	15.0	200.0
Median	12.0	12.0	13.5	15.0	20.0	20.0	20.0	20.0	20.0	18.0	15.0	14.5	193.0
Mean	12.2	12.3	13.0	14.7	17.6	17.9	17.6	18.7	17.5	16.2	14.3	12.7	170.3
Standard Error of the Mean	1.05	1.05	0.80	1.04	1.22	1.03	1.27	1.00	1.08	1.05	0.96	0.90	9.75
Standard Dev.	5.83	5.78	4.37	6.09	7.02	6.11	7.42	5.64	6.00	5.84	5.34	5.23	57.68
Skewness	0.39	0.52	(0.11)	(0.10)	(0.63)	(0.58)	(1.10)	(0.98)	(0.74)	(0.86)	(0.76)	(0.33)	(0.81)
Count	31	30	30	34	33	35	34	32	31	31	31	34	35

Source: Lallemand et al. 1998.

Table 96. Steaming time by month for small trawlers in the Northeast, whose primary gear was otter trawl, 1996.

	Estimated Total Steaming Time by month (in hours)												
	January	February	March	April	May	June	July	August	September	October	November	December	Total Steaming Time (hrs) in 1996
Maximum	104.0	104.0	100.0	140.0	200.0	252.0	168.0	150.0	168.0	120.0	252.0	208.0	1,452.0
Minimum	2.0	2.0	4.0	3.0	1.5	3.0	(2.0)	3.0	2.5	3.5	2.0	1.0	27.0
Range	102.0	102.0	96.0	137.0	198.5	249.0	170.0	147.0	165.5	116.5	250.0	207.0	1,425.0
Mode	24.0	40.0	30.0	20.0	30.0	25.0	20.0	24.0	40.0	30.0	30.0	30.0	204.0
Median	24.0	25.0	30.0	27.0	30.0	30.0	30.0	31.0	32.0	30.0	26.0	24.0	307.5
Mean	30.7	31.5	33.4	39.2	45.6	47.0	45.6	46.6	45.9	38.1	42.1	37.6	446.0
Standard Error of the Mean	4.07	4.33	4.20	5.64	8.34	8.79	7.65	7.32	7.37	5.72	9.89	7.51	64.99
Standard Dev.	22.65	23.71	23.01	32.91	47.91	52.02	44.62	41.42	41.05	31.85	55.06	43.77	384.48
Skewness	2.10	1.90	1.40	1.66	2.06	2.39	1.47	1.26	1.64	1.30	2.89	2.75	1.46
Count	31	30	30	34	33	35	34	32	31	31	31	34	35

Source: Lallemand et al. 1998.

Table 97. Trip expenses (per trip) for large trawlers in the Northeast, whose primary gear was otter trawl, 1997.

	Breakdown of Trip Expenses per Trip								
	Fuel per Trip [a] ($/ trip)	Oil per Trip [a] ($/ trip)	Ice per Trip [a] ($/ trip)	Food, Water per Trip [a] ($/ trip)	Lumpers Fees per Trip [a] ($/ trip)	Supplies per Trip [a] ($/ trip)	Consignment Fees per Trip [a] ($/ trip)	Other Trip Expenses [a] ($/ trip)	Total Operating Costs per Trip in 1997 [a] ($/ trip)
Maximum	2,164	182	513	550	600	1,000	351	500	4,468
Minimum	507	25	184	205	13	141	115	15	1,090
Range	1,657	156	329	345	587	859	236	485	3,378
Mode	- [b]	- [b]	227	- [b]	- [b]	- [b]	- [b]	- [b]	- [b]
Median	1,440	78	300	360	265	526	189	100	2,490
Mean	1,369	84	333	372	257	528	224	137	2,608
Standard Error of the Mean	194.31	15.17	39.69	42.67	45.62	100.01	50.97	64.53	311.23
Standard Dev.	614.46	47.98	131.62	134.95	158.02	331.70	113.97	170.73	1,078.12
Skewness	(0.27)	0.86	0.34	0.03	0.57	0.17	0.36	2.04	0.24
Count	10	10	11	10	12	11	5	7	12
# of Trimmed Responses [a]	5	3	5	6	1	4	2	2	4

[a] Cost Data were trimmed to exclude unusual values (i.e. values greater or lower than the Mean o 1 standard deviation respectively).

[b] In cases where all values reported were distinct, there is no modal value; we then report this as blank ("-"). The proper interpretation of such a ("-") cell is that all values within the range are equally likely.

Source: Lallemand et al. 1999.

Table 98. Trip expenses (per day) for large trawlers in the Northeast, whose primary gear was otter trawl, 1997.

	Breakdown of Trip Expenses per Day								
	Fuel per day [a] ($/ day)	Oil per day [a] ($/ day)	Ice per day [a] ($/ day)	Food, Water per day [a] ($/ day)	Lumpers Fees per day [a] ($/ day)	Supplies Per day [a] ($/ day)	Consignment Fees per day [a] ($/ day)	Other Trip Expenses per day [a] ($/ day)	Total Operating Costs per day in 1997 [a] ($/ day)
Maximum	384	25	94	92	69	175	67	65	760
Minimum	260	13	40	42	12	35	6	4	144
Range	124	12	54	50	57	140	60	62	617
Mode	- [b]	- [b]	- [b]	- [b]	- [b]	- [b]	- [b]	- [b]	- [b]
Median	341	20	58	56	40	85	31	25	481
Mean	332	21	62	60	42	95	32	24	472
Standard Error of the Mean	11.42	1.59	5.65	5.03	5.19	14.09	8.58	8.25	51.94
Standard Dev.	37.86	4.22	17.87	16.68	17.99	48.80	21.02	21.83	201.17
Skewness	(0.64)	(0.74)	0.90	1.32	0.01	0.42	0.68	1.19	(0.39)
Count	11	7	10	11	12	12	6	7	15
# of Trimmed Responses [a]	4	6	6	5	1	3	1	2	1

[a] Cost Data were trimmed to exclude unusual values (i.e. values greater or lower than the Mean o 1 standard deviation respectively).

[b] In cases where all values reported were distinct, there is no modal value; we then report this as blank ("-"). The proper interpretation of such a ("-") cell is that all values within the range are equally likely.

Source: Lallemand et al. 1999.

Table 99. Trip expenses (per year) for large trawlers in the Northeast, whose primary gear was otter trawl, 1997.

	Breakdown of Trip Expenses per Year								
	Fuel Per year [a] ($/ year)	Oil per year [a] ($/ year)	Ice Per year [a] ($/ year)	Food, Water per year [a] ($/ year)	Lumpers Fees per year [a] ($/ year)	Supplies Per year [a] ($/ year)	Consignment Fees per year [a] ($/ year)	Other Trip Expenses per year [a] ($/ year)	Total Operating Costs per year in 1997 [a] ($/ year)
Maximum	81,600	5,500	19,000	19,000	17,200	34,000	12,286	12,000	202,640
Minimum	53,215	2,600	6,000	7,000	1,500	3,800	1,500	800	61,248
Range	28,385	2,900	13,000	12,000	15,700	30,200	10,786	11,200	141,392
Mode	- [b]	3,000	9,000	12,000	- [b]	20,000	- [b]	- [b]	- [b]
Median	76,000	4,000	10,000	12,000	7,250	15,030	4,457	3,500	127,550
Mean	71,728	4,082	11,251	12,983	7,806	16,372	5,783	4,286	132,136
Standard Error of the Mean	3,829.29	375.70	1,146.56	1,168.66	1,151.51	2,376.98	1,664.42	1,484.86	13,630.49
Standard Dev.	10,830.87	1,127.10	4,133.97	3,876.00	3,988.96	8,570.33	4,076.97	3,928.57	47,217.41
Skewness	-0.85	0.09	0.60	0.31	1.03	0.77	0.89	1.42	0.08
Count	8	9	13	11	12	13	6	7	12
# of Trimmed Responses [a]	7	4	3	5	1	2	1	2	4

[a] Cost Data were trimmed to exclude unusual values (i.e. values greater or lower than the Mean o 1 standard deviation respectively).

[b] In cases where all values reported were distinct, there is no modal value; we then report this as blank ("-"). The proper interpretation of such a ("-") cell is that all values within the range are equally likely.

Source: Lallemand et al. 1999.

Table 100. Number of trips by month for large trawlers in the Northeast, whose primary gear was otter trawl, 1997.

	Number of Trips by month												
	January	February	March	April	May	June	July	August	September	October	November	December	Total number of Trips in 1997
Maximum	20.0	20.0	16.0	16.0	25.0	28.0	28.0	30.0	22.5	20.0	20.0	20.0	217.5
Minimum	2.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	19.0
Range	18.0	18.0	15.0	15.0	24.0	27.0	27.0	29.0	21.5	19.0	19.0	19.0	198.5
Mode	2.0	2.0	6.0	4.0	2.0	1.0	2.0	2.0	2.0	5.0	2.0	3.0	19.0
Median	4.0	4.0	5.0	4.0	4.5	4.0	4.0	4.0	3.3	4.0	3.8	3.0	47.5
Mean	5.3	5.3	5.0	4.7	7.9	8.0	8.6	7.7	6.5	5.8	5.1	5.7	71.8
Standard Error of the Mean	0.93	0.91	0.67	0.74	1.51	1.91	1.86	1.81	1.37	1.15	0.99	1.15	11.68
Standard Dev.	4.58	4.48	3.29	3.61	7.40	9.36	9.11	8.85	6.70	5.63	4.86	5.65	57.21
Skewness	2.33	2.33	1.84	1.89	1.02	1.32	1.11	1.62	1.51	1.87	2.03	1.68	1.12
Count	24	24	24	24	24	24	24	24	24	24	24	24	24

Source: Lallemand et al. 1999.

Table 101. Days absent by month for large trawlers in the Northeast, whose primary gear was otter trawl, 1997.

	Days Absent by month												
	January	February	March	April	May	June	July	August	September	October	November	December	Total Day Absent in 1997
Maximum	28.0	28.0	28.0	26.0	28.0	28.0	28.0	30.0	28.0	30.0	28.0	28.0	278.0
Minimum	3.8	0.4	5.1	2.0	4.0	1.1	7.0	7.0	3.8	8.8	2.0	2.0	107.0
Range	24.2	27.6	22.9	24.0	24.0	26.9	21.0	23.0	24.2	21.2	26.0	26.0	171.0
Mode	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	240.0
Median	15.5	18.6	17.0	16.0	18.0	20.0	19.9	17.8	17.2	18.0	14.8	14.9	184.3
Mean	15.8	17.6	16.7	15.5	17.0	16.9	18.6	17.4	16.1	17.3	14.6	14.7	188.4
Standard Error of the Mean	1.31	1.13	1.16	1.24	1.28	1.54	1.06	1.26	1.34	1.20	1.36	1.22	10.41
Standard Dev.	6.44	5.54	5.69	6.10	6.26	7.55	5.20	6.16	6.56	5.86	6.66	5.98	50.98
Skewness	(0.14)	(1.19)	(0.31)	(0.41)	(0.31)	(0.41)	(0.17)	0.06	(0.31)	0.41	(0.16)	(0.11)	0.14
Count	24	24	24	24	24	24	24	24	24	24	24	24	24

Source: Lallemand et al. 1999.

Table 102. Steaming time by month for large trawlers in the Northeast, whose primary gear was otter trawl, 1997.

	Estimated Total Steaming Time by month (in hours)												
	January	February	March	April	May	June	July	August	September	October	November	December	Total Steaming Time (hrs) in 1997
Maximum	210.0	364.5	268.6	302.5	320.0	374.9	520.0	255.5	418.3	185.5	177.8	264.0	2,292.1
Minimum	36.0	4.9	8.0	8.0	20.0	17.2	16.0	26.0	7.5	12.1	8.0	8.0	412.0
Range	174.0	359.6	260.6	294.5	300.0	357.8	504.0	229.5	410.8	173.4	169.8	256.0	1,880.1
Mode	120.0	-[a]	60.0	60.0	80.0	-[a]	-[a]	60.0	60.0	80.0	90.0	100.0	-[a]
Median	99.9	103.5	102.0	85.0	85.6	70.0	77.6	60.0	70.0	80.0	80.0	87.5	1,183.2
Mean	108.5	126.7	107.9	106.7	105.7	96.2	148.0	94.2	100.5	78.6	81.1	84.3	1,170.0
Standard Error of the Mean	11.07	18.41	12.86	15.96	14.02	18.80	30.85	14.31	20.18	8.60	8.98	11.47	111.79
Standard Dev.	51.93	88.27	62.99	76.54	68.69	86.14	141.39	68.63	94.67	41.27	43.99	55.01	547.64
Skewness	0.41	1.33	0.84	1.02	1.62	2.01	1.39	1.27	2.28	0.78	0.56	1.64	0.37
Count	22	23	24	23	24	21	21	23	22	23	24	23	24

[a] In cases where all values reported were distinct, there is no modal value; we then report this as blank ("-"). The proper interpretation of such a ("-") cell is that all values within the range are equally likely.

Source: Lallemand et al. 1999.

Table 103. Estimated average annual operating costs for pot and trap vessels in 2000.

Expenditure Category	Average Annual Expense ($'s)
Boat Repair and Maintenance - By Yard	576.14
Boat Repair and Maintenance - By Owner	3,445.63
Supplies (Store)	3,105.36
Food	1,240.83
Gear Maintenance (Normal Use)	4,162.50
Fuel and Lubricants	6,506.27
Vehicles	3,435.71

Source: University of Rhode Island lobster simulator data less bait expenditures.

Table 104. National economic impacts of total flounder and summer flounder commercial fishing in the Mid-Atlantic region. (Employment in person-years and income/output in $1000.)

	Total Flounders			Summer Flounder		
	Employment	Income	Output	Employment	Income	Output
Harvest	368	6,154	14,547	309	5,169	12,219
Processing	379	3,408	15,855	318	2,863	13,318
Distribution	93	1,815	3,378	78	1,525	2,838
Food Service	1,660	11,742	20,983	1,394	9,863	17,626
Retail	225	2,558	5,026	189	2,149	4,222
Cumulative	2,726	2,5677	59,789	2,290	21,569	50,223

Sources: Total flounders from National Fisheries Education and Research Foundation 1989. Summer flounder estimates were modified by unpublished NMFS General Canvass data.

Table 105. Summer flounder caught, landed, and released alive by recreational anglers, Maine to North Carolina, 1991-2000.

Year	Catch[a] (1,000 Fish)	Landings[b] (1,000 Fish)	Landings (1,000 lbs)	Percent of Catch Released Alive
1991	16,075	6,068	7,960	38.00
1992	11,910	5,002	7,148	42.00
1993	22,904	6,494	8,831	28.00
1994	17,725	6,703	9,327	38.00
1995	16,308	3,326	5,421	20.00
1996	18,994	6,997	9,820	37.00
1997	20,027	7,167	11,866	36.00
1998	22,086	6,979	12,477	32.00
1999	21,378	4,107	9,104	20.00
2000	24,445	7,494	15,816	31.00
AVG	19,185	6,034	9,777	32.00

[a] - MRFSS Type A, B1, and B2 catch
[b] - MRFSS Type A and B1 catch

Source: Personal communication from the National Marine Fisheries Service, Fisheries Statistics and Economics Division.

Table 106. The percent of summer flounder landed by weight by marine recreational fishermen in state waters and the EEZ along the North and Mid-Atlantic coast.

Subregion	Year	State	EEZ
North Atlantic	1991	95	5
	1992	84	16
	1993	94	6
	1994	97	3
	1995	95	5
	1996	98	2
	1997	94	6
	1998	94	6
	1999	96	4
	2000	93	7
	AVG	94	6
Mid-Atlantic (includes NC)	1991	96	4
	1992	94	6
	1993	94	6
	1994	96	4
	1995	96	4
	1996	93	7
	1997	90	10
	1998	94	6
	1999	86	14
	2000	88	12
	AVG	93	7

Source: Personal communication from the National Marine Fisheries Service, Fisheries Statistics and Economics Division.

Table 107. The average proportion (%) of summer flounder caught, landed, and released alive by mode for recreational fishermen, Maine to North Carolina, 1991-2000.

Mode	Catch (Number)	Landings (Number)	Landings (Weight)	Released Alive (Number)
Shore	10	6	5	11
Party/Charter	8	10	10	8
Private/Rental	82	84	85	81

Source: Personal communication from the National Marine Fisheries Service, Fisheries Statistics and Economics Division.

Table 108. The average annual recreational landings of summer flounder by state, 1991-2000.

State	Landings (1,000 Fish)	Percent	Landings (1,000 lbs)	Percent
ME	<1	<.01	17	<1
NH	37	1	89	1
MA	174	3	353	4
RI	277	5	537	5
CT	211	3	360	4
NY	1,070	18	1,928	20
NJ	2,742	45	4,211	43
DE	256	4	397	4
MD	197	3	290	3
VA	810	13	1,265	13
NC	295	5	362	4

Source: Personal communication from the National Marine Fisheries Service, Fisheries Statistics and Economics Division.

Table 109. Scup caught, landed, and released alive by recreational anglers, Maine to North Carolina, 1991-2000.

Year	Catch[a] (1,000 Fish)	Landings[b] (1,000 Fish)	Landings (1,000 lbs)	Percent of Catch Released Alive
1991	16,852	13,279	8,087	21
1992	10,077	7,764	4,412	23
1993	7,076	5,663	3,197	20
1994	5,650	4,270	2,628	24
1995	3,767	2,419	1,344	36
1996	4,676	2,972	2,156	36
1997	3,070	1,916	1,198	38
1998	2,670	1,211	875	55
1999	4,636	3,251	1,886	30
2000	10,752	6,903	5,183	36
AVG	6,923	4,965	3,097	32

[a] - MRFSS Type A, B1, and B2 catch
[b] - MRFSS Type A and B1 catch

Source: Personal communication from the National Marine Fisheries Service, Fisheries Statistics and Economics Division.

Table 110. The percent of scup landed by weight by marine recreational fishermen in state waters and the EEZ along the North and Mid-Atlantic coast.

Subregion	Year	State	EEZ
North Atlantic	1991	94	6
	1992	97	3
	1993	68	32
	1994	88	12
	1995	78	22
	1996	93	7
	1997	89	11
	1998	73	27
	1999	99	1
	2000	88	12
	AVG	87	13
Mid-Atlantic (includes NC)	1991	94	6
	1992	99	1
	1993	98	2
	1994	85	15
	1995	41	59
	1996	91	9
	1997	96	4
	1998	99	1
	1999	81	19
	2000	99	1
	AVG	88	12

Source: Personal communication from the National Marine Fisheries Service, Fisheries Statistics and Economics Division.

Table 111. The average proportion (%) of scup caught, landed, and released alive by mode for recreational fishermen, Maine to North Carolina, 1991-2000.

Mode	Catch (Number)	Landings (Number)	Landings (Weight)	Released Alive (Number)
Shore	10	9	6	12
Party/Charter	18	20	20	13
Private/Rental	72	71	74	75

Source: Personal communication from the National Marine Fisheries Service, Fisheries Statistics and Economics Division.

Table 112. The average annual recreational landings of scup by state, 1991-2000.

State	Landings (1,000 Fish)	Percent	Landings (1,000 lbs)	Percent
ME	0	0	0	0
NH	<1	0	<1	0
MA	1,290	25	905	27
RI	880	17	532	16
CT	740	14	485	15
NY	1,595	30	990	30
NJ	372	7	158	5
DE	51	1	16	0
MD	2	0	<1	0
VA	24	0	7	0
NC	309	6	225	7

Source: Personal communication from the National Marine Fisheries Service, Fisheries Statistics and Economics Division.

Table 113. Black sea bass caught, landed, and released alive by recreational anglers, Maine to North Carolina, 1991-2000.

Year	Catch[a] (1,000 Fish)	Landings[b] (1,000 Fish)	Landings (1,000 lbs)	Percent of Catch Released Alive
1991	11,233	5,458	4,274	51
1992	8,323	3,869	2,914	54
1993	9,488	6,197	4,985	35
1994	7,682	3,571	3,054	54
1995	14,653	6,887	6,339	53
1996	8,424	3,764	4,125	55
1997	11,062	4,868	4,399	56
1998	5,644	1,259	1,290	78
1999	7,695	1,412	1,697	82
2000	17,001	4,427	3,966	74
AVG	10,121	4,171	3,704	59

[a] - MRFSS Type A, B1, and B2 catch
[b] - MRFSS Type A and B1 catch

Source: Personal communication from the National Marine Fisheries Service, Fisheries Statistics and Economics Division.

Table 114. The percent of black sea bass landed by weight by marine recreational fishermen in state waters and the EEZ along the North and Mid-Atlantic Coast.

Subregion	Year	State	EEZ
North Atlantic	1991	95	5
	1992	77	23
	1993	81	19
	1994	87	13
	1995	63	37
	1996	63	37
	1997	41	59
	1998	93	7
	1999	87	13
	2000	89	11
	AVG	78	22
Mid-Atlantic (includes NC)	1991	29	71
	1992	36	64
	1993	48	52
	1994	15	85
	1995	13	87
	1996	16	84
	1997	13	87
	1998	12	88
	1999	23	77
	2000	25	75
	AVG	23	77

Source: Personal communication from the National Marine Fisheries Service, Fisheries Statistics and Economics Division.

Table 115. The average proportion (%) of black sea bass caught, landed, and released alive by mode for recreational fishermen, Maine to North Carolina, 1991-2000.

Mode	Catch (Number)	Landings (Number)	Landings (Weight)	Released Alive (Number)
Shore	13	3	1	19
Party/Charter	37	64	65	20
Private/Rental	50	33	34	61

Source: Personal communication from the National Marine Fisheries Service, Fisheries Statistics and Economics Division.

Table 116. The average annual recreational landings of black sea bass by state, 1991-2000.

State	Landings (1,000 Fish)	Percent	Landings (1,000 lbs)	Percent
ME	0	0	0	0
NH	<1	<1	<1	<1
MA	18	<1	24	<1
RI	42	1	63	2
CT	5	<1	6	<1
NY	161	4	149	4
NJ	2,244	54	1,984	54
DE	230	6	109	3
MD	536	13	488	13
VA	754	18	720	19
NC	182	4	163	4

Source: Personal communication from the National Marine Fisheries Service, Fisheries Statistics and Economics Division.

Table 117. Average willingness to pay for a one-day fishing trip, by state in 1994.

State	Mean ($'s)	Adjusted to 2000 ($'s)[a]
Maine	6.40	7.44
New Hampshire	0.85	0.99
Massachusetts	8.38	9.74
Rhode Island	4.23	4.92
Connecticut	3.07	3.57
New York	21.58	25.07
New Jersey	14.12	16.41
Delaware	1.43	1.66
Maryland	12.09	14.05
Virginia	42.33	49.19

[a] - Prices were adjusted using the Bureau of Labor Statistics Consumer Price Index.

Table 118. Aggregate willingness to pay for anglers that indicated they were targeting summer flounder in 2000.

State	Willingness to pay ($'s)
Maine	0
New Hampshire	0
Massachusetts	1,294,173
Rhode Island	1,488,403
Connecticut	780,388
New York	37,438,435
New Jersey	33,923,769
Delaware	381,317
Maryland	6,287,347
Virginia	32,598,262

Table 119. Willingness to pay for a one fish increase in the catch rate of flat fish per trip, Maine to Virginia, 1994.

State	Mean ($'s)	Adjusted to 2000 ($'s)[a]
Maine	5.75	6.68
New Hampshire	4.77	5.54
Massachusetts	4.33	5.03
Rhode Island	4.40	5.11
Connecticut	4.43	5.15
New York	3.10	3.60
New Jersey	3.48	4.04
Delaware	4.24	4.93
Maryland	5.30	6.16
Virginia	3.36	3.90
All States	4.01	4.66

[a] - Prices were adjusted using the Bureau of Labor Statistics Consumer Price Index.

Table 120. Aggregate willingness to pay for anglers that indicated they were targeting scup in 2000.

State	Willingness to pay ($'s)
Maine	0
New Hampshire	0
Massachusetts	664,901
Rhode Island	337,876
Connecticut	281,141
New York	5,147,347
New Jersey	279,495
Delaware	0
Maryland	0
Virginia	0

Table 121. Willingness to pay for a one fish increase in the catch rate of bottom fish per trip, Maine to Virginia, 1994.

State	Mean ($'s)	Adjusted to 2000 ($'s)[a]
Maine	2.62	3.04
New Hampshire	2.14	2.49
Massachusetts	2.04	2.37
Rhode Island	2.11	2.45
Connecticut	2.25	2.61
New York	1.63	1.89
New Jersey	1.73	2.01
Delaware	2.06	2.39
Maryland	2.44	2.84
Virginia	1.79	2.08
All States	1.97	2.29

[a] - Prices were adjusted using the Bureau of Labor Statistics Consumer Price Index.

Table 122. Aggregate willingness to pay for anglers that indicated they were targeting black sea bass in 2000.

State	Willingness to pay ($'s)
Maine	0
New Hampshire	0
Massachusetts	47,444
Rhode Island	55,389
Connecticut	0
New York	1,349,393
New Jersey	1,746,762
Delaware	19,286
Maryland	197,585
Virginia	1,574,769

Table 123. 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 124. 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 125. Party and Charter Boat Operating Experience in 1985 and 1989.

	Charter		Party	
	1985 (mean)	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	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 126. Ports that showed commercial landings of summer flounder, scup, and/or black sea bass, from Maine to North Carolina, 1999.

Port Name	State	County	summer flounder	scup	bsb	all three species
PORTLAND	ME	CUMBERLAND	X			
CHATHAM	MA	BARNSTABLE	X	X	X	X
COTUIT	MA	BARNSTABLE			X	
FALMOUTH	MA	BARNSTABLE	X	X	X	X
HARWICHPORT	MA	BARNSTABLE		X	X	
OTHER BARNSTABLE	MA	BARNSTABLE	X	X	X	X
PROVINCETOWN	MA	BARNSTABLE	X			
WOODS HOLE	MA	BARNSTABLE	X			
FALL RIVER	MA	BRISTOL	X	X	X	X
NEW BEDFORD	MA	BRISTOL	X	X	X	X
WESTPORT	MA	BRISTOL	X		X	
OTHER DUKES	MA	DUKES	X	X	X	X
GLOUCESTER	MA	ESSEX	X	X	X	X
NEWBURYPORT	MA	ESSEX	X	X	X	X
NANTUCKET	MA	NANTUCKET	X		X	
OTHER MASS	MA	NOT-SPECIFIED	X	X	X	X
PLYMOUTH	MA	PLYMOUTH	X	X	X	X
SCITUATE	MA	PLYMOUTH	X		X	
BOSTON	MA	SUFFOLK	X		X	
BRISTOL	RI	BRISTOL	X	X	X	X
OTHER KENT	RI	KENT	X	X	X	X
JAMESTOWN	RI	NEWPORT	X	X	X	X
LITTLE COMPTON	RI	NEWPORT	X	X	X	X
MELVILLE	RI	NEWPORT	X			
NEWPORT	RI	NEWPORT	X	X	X	X
PORTSMOUTH	RI	NEWPORT	X	X	X	X
TIVERTON	RI	NEWPORT	X	X	X	X
CHARLESTOWN	RI	WASHINGTON	X	X	X	X
NEW SHOREHAM	RI	WASHINGTON	X			
NORTH KINGSTOWN	RI	WASHINGTON	X	X	X	X
POINT JUDITH	RI	WASHINGTON	X	X	X	X
SOUTH KINGSTOWN	RI	WASHINGTON	X	X	X	X
WESTERLEY	RI	WASHINGTON	X	X	X	X
NORWALK	CT	FAIRFIELD	X			
CLINTON	CT	MIDDLESEX	X	X	X	X
OLD SAYBROOK	CT	MIDDLESEX	X	X	X	X
BRANFORD	CT	NEW HAVEN	X	X	X	X
EAST HAVEN	CT	NEW HAVEN	X	X	X	X
GUILFORD	CT	NEW HAVEN	X	X	X	X
EAST LYME	CT	NEW LONDON	X	X	X	X
GROTON	CT	NEW LONDON	X	X	X	X
LYME	CT	NEW LONDON	X			
MYSTIC	CT	NEW LONDON	X		X	
NEW LONDON	CT	NEW LONDON	X	X	X	X
NOANK	CT	NEW LONDON	X	X	X	X
OLD LYME	CT	NEW LONDON		X	X	
STONINGTON	CT	NEW LONDON	X	X	X	X
WATERFORD	CT	NEW LONDON	X	X	X	X
OTHER CONNECTICUT	CT	NOT-SPECIFIED	X	X		

Table 126 (continued). Ports that showed commercial landings of summer flounder, scup, and/or black sea bass, from Maine to North Carolina, 1999.

Port Name	State	County	summer flounder	scup	bsb	all three species
BROOKLYN	NY	KINGS	X	X	X	X
FREEPORT	NY	NASSAU	X	X	X	X
OTHER NASSAU	NY	NASSAU			X	
NEW YORK CITY	NY	NEW YORK		X	X	
OTHER NY	NY	NOT-SPECIFIED	X	X	X	X
OTHER QUEENS	NY	QUEENS			X	
AMMAGANSETT	NY	SUFFOLK	X	X	X	X
GREENPORT	NY	SUFFOLK	X	X	X	X
HAMPTON BAY	NY	SUFFOLK	X	X	X	X
MATTITUCK	NY	SUFFOLK	X	X	X	X
MONTAUK	NY	SUFFOLK	X	X	X	X
OTHER SUFFOLK	NY	SUFFOLK	X	X	X	X
ATLANTIC CITY	NJ	ATLANTIC			X	
OTHER ATLANTIC	NJ	ATLANTIC	X		X	
CAPE MAY	NJ	CAPE MAY	X	X	X	X
OTHER CAPE MAY	NJ	CAPE MAY	X			
SEA ISLE CITY	NJ	CAPE MAY	X	X	X	X
WILDWOOD	NJ	CAPE MAY	X	X	X	X
OTHER CUMBERLAND	NJ	CUMBERLAND	X			
OTHER ESSEX	NJ	ESSEX	X		X	
BELFORD	NJ	MONMOUTH	X	X	X	X
BELMAR	NJ	MONMOUTH	X			
HIGHLANDS	NJ	MONMOUTH			X	
NEPTUNE	NJ	MONMOUTH	X		X	
OTHER MONMOUTH	NJ	MONMOUTH	X		X	
LONG BEACH/BARNEGAT LIGHT	NJ	OCEAN	X	X	X	X
OTHER OCEAN	NJ	OCEAN	X		X	
PT. PLEASANT	NJ	OCEAN	X	X	X	X
OTHER UNION	NJ	UNION	X		X	
OTHER DELAWARE	DE	NOT-SPECIFIED	X		X	
INDIAN RIVER	DE	SUSSEX	X		X	
LEWES	DE	SUSSEX			X	
OTHER SUSSEX	DE	SUSSEX			X	
OTHER MARYLAND	MD	NOT-SPECIFIED	X	X	X	X
FLOOD CREEK	MD	ST. MARY'S	X			
HERRING CREEK	MD	ST. MARY'S	X			
ISLAND CREEK	MD	ST. MARY'S	X			
SMITH CREEK	MD	ST. MARY'S	X			
ST. GEORGES CREEK	MD	ST. MARY'S	X			
ST. PATRICK'S CREEK	MD	ST. MARY'S	X			
OCEAN CITY	MD	WORCESTER	X	X	X	X
CHINCOTEAGUE	VA	ACCOMAC	X	X	X	X
OTHER ACCOMAC	VA	ACCOMAC	X	X	X	X
WACHAPREAGUE	VA	ACCOMAC	X		X	
OTHER CHESTERFIELD	VA	CHESTERFIELD	X			
HAMPTON	VA	CITY OF HAMPTON	X	X	X	X
NEWPORT NEWS	VA	CITY OF NEWPORT NEWS	X	X	X	X
NORFOLK	VA	CITY OF NORFOLK	X		X	
OTHER CITY OF SUFFOLK	VA	CITY OF SUFFOLK	X			
VIRGINIA BEACH/LYNNHAVEN	VA	CITY OF VIRGINIA BEACH	X	X	X	X
OTHER ESSEX	VA	ESSEX	X			
OTHER GLOUCESTER	VA	GLOUCESTER	X			

Table 126 (continued). Ports that showed commercial landings of summer flounder, scup, and/or black sea bass, from Maine to North Carolina, 1999.

Port Name	State	County	summer flounder	scup	bsb	all three species
OTHER ISLE OF WIGHT	VA	ISLE OF WIGHT	X			
OTHER JAMES CITY	VA	JAMES CITY	X			
OTHER KING & QUEEN	VA	KING & QUEEN	X			
OTHER KING GEORGE	VA	KING GEORGE	X			
OTHER LANCASTER	VA	LANCASTER	X	X		
OTHER MATHEWS	VA	MATHEWS	X	X		
OTHER MIDDLESEX	VA	MIDDLESEX	X		X	
CAPE CHARLES	VA	NORTHAMPTON	X		X	
OTHER NORTHAMPTON	VA	NORTHAMPTON	X			
OYSTER	VA	NORTHAMPTON	X			
COAN RIVER	VA	NORTHUMBERLAND	X			
HULL CREEK	VA	NORTHUMBERLAND	X			
LITTLE WICOMICO RIVER	VA	NORTHUMBERLAND	X			
MUNDY POINT	VA	NORTHUMBERLAND	X			
OTHER NORTHUMBERLAND	VA	NORTHUMBERLAND	X		X	
OTHER VA	VA	NOT-SPECIFIED	X			
OTHER RICHMOND	VA	RICHMOND	X			
NOMINI BAY	VA	WESTMORELAND	X			
OTHER WESTMORELAND	VA	WESTMORELAND	X			
RAGGED POINT HOLLOW	VA	WESTMORELAND	X			
CITY OF SEAFORD	VA	YORK	X		X	
OTHER YORK	VA	YORK	X			
ATLANTIC	NC	CARTERET	X		X	
BEAUFORT	NC	CARTERET	X		X	
MOREHEAD CITY	NC	CARTERET	X	X	X	X
OTHER CARTERET	NC	CARTERET	X		X	
AVON	NC	DARE	X		X	
HATTERAS	NC	DARE	X		X	
	NC	DARE			X	
OTHER DARE	NC	DARE	X	X	X	X
WANCHESE	NC	DARE	X		X	
ENGELHARD	NC	HYDE	X		X	
OTHER NORTH CAROLINA	NC	NOT-SPECIFIED	X			
SWANSBORO	NC	ONSLOW	X			
BAYBORO	NC	PAMLICO	X		X	
HOBUCKEN	NC	PAMLICO	X		X	
LOWLAND	NC	PAMLICO	X			
ORIENTAL	NC	PAMLICO	X		X	
OTHER PAMLICO	NC	PAMLICO	X		X	
VANDEMERE	NC	PAMLICO	X		X	

Table 127. Permit year 2000 descriptive data from northeast region permit files for commercial vessels.

	CT	DE	FL	MA	MD	ME	NC	NH	NJ	NY	PA	RI	SC	VA	WV	Other
No. of Permits by Mailing Address State	26	17	3	370	18	46	134	20	181	184	3	172	1	125	0	3
No. of Permits by Home Port State	15	14	4	429	15	33	117	13	152	212	22	133	1	137	2	4
No. of Permits by Principal Port State	28	8	2	383	23	44	125	18	181	184	0	171	1	133	1	1
Average Length by Principal Port	57.9	38.3	82.0	58.9	52.1	57.9	60.6	51.6	56.5	44.2	NA	56.9	47.0	63.3	NA	NA
Average Tonnage by Principal Port	74.1	16.0	127.0	82.6	37.6	75.1	79.0	44.8	69.3	40.0	NA	69.8	33.0	93.0	NA	NA
Percent Home Port Equal Principal Port	53.6	50.0	25.0	87.4	65.2	75.0	81.6	72.2	77.9	84.9	0	74.9	100	81.8	0	NA

Table 128. Permit year 2000 descriptive data from northeast region permit files for party/charter vessels.

	CT	DE	FL	MA	MD	ME	NC	NH	NJ	NY	PA	RI	VA	Other
No. of Permits by Mailing Address State	25	7	4	119	8	23	12	18	153	101	6	39	31	0
No. of Permits by Home Port State	15	10	6	125	6	23	13	18	121	111	25	35	34	4
No. of Permits by Principal Port State	22	7	2	116	6	25	15	18	155	96	3	46	34	1
Average Length by Principal Port	45.0	38.6	60.5	37.0	58.8	36.0	38.8	30.9	45.7	47.0	52.3	36.8	39.0	NA
Average Tonnage by Principal Port	26.8	11.7	68.5	19.2	45.5	20.2	20.2	9.1	31.1	34.1	44.7	19.1	22.2	NA
Percent Home Port Equals Principal Port	68.2	70.0	16.7	90.4	66.7	88.0	80.0	94.4	76.8	79.3	4.0	76.1	88.2	NA

Table 129. Permit year 2000 descriptive data from northeast region permit files for combination commercial/recreational vessels.

	CT	DE	FL	MA	ME	NC	NH	NJ	NY	PA	RI	VA	Other

No .of Permits by Mailing Address State	3	3	1	20	1	3	2	17	47	0	10	13	0
No. of Permits by Home Port State	3	3	1	26	4	1	14	49	2	2	5	12	0
No. of Permits by Principal Port State	2	2	0	20	1	4	2	14	48	2	12	12	1
Average Length by Principal Port	33.5	59.0	NA	34.8	46.0	41.3	33.5	53.1	37.9	66.5	41.8	46.7	36.0
Average Tonnage by Principal Port	7.0	55.0	NA	15.1	48.0	19.8	4.0	42.6	22.2	101.5	29.2	35.8	17.0
Percent Home Port Equal Principal Port	66.7	66.7	0	73.1	0	75.0	50.0	78.6	95.9	0	41.7	91.7	NA

Table 130. MRFSS preliminary estimates of 1999 recreational harvest and total catch (in numbers of fish).

State	FLK Harvest	FLK Catch	SCP Harvest	SCP Catch	BSB Harvest	BSB Catch
CT	215,311	717,740	373,943	647,073	1,583	175,312
MA	147,720	393,316	1,209,089	1,549,781	20,985	46,636
RI	432,087	872,254	718,660	998,039	25,290	145,934
DE	180,562	613,297	492	11,498	41,462	253,967
MD	226,912	1,239,079	2,105	2,105	159,527	1,646,599
NJ	1,502,689	10,723,182	251,821	351,894	449,134	2,177,475
NY	759,640	4,020,124	874,539	1,071,762	88,880	820,126
VA	378,283	2,561,235	0	3,890	536,489	1,778,424
NC	236,791	236,791	0	0	88,493	712,993

Table 131. Dealers reporting buying summer flounder, black sea bass, and/or scup, by state (from NMFS commercial landings database).

	DE, ME, NH, CT	MD	MA	NJ	NY	NC	RI	VA
Number of Dealers	5	3	43	23	44	27	37	17

Table 132. A comparison of the environmental impacts of the alternatives. The impact of the status quo measures is noted and significant impact of the remainder of the alternatives is relative to the status quo alternative under that category. Significance is evaluated by the context and intensity of the impact (40 CFR 1508.27). The following scale is used to denote the significance of the impact: high positive (hp), moderate positive (mp), low positive (lp), unknown impact (unk), no change (nc), low negative (ln), moderate negative (mn), high negative impact (hn).

Biological Impacts		Black Sea Bass Management Alternatives										
		Quota Management Alternatives										
		1: Status Quo, quarterly quota	2: Quarterly quota with rollover provision		3 (a-b): By 3 permit categories		3 (c-d): By 2 permit categories		4: Two subregions with period allocations, Jan.-Apr. and May-Dec.		5: State by state	
		a:1988-1992	b:1988-1997	a: 1993-1997	a: 1988-1997	b: 1993-1997	c: 1988-1997	d: 1993-1997	a: 1988-1997	b: 1993-1997	a: 1988-1997	b: 1993-1997
Fishing Effort	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc-mn-may encourage derby style fishing	lp-discourage derby-style fishing practices	lp-discourage derby-style fishing practices	mp	mp	mp	mp	mp	mp	mp	mp
Bycatch	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc -mn	lp-discourage derby-style fishing practices	lp-discourage derby-style fishing practices	mp	mp	mp	mp	mp	mp	mp	mp
Marine Mammals, Sea Turtles, Sea Birds	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Essential Fish Habitat	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc-lp-closures may give habitat recovery time. ln-high intensity fishing may result from derby style fishing effort	ln, lp	ln, lp	lp	lp	lp	lp	lp	lp	lp	lp
Marine Environment	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc-lp-closures may give habitat recovery time. ln-high intensity fishing may result from derby style fishing effort	ln, lp	ln, lp	lp	lp	lp	lp	lp	lp	lp	lp
Rebuilding Schedule	Direct	nc	nc	nc	mp	mp	mp	mp	mp	mp	mp	mp
	Indirect	nc- mn-if annual quota is overharvested rebuilding may be slowed	mn-if annual quota is overharvested rebuilding may be slowed	mn-if annual quota is overharvested rebuilding may be slowed	mp-may constrain landings	mp	mp	mp	mp	mp	mp	mp

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Biological Impacts		**Black Sea Bass Management Alternatives**										
		Quota Management Alternatives										
		1: Status Quo, quarterly quota	2: Quarterly quota with rollover provision		3 (a-b): By 3 permit categories		3 (c-d): By 2 permit categories		4: Two subregions with period allocations, Jan.-Apr. and May-Dec.		5: State by state	
		a:1988-1992	b:1988-1997	a: 1993-1997	a: 1988-1997	b: 1993-1997	c: 1988-1997	d: 1993-1997	a: 1988-1997	b: 1993-1997	a: 1988-1997	b: 1993-1997
Stock Status	Direct	nc-mn-stock may not recover as quickly if rebuilding is slowed	mn-stock may not recover as quickly if rebuilding is slowed	mn-stock may not recover as quickly if rebuilding is slowed	mp	mp	mp	mp	mp	mp	mp	mp
	Indirect	nc-mn-stock may not recover as quickly if rebuilding is slowed	mn-stock may not recover as quickly if rebuilding is slowed	mn-stock may not recover as quickly if rebuilding is slowed	mp	mp	mp	mp	mp	mp	mp	mp
Cumulative		nc-mn-stock may not recover as quickly if rebuilding is slowed, derby style fishing may have negative impact on other species	mn-stock may not recover as quickly if rebuilding is slowed, derby style fishing may have negative impact on other species	mn-stock may not recover as quickly if rebuilding is slowed, derby style fishing may have negative impact on other species	mp-greater probability of achieving target mortalities	mp-greater probability of achieving target mortalities	mp-greater probability of achieving target mortalities	mp-greater probability of achieving target mortalities	mp-greater probability of achieving target mortalities	mp-greater probability of achieving target mortalities	mp-greater probability of achieving target mortalities	mp-greater probability of achieving target mortalities

Table 132. A comparison of the environmental impacts of the alternatives. The impact of the status quo measures is noted and significant impact of the remainder of the alternatives is relative to the status quo alternative under that category. Significance is evaluated by the context and intensity of the impact (40 CFR 1508.27). The following scale is used to denote the significance of the impact: high positive (hp), moderate positive (mp), low positive (lp), unknown impact (unk), no change (nc), low negative (ln), moderate negative (mn), high negative impact (hn).

Biological Impacts		**Black Sea Bass Management Alternatives**							
		Quota Management Alternatives							
		5: State by state		6: Hybrid, coastwide quota Jan.-Apr., state by state quotas May-Dec.		7: Hybrid, coastwide quota Jan.-Apr., subregional quotas May-Dec.		8: By gear type	
		c: best 5 years, 1988-1997	d: best 5 years, 1980-1997	a: 1988-1997	b: 1993-1997	a: 1988-1997	b: 1993-1997	a: 1988-1997	b: 1993-1997
Fishing Effort	Direct	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	mp	mp	mp	mp	mp	mp	mp	mp
Bycatch	Direct	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	mp	mp	mp	mp	mp	mp	mp	mp
Marine Mammals, Sea Turtles, Sea Birds	Direct	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc
Essential Fish Habitat	Direct	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	lp	lp	lp	lp	lp	lp	lp	lp
Marine Environment	Direct	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	lp	lp	lp	lp	lp	lp	lp	lp
Rebuilding Schedule	Direct	mp	mp	mp	mp	mp	mp	mp	mp
	Indirect	mp	mp	mp	mp	mp	mp	mp	mp
Stock Status	Direct	mp	mp	nc	nc	nc	nc	nc	nc
	Indirect	mp	mp	mp	mp	mp	mp	mp	mp
Cumulative		mp-greater probability of achieving target mortalities	mp-greater probability of achieving target mortalities	mp-greater probability of achieving target mortalities	mp-greater probability of achieving target mortalities	mp-greater probability of achieving target mortalities	mp-greater probability of achieving target mortalities	mp-greater probability of achieving target mortalities	mp-greater probability of achieving target mortalities

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Biological Impacts		**Black Sea Bass Management Alternatives**									
		Other Black Sea Bass Management Alternatives									
		9: Permit Requirements		10: Prohibit wet storage of black sea bass pots			11: Black sea bass pot/trap tag program		12: Limit on the number of pots		
		a: status quo	b: remove restriction of using Snapper/Grouper permit during northeast closure	a: status quo	b: during a closure of longer than 2 weeks	c: during a closure of longer than four weeks	a: status quo	b: tag requirement	a: status quo	b: limit of 400	c: limit of 800
Fishing Effort	Direct	nc	nc	nc-mn	mp	mp	nc	nc	nc	unk	unk
	Indirect	nc	nc	nc-mn	mp	mp	nc	nc	nc	unk	unk
Bycatch	Direct	nc	nc	nc-mn	mp	mp	nc	nc	nc	unk	unk
	Indirect	nc	nc	nc-mn	mp	mp	nc	nc	nc	unk	unk
Marine Mammals, Sea Turtles, Sea Birds	Direct	nc	nc	nc	mp	mp	nc	nc	nc	unk	unk
	Indirect	nc	nc	nc	mp	mp	nc	nc	nc	unk	unk
Essential Fish Habitat	Direct	nc	nc	nc-ln, lp	ln, lp	ln, lp	nc	nc	nc	unk	unk
	Indirect	nc	nc	nc-ln, lp	ln, lp	ln, lp	nc	nc	nc	unk	unk
Marine Environment	Direct	nc	nc	nc–ln, lp	ln, lp	ln, lp	nc	nc	nc	unk	unk
	Indirect	nc	nc	nc-ln,lp	ln, lp	ln, lp	nc	nc	nc	unk	unk
Rebuilding Schedule	Direct	nc	nc	nc	mp	mp	nc	nc	nc	unk	unk
	Indirect	nc	nc	nc-mn	mp	mp	nc	nc	nc	unk	unk
Stock Status	Direct	nc	nc	nc	mp	mp	nc	nc	nc	unk	unk
	Indirect	nc	nc	nc-mn	mp	mp	nc	nc	nc	unk	unk
Cumulative		nc	nc	nc	mp	mp	nc	nc	nc	unk	unk

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Biological Impacts		Summer Flounder, Scup, and Black Sea Bass				
		EFH Alternatives				
		EFH1: Status Quo	EFH2: Prohibit bottom tending mobile gear from nearshore areas surrounding estuaries	EFH3: Prohibit bottom tending mobile gear from area surrounding Hudson Canyon	EFH4: Roller rig and rockhopper gear restrictions	EFH5: Prohibit streetsweeper gear
Fishing Effort	Direct	nc-mp	lp	lp	unk	unk
	Indirect	nc-mp	lp	lp	unk	unk
Bycatch	Direct	nc-mp	nc	nc	nc	nc
	Indirect	nc-mp	nc	nc	nc	nc
Marine Mammals, Sea Turtles, Sea Birds	Direct	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc
Essential Fish Habitat	Direct	nc-mp	mp	mp	unk-mp	unk-mp
	Indirect	nc-mp	mp	mp	unk-mp	unk-mp
Marine Environment	Direct	nc-mp	mp	mp	unk-mp	unk-mp
	Indirect	nc-mp	mp	mp	unk-mp	unk-mp
Rebuilding Schedule	Direct	nc-mp	nc	nc	nc	nc
	Indirect	nc-mp	nc	nc	nc	nc
Stock Status	Direct	nc-mp	nc	nc	nc	nc
	Indirect	nc-mp	nc	nc	nc	nc
Cumulative		mp-stock may rebuild by meeting mortality targets, protecting in the process will further benefit habitat	mp-closed areas can provide buffer against uncertainty in stock assessment and environmental variables mn-may cause greater revenue loss when combined with reduced fishing mortality rates in rebuilding schedule	mp-closed areas can provide buffer against uncertainty in stock assessment and environmental variables mn-may cause greater revenue loss when combined with reduced fishing mortality rates in rebuilding schedule	unk	unk

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Economic Impacts	Black Sea Bass Management Alternatives											
	Quota Management Alternatives											
		1: Status Quo	2: Quarterly quota with rollover provision		3 (a-b): By 3 permit categories		3 (c-d): By 2 permit categories		4: Two subregions with period allocations, Jan.-Apr. and May-Dec.		5: State by state	
		a:1988-1992	b:1988-1997	a: 1993-1997	a: 1988-1997	b: 1993-1997	c: 1988-1997	c: 1993-1997	a: 1988-1997	b: 1993-1997	a: 1988-1997	b: 1993-1997
Quota Overage	Direct	nc	nc-hn	nc-hn	mp	mp	mp	mp	nc	nc	nc	nc
	Indirect	nc-hn	nc-hn	nc-hn	mp	mp	mp	mp	mp	mp	mp	mp
Trip Limits	Direct	nc	nc-hn	nc-hn	mp	mp	mp	mp	nc	nc	nc	nc
	Indirect	nc-hn	nc-hn	nc-hn	mp	mp	mp	mp	mp	mp	mp	mp
Derby Style Fishing	Direct	nc-hn	mp	mp	mp	mp	mp	mp	nc	nc	nc	nc
	Indirect	nc-hn	mp	mp	mp	mp	mp	mp	nc	nc	nc	nc
Market Value	Direct	nc-hn	mp	mp	mp	mp	mp	mp	nc	nc	nc	nc
	Indirect	nc-hn	mp	mp	mp	mp	mp	mp	ln, lp	ln, lp	ln, lp	ln, lp
Landings	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc	nc	nc	ln, lp	ln, lp	ln, lp	ln, lp
Revenues	Direct	nc-hn	mp	mp	mp	mp	mp	mp	mp	mp	mp	mp
	Indirect	nc-hn	mp	mp	mp	mp	mp	mp	mp	mp	mp	mp
Geographic Equity	Direct	nc-mn	mp	mp	mp	mp	mp	mp	mp	mp	mp	mp
	Indirect	nc-mn	mp	mp	mp	mp	mp	mp	mp	mp	mp	mp
Seasonal Closures	Direct	nc-hn	mp	mp	mp	mp	mp	mp	mp	mp	mp	mp
	Indirect	nc-hn	mp	mp	mp	mp	mp	mp	mp	mp	mp	mp

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Economic Impacts		Black Sea Bass Management Alternatives										
		Quota Management Alternatives										
		1: Status Quo	2: Quarterly quota with rollover provision		3 (a-b): By 3 permit categories		3 (c-d): By 2 permit categories		4: Two subregions with period allocations, Jan.-Apr. and May-Dec.		5: State by state	
		a:1988-1992	b:1988-1997	a: 1993-1997	a: 1988-1997	b: 1993-1997	c: 1988-1997	c: 1993-1997	a: 1988-1997	b: 1993-1997	a: 1988-1997	b: 1993-1997
Implementation	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	mp	mp
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc	nc	ln	ln
Enforceability	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc	nc	ln	ln
Geographic Consistency	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Cumulative		mn-long term economic impacts associated with slow stock rebuilding	mn-long term economic impacts associated with slow stock rebuilding	mn-long term economic impacts associated with slow stock rebuilding	mp-long term economic impacts associated with stock rebuilding	mp-long term economic impacts associated with stock rebuilding	mp-long term economic impacts associated with stock rebuilding	mp-long term economic impacts associated with stock rebuilding	mp-long term economic impacts associated with stock rebuilding	mp-long term economic impacts associated with stock rebuilding	mp-long term economic impacts associated with stock rebuilding	mp-long term economic impacts associated with stock rebuilding

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Economic Impacts		Black Sea Bass Management Alternatives							
		Quota Management Alternatives							
		5: State by state		6: Hybrid, coastwide quota Jan.-Apr., state by state quotas May-Dec.		7: Hybrid, coastwide quota Jan.-Apr., subregional quotas May-Dec.		8: By gear type	
		c: best five years, 1988-1997	d:best five years, 1980-1997	a: 1988-1997	b: 1993-1997	a: 1988-1997	b: 1993-1997	a: 1988-1997	b: 1993-1997
Quota Overage	Direct	nc	nc	mp	mp	mp	mp	mp	mp
	Indirect	mp	mp	mp	mp	mp	mp	mp	mp
Trip Limits	Direct	nc	nc	mp	mp	mp	mp	mp	mp
	Indirect	mp	mp	mp	mp	mp	mp	mp	mp
Derby Style Fishing	Direct	mp	mp	mp	mp	mp	mp	mp	mp
	Indirect	mp	mp	mp	mp	mp	mp	mp	mp
Market Value	Direct	nc	nc	mp	mp	mp	mp	mp	mp
	Indirect	ln, lp	ln, lp	mp	mp	mp	mp	mp	mp
Landings	Direct	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	ln, lp	ln, lp	nc	nc	nc	nc	nc	nc
Revenues	Direct	mp	mp	mp	mp	mp	mp	mp	mp
	Indirect	mp	mp	mp	mp	mp	mp	mp	mp
Geographic Equity	Direct	mp	mp	mp	mp	mp	mp	mp	mp
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc
Seasonal Closures	Direct	mp	mp	mp	mp	mp	mp	mp	mp
	Indirect	mp	mp	mp	mp	mp	mp	mp	mp

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Economic Impacts		Black Sea Bass Management Alternatives							
		Quota Management Alternatives							
		5: State by state		6: Hybrid, coastwide quota Jan.-Apr., state by state quotas May-Dec.		7: Hybrid, coastwide quota Jan.-Apr., subregional quotas May-Dec.		8: By gear type	
		c: best five years, 1988-1997	d:best five years, 1980-1997	a: 1988-1997	b: 1993-1997	a: 1988-1997	b: 1993-1997	a: 1988-1997	b: 1993-1997
Implementation	Direct	nc	nc	nc	nc	nc	nc	nc	hp
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc
Enforceability	Direct	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	ln	ln	nc	nc	nc	nc	nc	nc
Geographic Consistency	Direct	ln	ln	ln	ln	ln	ln	nc	nc
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc
Cumulative		mp-long term economic impacts associated with stock rebuilding	mp-long term economic impacts associated with stock rebuilding	hp-long term economic impacts associated with stock rebuilding	hp-long term economic impacts associated with stock rebuilding hp	hp-long term economic impacts associated with stock rebuilding hp	hp-long term economic impacts associated with stock rebuilding hp	hp-long term economic impacts associated with stock rebuilding hp	hp-long term economic impacts associated with stock rebuilding

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Economic Impacts		Black Sea Bass Management Alternatives									
		Other Black Sea Bass Management Alternatives									
		9: Permit Requirements		10: Prohibit wet storage of black sea bass pots			11: Black sea bass pot/trap tag program		12: Limit on number of pots		
		a: status quo	b: remove restriction of using Snapper/Grouper permit during northeast closure	a: status quo	b: during a closure of longer than 2 weeks	c: during a closure of longer than four weeks	a: status quo	b: tag requirement	a: status quo	b: limit of 400	c: limit of 800
Quota Overage	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc-pos. limits constrain landings	nc-pos. limits constrain landings
	Indirect	nc	nc	nc-mn	mp	mp	nc	nc	nc	lp-may be indirect pos. impact	lp-may be indirect pos. impact
Trip Limits	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Derby Style Fishing	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc-pos. limits constrain landings	nc-pos. limits constrain landings
	Indirect	nc	nc	nc-mn	mp	mp	nc	nc	nc	lp-may be indirect pos. impact	lp-may be indirect pos. impact
Market Value	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc-mn	mp	mp	nc	nc	nc	nc	nc

Table 132. A comparison of the environmental impacts of the alternatives. The impact of the status quo measures is noted and significant impact of the remainder of the alternatives is relative to the status quo alternative under that category. Significance is evaluated by the context and intensity of the impact (40 CFR 1508.27). The following scale is used to denote the significance of the impact: high positive (hp), moderate positive (mp), low positive (lp), unknown impact (unk), no change (nc), low negative (ln), moderate negative (mn), high negative impact (hn).

Economic Impacts		Black Sea Bass Management Alternatives									
		Other Black Sea Bass Management Alternatives									
		9: Permit Requirements		10: Prohibit wet storage of black sea bass pots			11: Black sea bass pot/trap tag program		12: Limit on number of pots		
		a: status quo	b: remove restriction of using Snapper/Grouper permit during northeast closure	a: status quo	b: during a closure of longer than 2 weeks	c: during a closure of longer than four weeks	a: status quo	b: tag requirement	a: status quo	b: limit of 400	c: limit of 800
Landings	Direct	nc	nc	nc-mn	mp	mp	nc	nc	nc	nc-pos. limits constrain landings	nc-pos. limits constrain landings
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Revenues	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc-mn	mp	mp	nc	nc	nc	nc	nc
Geographic Equity	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Seasonal Closures	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc-pos. limits constrain landings	nc-pos. limits constrain landings
	Indirect	nc	nc	nc-mn	mp	mp	nc	nc	nc	nc	nc
Implementation	Direct	nc	nc	nc	nc	nc	nc	nc	nc	ln	ln
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc	ln	ln

Table 132. A comparison of the environmental impacts of the alternatives. The impact of the status quo measures is noted and significant impact of the remainder of the alternatives is relative to the status quo alternative under that category. Significance is evaluated by the context and intensity of the impact (40 CFR 1508.27). The following scale is used to denote the significance of the impact: high positive (hp), moderate positive (mp), low positive (lp), unknown impact (unk), no change (nc), low negative (ln), moderate negative (mn), high negative impact (hn).

Economic Impacts		**Black Sea Bass Management Alternatives**									
		Other Black Sea Bass Management Alternatives									
		9: Permit Requirements		10: Prohibit wet storage of black sea bass pots			11: Black sea bass pot/trap tag program		12: Limit on number of pots		
		a: status quo	b: remove restriction of using Snapper/Grouper permit during northeast closure	a: status quo	b: during a closure of longer than 2 weeks	c: during a closure of longer than four weeks	a: status quo	b: tag requirement	a: status quo	b: limit of 400	c: limit of 800
Enforceability	Direct	nc	nc	nc	mn	mn	nc	nc	nc	mn	mn
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc	mn	mn
Geographic Consistency	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Cumulative		nc	nc	nc	unk	unk	nc	nc	nc	unk	unk

Table 132. A comparison of the environmental impacts of the alternatives. The impact of the status quo measures is noted and significant impact of the remainder of the alternatives is relative to the status quo alternative under that category. Significance is evaluated by the context and intensity of the impact (40 CFR 1508.27). The following scale is used to denote the significance of the impact: high positive (hp), moderate positive (mp), low positive (lp), unknown impact (unk), no change (nc), low negative (ln), moderate negative (mn), high negative impact (hn).

Economic Impacts		Summer Flounder, Scup, and Black Sea Bass				
		EFH Alternatives				
		EFH1: Status Quo	EFH2: Prohibit bottom tending mobile gear from nearshore areas surrounding estuaries	EFH3: Prohibit bottom tending mobile gear from area surrounding Hudson Canyon	EFH4: Roller rig and rockhopper gear restrictions	EFH5: Prohibit streetsweeper gear
Quota Overage	Direct	nc	nc	nc	unk	unk
	Indirect	nc	lp	lp	unk	unk
Trip Limits	Direct	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc
Derby Style Fishing	Direct	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc
Market Value	Direct	nc	nc	nc	nc	mn
	Indirect	nc	nc	nc	nc	lp
Landings	Direct	nc	mn	mn	unk	mn
	Indirect	nc	nc	nc	unk	lp
Revenues	Direct	nc	mn	mn	unk	mn
	Indirect	nc	nc	nc	unk	lp
Geographic Equity	Direct	nc	mn	ln	nc	nc
	Indirect	nc	nc	nc	nc	nc

Table 132. A comparison of the environmental impacts of the alternatives. The impact of the status quo measures is noted and significant impact of the remainder of the alternatives is relative to the status quo alternative under that category. Significance is evaluated by the context and intensity of the impact (40 CFR 1508.27). The following scale is used to denote the significance of the impact: high positive (hp), moderate positive (mp), low positive (lp), unknown impact (unk), no change (nc), low negative (ln), moderate negative (mn), high negative impact (hn).

Economic Impacts		Summer Flounder, Scup, and Black Sea Bass				
		EFH Alternatives				
		EFH1: Status Quo	EFH2: Prohibit bottom tending mobile gear from nearshore areas surrounding estuaries	EFH3: Prohibit bottom tending mobile gear from area surrounding Hudson Canyon	EFH4: Roller rig and rockhopper gear restrictions	EFH5: Prohibit streetsweeper gear
Seasonal Closures	Direct	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc
Implementation	Direct	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc
Enforceability	Direct	nc	mn	mn	nc	nc
	Indirect	nc	mn	nc	nc	nc
Geographic Consistency	Direct	nc	ln	ln	mp	mp
	Indirect	nc	nc	nc	nc	nc
Cumulative		mp	mp	mp	mp	mp

Table 132. A comparison of the environmental impacts of the alternatives. The impact of the status quo measures is noted and significant impact of the remainder of the alternatives is relative to the status quo alternative under that category. Significance is evaluated by the context and intensity of the impact (40 CFR 1508.27). The following scale is used to denote the significance of the impact: high positive (hp), moderate positive (mp), low positive (lp), unknown impact (unk), no change (nc), low negative (ln), moderate negative (mn), high negative impact (hn).

Social Impacts	Black Sea Bass Management Alternatives											
	Quota Management Alternatives											
		1: Status Quo	2: Quarterly quota with rollover provision		3 (a-b): By 3 permit categories		3 (c-d): By 2 permit categories		4: Two subregions with period allocations, Jan.-Apr. and May-Dec.		5: State by state	
		a:1988-1992	b:1988-1997	a: 1993-1997	a: 1988-1997	b: 1993-1997	c: 1988-1997	d: 1993-1997	a: 1988-1997	b: 1993-1997	a: 1988-1997	b: 1993-1997
Safety at Sea	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc-mn	unk-lp	unk-lp	mp	mp	mp	mp	mp	mp	mp	mp
Social Burdens Associated with Closures	Direct	nc-hn	unk-lp	unk-lp	mp	mp	mp	mp	mp	mp	mp	mp
	Indirect	nc-hn	unk-lp	unk-lp	mp	mp	mp	mp	mp	mp	mp	mp
Landings Patterns (Current or Historical)	Direct	nc-mn	unk-lp	unk-lp	mp	mp	mp	mp	mp	mp	mp	
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
User Group Allocations (Geographic, Gear Type, etc.)	Direct	nc-mn	nc	nc	mp	mp	mp	mp	mp	mp	mp	mp
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Cultural and Social Needs (Fishery, Community, Etc.)	Direct	nc-mn	nc	nc	mp	mp	mp	mp	mp	mp	mp	mp
	Indirect	nc-mn	nc	nc	mp	mp	mp	mp	mp	mp	mp	mp
Geographic Consistency	Direct	nc	nc	nc	mp	mp	mp	mp	ln	ln	mn	mn
	Indirect	nc	nc	nc	mp	mp	mp	mp	ln	ln	mn	mn
Practicability (Implementation)	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Nonconsumptive Human Activities	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc

Table 132. A comparison of the environmental impacts of the alternatives. The impact of the status quo measures is noted and significant impact of the remainder of the alternatives is relative to the status quo alternative under that category. Significance is evaluated by the context and intensity of the impact (40 CFR 1508.27). The following scale is used to denote the significance of the impact: high positive (hp), moderate positive (mp), low positive (lp), unknown impact (unk), no change (nc), low negative (ln), moderate negative (mn), high negative impact (hn).

Social Impacts		Black Sea Bass Management Alternatives										
		Quota Management Alternatives										
		1: Status Quo	2: Quarterly quota with rollover provision		3 (a-b): By 3 permit categories		3 (c-d): By 2 permit categories		4: Two subregions with period allocations, Jan.-Apr. and May-Dec.		5: State by state	
		a:1988-1992	b:1988-1997	a: 1993-1997	a: 1988-1997	b: 1993-1997	c: 1988-1997	d: 1993-1997	a: 1988-1997	b: 1993-1997	a: 1988-1997	b: 1993-1997
Enforcement	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Gear Conflicts	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Ports and Communities	Direct	nc-mn	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc-mn	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Cumulative		mn-long term social impacts associated with slow stock rebuilding	mn-long term social impacts associated with slow stock rebuilding	mn-long term social impacts associated with slow stock rebuilding	mp-long term social impacts associated with stock rebuilding	mp-long term social impacts associated with stock rebuilding	mp-long term social impacts associated with stock rebuilding	mp-long term social impacts associated with stock rebuilding	mp-long term social impacts associated with stock rebuilding	mp-long term social impacts associated with stock rebuilding	mp-long term social impacts associated with stock rebuilding	mp-long term social impacts associated with stock rebuilding

Table 132. A comparison of the environmental impacts of the alternatives. The impact of the status quo measures is noted and significant impact of the remainder of the alternatives is relative to the status quo alternative under that category. Significance is evaluated by the context and intensity of the impact (40 CFR 1508.27). The following scale is used to denote the significance of the impact: high positive (hp), moderate positive (mp), low positive (lp), unknown impact (unk), no change (nc), low negative (ln), moderate negative (mn), high negative impact (hn).

Social Impacts		Black Sea Bass Management Alternatives					
		Quota Management Alternatives					
		5: State by state		7: Hybrid, coastwide quota Jan.-Apr., subregional quotas May-Dec.		8: By gear type	
		c: best 5 years, 1988-1997	d: best 5 years, 1980-1997	a: 1988-1997	b: 1993-1997	a: 1988-1997	b: 1993-1997
Safety at Sea	Direct	nc	nc	nc	nc	nc	nc
	Indirect	mp	mp	mp	mp	mp	mp
Social Burdens Associated with Closures	Direct	mp	mp	mp	mp	mp	mp
	Indirect	mp	mp	mp	mp	mp	mp
Landings Patterns (Current or Historical)	Direct	mp		nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc	nc
User Group Allocations (Geographic, Gear Type, etc.)	Direct	mp	mp	mp	mp	mp	mp
	Indirect	nc	nc	nc	nc	nc	nc
Cultural and Social Needs (Fishery, Community, Etc.)	Direct	mp	mp	mp	mp	mp	mp
	Indirect	mp	mp	mp	mp	mp	mp
Nonconsumptive Human Activities	Direct	mn	mn	nc	nc	nc	nc
	Indirect	mn	mn	nc	nc	nc	nc
Gear Conflicts	Direct	nc	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc	nc
Ports and Communities	Direct	nc	nc	mp	mp	mp	mp
	Indirect	nc	nc	mp	mp	mp	mp
Cumulative		mp-long term social impacts associated with stock rebuilding	mp-long term social impacts associated with stock rebuilding	mp-long term social impacts associated with stock rebuilding	mp-long term social impacts associated with stock rebuilding	mp-long term social impacts associated with stock rebuilding	mp-long term social impacts associated with stock rebuilding

Table 132. A comparison of the environmental impacts of the alternatives. The impact of the status quo measures is noted and significant impact of the remainder of the alternatives is relative to the status quo alternative under that category. Significance is evaluated by the context and intensity of the impact (40 CFR 1508.27). The following scale is used to denote the significance of the impact: high positive (hp), moderate positive (mp), low positive (lp), unknown impact (unk), no change (nc), low negative (ln), moderate negative (mn), high negative impact (hn).

Social Impacts		Black Sea Bass Management Alternatives									
		Other Black Sea Bass Management Alternatives									
		9: Permit Requirements		10: Prohibit wet storage of black sea bass pots			11: Black sea bass pot/trap tag program		12: Limit on the number of pots		
		a: status quo	b: remove restriction of using Snapper/Grouper permit during northeast closure	a: status quo	b: during a closure of longer than 2 weeks	c: during a closure of longer than four weeks	a: status quo	b: tag requirement	a: status quo	b: limit of 400	c: limit of 800
Safety at Sea	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Social Burdens Associated with Closures	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Landings Patterns (Current or Historical)	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
User Group Allocations (Geographic, Gear Type, etc.)	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Cultural and Social Needs (Fishery, Community, Etc.)	Direct	nc-mn	mp	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc-mn	mp	nc	nc	nc	nc	nc	nc	nc	nc
Nonconsumptive Human Activities	Direct	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Gear Conflicts	Direct	nc	nc	nc-mn	mp	mp	nc	nc	nc	mp	mp
	Indirect	nc	nc	nc-mn	mp	mp	nc	nc	nc	mp	mp
Ports and Communities	Direct	nc-mn	mp	nc	nc	nc	nc	nc	nc	nc	nc
	Indirect	nc-mn	mp	nc	nc	nc	nc	nc	nc	nc	nc
Cumulative		nc	nc	nc	unk	unk	nc	unk	unk	mp	mp

Table 132. A comparison of the environmental impacts of the alternatives. The impact of the status quo measures is noted and significant impact of the remainder of the alternatives is relative to the status quo alternative under that category. Significance is evaluated by the context and intensity of the impact (40 CFR 1508.27). The following scale is used to denote the significance of the impact: high positive (hp), moderate positive (mp), low positive (lp), unknown impact (unk), no change (nc), low negative (ln), moderate negative (mn), high negative impact (hn).

Social Impacts		Summer Flounder, Scup, and Black Sea Bass				
		EFH Alternatives				
		EFH1: Status Quo	EFH2: Prohibit bottom tending mobile gear from nearshore areas surrounding estuaries	EFH3: Prohibit bottom tending mobile gear from area surrounding Hudson Canyon	EFH4: Roller rig and rockhopper gear restrictions	EFH5: Prohibit streetsweeper gear
Safety at Sea	Direct	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc
Social Burdens Associated with Closures	Direct	nc	nc	nc	nc	nc
	Indirect	nc	nc	nc	nc	nc
Landings Patterns (Current or Historical)	Direct	nc	mn	mn	unk	unk
	Indirect	nc	nc	nc	unk	unk
User Group Allocations (Geographic, Gear Type, etc.)	Direct	nc	hn	hn	nc	nc
	Indirect	nc	nc	nc	nc	nc
Cultural and Social Needs (Fishery, Community, Etc.)	Direct	nc	hn	hn	unk	unk
	Indirect	nc	nc	nc	unk	unk
Nonconsumptive Human Activities	Direct	nc	mp	mp	mn	mn
	Indirect	nc	mp	mp	mn	mn
Gear Conflicts	Direct	nc	nc	nc	mp	mp
	Indirect	nc	nc	nc	mp	mp
Ports and Communities	Direct	nc	mn	mn	unk	unk
	Indirect	nc	mn	mn	unk	unk
Cumulative		mp	mp	mp	mp	mp

Table 133. Potential changes in black sea bass landings associated with three state-by-state quota allocations and a hypothetical[1] commercial quota of 3,024,742 pounds for 2002 compared to the based year.

State	2000 Landings[2]	2002 quota based on 1988-1997 Landings	% Change	2002 quota Based on 1993-1997 Landings	% Change	2002 quota based on best 5-years[3] 1980-1997	% Change	2002 quota based on best 5-years[4] 1988-1997	% Change
ME	9	772	8480.55%	24	161.55%	1,646	18189.26%	1,213	13372.75%
MA	626,012	182,204	-70.89%	53,121	-91.51%	255,262	-59.22%	256,763	-58.98%
RI	101,494	160,529	58.17%	167,400	64.94%	349,066	243.93%	164,415	61.99%
CT	14,795	14,738	-0.39%	10,504	-29.00%	21,763	47.10%	18,130	22.54%
NY	134,960	147,461	9.26%	221,704	64.27%	144,326	6.94%	155,735	15.39%
NJ	588,110	1,057,306	79.78%	1,156,825	96.70%	745,864	26.82%	973,160	65.47%
DE	55,283	150,728	172.65%	146,285	164.61%	112,778	104.00%	142,229	157.27%
MD	304,927	401,057	31.53%	444,345	45.72%	303,965	-0.32%	385,874	26.55%
VA	648,118	635,154	-2.00%	642,612	-0.85%	687,073	6.01%	622,976	-3.88%
NC	185,334	274,793	48.27%	181,923	-1.84%	402,998	117.44%	304,249	64.16%
Total	2,659,042	3,024,742	13.75%	3,024,742	13.75%	3,024,742	13.75%	3,024,742	13.75%

[1]This is the same commercial quota level that has been in place since the implementation of Amendment 9.
[2]Preliminary Dealer data.
[3]Best 5-years commercial landings for each state during the 1980 to 1997 period.
[4]Best 5-years commercial landings for each state during the 1988 to 1997 period.

Table 134. Black sea bass landings (percentage) by gear type and month, Maine to Cape Hatteras, North Carolina, 1988-1997 combined.

	Month											
Gear	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bottom/Mid water trawls	76.92	82.28	85.69	74.84	11.43	5.22	5.31	6.41	5.44	7.46	11.88	28.11
Pot/Traps	17.59	14.11	10.34	19.78	78.47	84.81	77.70	67.38	72.06	77.55	74.93	63.25
Gill Nets	0.02	0.04	0.26	0.38	0.92	0.46	0.12	0.57	0.72	0.77	0.94	0.20
Lines	5.37	3.44	3.60	4.45	6.25	6.94	15.27	22.15	18.30	12.53	11.52	8.01
Other	0.10	0.12	0.12	0.54	2.93	2.57	1.60	3.49	3.48	1.69	0.74	0.43
Total	100.00	99.99	100.01	99.99	100.00	100.00	100.00	100.00	100.00	100.00	100.01	100.00

Table 135. Potential changes in black sea bass landings associated with the hybrid allocation system during the first (January-April) and second (May-December) periods for a hypothetical[1] overall commercial quota of 3,024,742 pounds for 2002.

Period	2000 Landings[2]	2002 allocation based on 88-97 landings	% Change	2002 allocation based on 93-97 landings	% Change	2002 allocation based on 90-97 landings	% Change
Jan-Apr	1,071,038	1,368,091	27.74%	1,310,318	22.34%	1,517,816	41.71%
May-Dec	1,588,004	1,656,651	4.32%	1,714,424	7.96%	1,506,926	-5.11%
Total	2,659,042	3,024,742	13.75%	3,024,742	13.75%	3,024,742	13.75%

[1]This is the same commercial quota level that has been in place since the implementation of Amendment 9.
[2]Preliminary Dealer Data.

Table 136. Potential changes in black sea bass landings associated with the hybrid allocation system during the second period (May-December) --state-by-state -- for a hypothetical[1] overall commercial quota of 3,024,742 pounds for 2002.

State	2000 Landings[2]	2002 allocation based on 88-97 landings	% Change	2002 allocation based on 93-97 landings	% Change	2002 allocation based on 80-97 landings	% Change
ME	9	334	3612.74%	0	-100.00%	187	1976.73%
MA	625,459	97,355	-84.43%	50,826	-91.87%	151,182	-75.83%
RI	67,790	87,151	28.56%	79,657	17.51%	204,439	201.58%
CT	3,266	2,547	-22.02%	5,567	70.46%	1,319	-59.62%
NY	76,929	86,891	12.95%	119,814	55.75%	97,301	26.48%
NJ	239,151	650,939	172.19%	673,267	181.52%	503,312	110.46%
DE	51,567	88,354	71.34%	75,808	47.01%	28,655	-44.43%
MD	281,473	392,352	39.39%	438,627	55.83%	309,140	9.83%
VA	202,404	180,994	-10.58%	205,467	1.51%	156,673	-22.59%
NC	39,956	69,734	74.53%	65,389	63.65%	54,719	36.95%
Total	1,588,004	1,656,651	4.32%	1,714,424	7.96%	1,506,926	-5.11%

[1]This is the same commercial quota level that has been in place since the implementation of Amendment 9.
[2]Preliminary Dealer Data.

Table 137. Potential changes in black sea bass landings associated with the hybrid allocation system during the second period (May-December) --by region-- for a hypothetical[1] overall commercial quota of 3,024,742 pounds for 2002.

Region	2000 Landings[2]	2002 allocation based on 88-97 landings	% Change	2002 allocation based on 93-97 landings	% Change
North	1,012,604	274,278	-72.91%	255,865	-74.73%
South	575,400	1,382,373	140.25%	1,458,559	153.49%
Total	1,588,004	1,656,651	4.32%	1,714,424	7.96%

[1]This is the same commercial quota level that has been in place since the implementation of Amendment 9.
[2]Preliminary Dealer Data.

Table 138. Potential changes in black sea bass landings associated with gear allocation for a hypothetical[1] quota of 3,024,742 pounds for 2000.

Gear Type	2000 Landings[1]	2002 allocation based on 88-97 landings	% Change	2002 allocation based on 93-97 landings	% Change
Bottom/Mid water trawls	794,461	1,385,937	74.45	1,376,560	73.27
Pot/Traps	1,298,031	1,352,665	4.21	1,304,874	0.53
Gill Nets	41,534	12,099	-70.87	19,661	-52.66
Lines	363,511	234,418	-35.51	253,171	-30.35
Other	161,505	39,624	-75.47	70,476	-56.36
Total	2,659,042	3,024,742	13.75	3,024,742	13.75

[1]Preliminary Dealer Data.

Table 139. Landings ('000 lbs) of MAFMC managed fish and squid in 1973, 1987, and 1997.

SPECIES	1973	1987	1997
Bluefish		12,945	8,982
Summer flounder		27,053	8,975
Scup		13,382	4,804
Black sea bass		4,167	2,458
Atlantic mackerel	864,066	116,801	33,155
Loligo	82,936	55,799	35,664
Illex	42,236	22,623	9,548
Butterfish	42,896	9,940	5,933
Surfclam		47,923	41,021
Ocean Quahogs		47,430	*42,790
Spiny Dogfish		5,959	45,188
Tilefish		7,075	3,905

Source: Council FMPs.

* Excludes Maine fishery.

Note: To look at the entire time series of landings please refer to individual FMPS.

Table 140. Catch disposition for trips that kept 100 or more pounds of summer flounder, 1999, all gear combined.

Species	Landed (lbs)	% of Total Landed	Discarded (lbs)	% of Total Discarded	Total Catch (lbs)
.	1352	65.887	700	34.1131	2052
ANGLER	1662985	97.859	36377	2.1406	1699362
BLUEFISH	284353	99.869	374	0.1314	284727
BONITO	3831	88.15	515	11.85	4346
BUTTERFISH	1209071	97.998	24704	2.0023	1233775
COBIA	1239	100	0	0	1239
COD	508453	99.678	1642	0.3219	510095
CROAKER, ATLANTIC	1236243	99.532	5810	0.4678	1242053
CUNNER	4	100	0	0	4
CUSK	1347	100	0	0	1347
RIBBONFISH	2	100	0	0	2
DRUM, NK	370	100	0	0	370
DOLPHIN FISH	58	100	0	0	58
DRUM, BLACK	2112	95.479	100	4.5208	2212
DRUM, RED	34	100	0	0	34
HERRING, BLUE BACK	4154	74.685	1408	25.3146	5562
EEL, CONGER	3237	100	0	0	3237
EEL, NK	3196	100	0	0	3196
FLOUNDER, WINTER	1251680	99.18	10353	0.8203	1262033
FLOUNDER, SUMMER	8953018	98.239	160493	1.761	9113511
FLOUNDER, WITCH	226233	99.644	809	0.3563	227042
FLOUNDER, YELLOWTAIL	2385847	99.326	16201	0.6745	2402048
FLOUNDER, AM. PLAICE	137676	99.597	557	0.4029	138233
FLOUNDER, SAND-DAB	121363	93.532	8393	6.4683	129756
FLOUNDERS (NK)	105353	99.877	130	0.1232	105483
FLOUNDER, FOURSPOT	5734	99.29	41	0.71	5775
MACKEREL, FRIGATE	500	100	0	0	500
GROUPER	800	100	0	0	800
HADDOCK	161108	100	0	0	161108
HAKE, RED	884799	97.66	21196	2.3395	905995
HAKE, WHITE	227517	98.398	3705	1.6024	231222
HAKE MIX RED & WHITE	73644	99.973	20	0.0272	73664
HALIBUT, ATLANTIC	244	100	0	0	244
HERRING, ATLANTIC	32971	90.652	3400	9.3481	36371
JOHN DORY	11375	99.562	50	0.4376	11425
MACKEREL, KING	16	100	0	0	16
WHITING, KING	179102	99.998	3	0.0017	179105
MACKEREL, ATLANTIC	585613	98.701	7710	1.2995	593323
MACKEREL, CHUB	49	100	0	0	49
MENHADEN	4800	100	0	0	4800
MULLETS	18132	100	0	0	18132
REDFISH	4537	99.452	25	0.548	4562
POUT, OCEAN	10352	99.043	100	0.9568	10452
POLLOCK	36060	99.448	200	0.5516	36260
SCULPINS	32	100	0	0	32
SEA RAVEN	1169	95.118	60	4.882	1229
SCUP	821813	98.794	10030	1.2058	831843
SCAD, ROUGH	20	100	0	0	20
SEA BASS, BLACK	508659	99.491	2602	0.5089	511261
SEA ROBINS	13384	97.987	275	2.0133	13659
WEAKFISH, SQUETEAGUE	173520	99.9	174	0.1002	173694
WEAKFISH, SPOTTED	19118	95.83	832	4.1704	19950
DOGFISH CHAIN	19541	99.364	125	0.6356	19666
SHAD, AMERICAN	4041	99.951	2	0.0495	4043
SHARK, SAND TIGER	20	100	0	0	20
DOGFISH (NK)	134284	95.566	6230	4.4337	140514
DOGFISH SMOOTH	40550	98.813	487	1.1867	41037
DOGFISH SPINY	892739	92.579	71560	7.4209	964299
SHARK, THRESHER	32	100	0	0	32
SHARK, MAKO SHORTFIN	32	100	0	0	32
SHEEPSHEAD	4012	100	0	0	4012

Table 140 (continued). Catch disposition for trips that kept 100 or more pounds of summer flounder, 1999, all gear combined.

Species	Landed (lbs)	% of Total Landed	Discarded (lbs)	% of Total Discarded	Total Catch (lbs)
SPADEFISH	762	100	0	0	762
MACKEREL, SPAN	386	100	0	0	386
SPOT	12603	100	0	0	12603
BASS, STRIPED	7265	87.33	1054	12.6698	8319
SUNFISHES	10	100	0	0	10
PUFFER, NORTHERN	4611	100	0	0	4611
TAUTOG	6718	98.173	125	1.8267	6843
TILEFISH	32188	99.774	73	0.2263	32261
TOADFISH, OYSTER	775	100	0	0	775
TRIGGERFISH	363	100	0	0	363
TUNA, SKIPJACK	607	100	0	0	607
TUNA, ALBACORE	420	100	0	0	420
SHARK, WHITE	175	100	0	0	175
SHARK, PORBEAGLE	422	100	0	0	422
SHARK, SANDBAR	200	100	0	0	200
SHARK, DUSKY	66	100	0	0	66
SHARK, BLACK TIP	35	100	0	0	35
SHARK, BLUE	35	100	0	0	35
WHITING, BLACK	305428	99.527	1450	0.4725	306878
HAKE, SILVER	6311807	99.081	58569	0.9194	6370376
WOLFFISHES	3641	100	0	0	3641
OTHER FISH	26916	96.376	1012	3.6236	27928
CRAB, BLUE	13548	91.863	1200	8.1367	14748
CRAB, RED	10	100	0	0	10
CRAB, JONAH	1021	100	0	0	1021
CRAB, ROCK	2289	100	0	0	2289
CRAB, NK	52130	58.682	36705	41.3182	88835
CRAB, CANCER	1471	100	0	0	1471
CRAB, HORSESHOE	318483	71.984	123954	28.0162	442437
LOBSTER	47218	96.228	1851	3.7722	49069
SHRIMP (NK)	9520	100	0	0	9520
SHRIMP (PANDALID)	201669	100	0	0	201669
QUAHOG, OCEAN	5	100	0	0	5
CLAM, SURF	10	100	0	0	10
CONCHS	16986	97.335	465	2.6646	17451
WHELK, CHANNELED	47815	99.476	252	0.5243	48067
WHELK, KNOBBED	17135	99.287	123	0.7127	17258
WHELK, LIGHTNING	81	100	0	0	81
OCTOPUS	5	100	0	0	5
SCALLOP, SEA	2032817	99.083	18821	0.9174	2051638
SQUID (LOLIGO)	8158284	99.858	11595	0.1419	8169879
SQUID (ILLEX)	86338	100	0	0	86338
SQUIDS (NS)	1856011	99.774	4209	0.2263	1860220
SEA CUCUMBERS	2	100	0	0	2
STARFISH	25	0.775	3200	99.2248	3225
OTHER SHELLFISH	566	17.877	2600	82.1226	3166

Table 141. Catch disposition for trips that kept 100 or more pounds of scup, 1999, all gear combined.

Species	Landed (lbs)	% of Total Landed	Discarded (lbs)	% of Total Discarded	Total Catch (lbs)
BONITO	1467	74.581	500	25.4194	1967
BUTTERFISH	225172	98.775	2792	1.2248	227964
COD	7736	99.845	12	0.1549	7748
CUNNER	76	17.234	365	82.7664	441
CUSK	500	100	0	0	500
DRUM, BLACK	8	100	0	0	8
HERRING, BLUE BACK	190	100	0	0	190
EEL, CONGER	66	100	0	0	66
EEL, NK	1129	100	0	0	1129
FLOUNDER, WINTER	47087	97.937	992	2.0633	48079
FLOUNDER, SUMMER	202027	90.968	20058	9.0317	222085
FLOUNDER, WITCH	3160	100	0	0	3160
FLOUNDER, YELLOWTAIL	11740	99.728	32	0.2718	11772
FLOUNDER, AM. PLAICE	3620	99.862	5	0.1379	3625
FLOUNDER, SAND-DAB	573	100	0	0	573
FLOUNDERS (NK)	952	98.96	10	1.0395	962
FLOUNDER, FOURSPOT	697	100	0	0	697
MACKEREL, FRIGATE	200	100	0	0	200
GRUNTS	9	100	0	0	9
HADDOCK	1000	100	0	0	1000
HAKE, RED	262921	98.838	3090	1.1616	266011
HAKE, WHITE	82993	98.54	1230	1.4604	84223
HAKE MIX RED & WHITE	5730	100	0	0	5730
HALIBUT, ATLANTIC	20	100	0	0	20
HERRING, ATLANTIC	96257	99.074	900	0.9263	97157
JOHN DORY	3639	100	0	0	3639
WHITING, KING	18753	100	0	0	18753
MACKEREL, ATLANTIC	242815	100	0	0	242815
MENHADEN	6900	100	0	0	6900
MULLETS	30	100	0	0	30
REDFISH	1320	100	0	0	1320
POUT, OCEAN	856	100	0	0	856
POLLOCK	1510	100	0	0	1510
SEA RAVEN	103	100	0	0	103
SCUP	2372371	98.401	38542	1.5986	2410913
SEA BASS, BLACK	266534	92.112	22825	7.8881	289359
SEA ROBINS	5437	95.52	255	4.48	5692
WEAKFISH, SQUETEAGUE	37464	99.907	35	0.0933	37499
WEAKFISH, SPOTTED	22859	99.586	95	0.4139	22954
DOGFISH CHAIN	17329	99.552	78	0.4481	17407
SHAD, AMERICAN	1702	85.015	300	14.985	2002
DOGFISH (NK)	27557	99.638	100	0.3616	27657
DOGFISH SMOOTH	3631	99.425	21	0.575	3652
DOGFISH SPINY	49383	91.978	4307	8.022	53690
SKATES	345091	95.47	16375	4.5302	361466
SPADEFISH	25	100	0	0	25
BASS, STRIPED	1184	95.33	58	4.6699	1242
STURGEONS	70	100	0	0	70
TAUTOG	6031	97.321	166	2.679	6197
TILEFISH	2094	100	0	0	2094
TRIGGERFISH	12	100	0	0	12
TUNA NK	42	100	0	0	42
SHARK, BLACK TIP	29	100	0	0	29
WHITING, BLACK	78543	99.493	400	0.507	78943
HAKE, SILVER	969989	99.447	5392	0.553	975381
WOLFFISHES	1000	100	0	0	1000
OTHER FISH	8150	99.89	9	0.11	8159
CRAB, JONAH	120	100	0	0	120
LOBSTER	2791	93.501	194	6.499	2985
WHELK, CHANNELED	10	100	0	0	10
SCALLOP, SEA	120	100	0	0	120
SQUID (LOLIGO)	1254436	99.889	1400	0.111	1255836
SQUID (ILLEX)	34857	100	0	0	34857
SQUIDS (NS)	276140	99.928	200	0.072	276340

Table 142. Catch disposition for trips that kept 100 or more pounds of black sea bass, 1999, all gear combined.

Species	Landed (lbs)	% of Total Landed	Discarded (lbs)	% of Total Discarded	Total Catch (lbs)
BLUEFISH	130471	99.889	145	0.111	130616
BONITO	1378	100	0	0	1378
BUTTERFISH	380750	97.853	8355	2.1472	389105
COBIA	62	100	0	0	62
COD	17366	99.919	14	0.0806	17380
CREVALLE	23	100	0	0	23
CROAKER, ATLANTIC	910288	99.78	2009	0.2202	912297
CUNNER	705	59.949	471	40.051	1176
CUSK	4	100	0	0	4
DOLPHIN FISH	456	98.701	6	1.2987	462
DRUM, BLACK	8	100	0	0	8
HERRING, BLUE BACK	2425	66.749	1208	33.2508	3633
EEL, CONGER	11462	100	0	0	11462
EEL, NK	24579	99.862	34	0.1381	24613
FLOUNDER, WINTER	71929	99.886	82	0.1139	72011
FLOUNDER, SUMMER	1160804	97.101	34658	2.8991	1195462
FLOUNDER, WITCH	21242	99.953	10	0.0471	21252
FLOUNDER, YELLOWTAIL	9418	99.524	45	0.4755	9463
FLOUNDER, AM. PLAICE	681	100	0	0	681
FLOUNDER, SAND-DAB	1572	100	0	0	1572
FLOUNDERS (NK)	827	100	0	0	827
FLOUNDER, FOURSPOT	2337	100	0	0	2337
GROUPER	1529	100	0	0	1529
GRUNTS	300	97.72	7	2.2801	307
HADDOCK	6773	100	0	0	6773
HAKE, RED	419949	98.638	5798	1.3618	425747
HAKE, WHITE	76451	98.353	1280	1.6467	77731
HAKE MIX RED & WHITE	11860	100	0	0	11860
HALIBUT, ATLANTIC	25	100	0	0	25
HERRING, ATLANTIC	13075	100	0	0	13075
JOHN DORY	15307	100	0	0	15307
MACKEREL, KING	7	100	0	0	7
WHITING, KING	37163	100	0	0	37163
MACKEREL, ATLANTIC	996886	99.361	6410	0.6389	1003296
MULLETS	200	100	0	0	200
REDFISH	20	100	0	0	20
ROSEFISH,BLK BELLIED	121	100	0	0	121
POUT, OCEAN	4135	96.118	167	3.8819	4302
PIGFISH	509	100	0	0	509
POLLOCK	1207	99.097	11	0.9031	1218
POMPANO, COMMON	3	100	0	0	3
SCULPINS	20	100	0	0	20
SEA RAVEN	390	90.698	40	9.3023	430
SCUP	996804	97.911	21267	2.089	1018071
SEA BASS, BLACK	2267913	92.322	188616	7.6782	2456529
SNAPPER	69	100	0	0	69
SEA ROBINS	3581	87.834	496	12.1658	4077
WEAKFISH, SQUETEAGUE	25237	97.301	700	2.6988	25937
WEAKFISH, SPOTTED	7053	91.681	640	8.3193	7693
DOGFISH CHAIN	10923	99.854	16	0.1463	10939
SHAD, AMERICAN	1238	99.839	2	0.1613	1240
DOGFISH (NK)	71549	99.958	30	0.0419	71579
DOGFISH SMOOTH	1538	99.805	3	0.1947	1541
DOGFISH SPINY	211969	99.653	739	0.3474	212708
SHEEPSHEAD	539	100	0	0	539
SKATES	241838	99.668	806	0.3322	242644
SPADEFISH	215	100	0	0	215
MACKEREL, SPAN	502	100	0	0	502

Table 142 (continued). Catch disposition for trips that kept 100 or more pounds of black sea bass, 1999, all gear combined.

Species	Landed (lbs)	% of Total Landed	Discarded (lbs)	% of Total Discarded	Total Catch (lbs)
TAUTOG	25563	85.569	4311	14.4306	29874
TILEFISH	67430	99.97	20	0.0297	67450
TOADFISH, OYSTER	71	100	0	0	71
TRIGGERFISH	4043	99.459	22	0.5412	4065
TUNA NK	57	100	0	0	57
TUNA, ALBACORE	200	100	0	0	200
TUNA, YELLOWFIN	1589	100	0	0	1589
SHARK, BLACK TIP	38	100	0	0	38
SHARK, ATL SHARPNOSE	2	100	0	0	2
WHITING, BLACK	222736	99.821	400	0.1793	223136
HAKE, SILVER	1822887	99.475	9612	0.5245	1832499
WOLFFISHES	1034	100	0	0	1034
OTHER FISH	3367	100	0	0	3367
CRAB, JONAH	27897	95.744	1240	4.2558	29137
CRAB, ROCK	581	99.828	1	0.1718	582
CRAB, NK	159	3.805	4020	96.1953	4179
CRAB, HORSESHOE	5699	100	0	0	5699
LOBSTER	79067	90.641	8164	9.3591	87231
CONCHS	827	100	0	0	827
WHELK, CHANNELED	59637	99.931	41	0.0687	59678
WHELK, KNOBBED	324	100	0	0	324
OCTOPUS	5	100	0	0	5
SCALLOP, CALICO	140	100	0	0	140
SCALLOP, SEA	55120	99.101	500	0.899	55620
SQUID (LOLIGO)	1855099	99.829	3174	0.1708	1858273
SQUID (ILLEX)	18978	100	0	0	18978
SQUIDS (NS)	333004	99.988	40	0.012	333044
OTHER SHELLFISH	30	100	0	0	30

Table 143. Catch disposition for trips that kept 100 or more pounds of summer flounder, 1999, trawl gear.

Species	Landed (lbs)	% of Total Landed	Discarded (lbs)	% of Total Discarded	Total Catch (lbs)
BLUEFISH	1096	89.91	123	10.09	1219
BUTTERFISH	5984	17.728	27770.8	82.272	33754.8
COD	2	100	0	0	2
CROAKER, ATLANTIC	1169	92.265	98	7.735	1267
DRUM, BLACK	0	0	28	100	28
DRUM, RED	50	100	0	0	50
EEL, CONGER	1	1.563	63	98.438	64
FLOUNDER, WINTER	0	0	50	100	50
FLOUNDER, SUMMER	60109	80.433	14623	19.567	74732
FLOUNDER, WITCH	8	2.597	300	97.403	308
FLOUNDER, AM. PLAICE	0	0	212	100	212
FLOUNDER, SAND-DAB	30	3.133	927.5	96.867	957.5
FLOUNDERS (NK)	0	0	8	100	8
FLOUNDER, FOURSPOT	0	0	18322.5	100	18322.5
HOGCHOCKER	0	0	15	100	15
HADDOCK	0	0	3	100	3
HAKE, RED	5488	14.879	31395	85.121	36883
HAKE, WHITE	24	100	0	0	24
HERRING (NK)	2	0.013	15742	99.987	15744
HERRING, ATLANTIC	0	0	11056	100	11056
SHAD, HICKORY	0	0	40	100	40
JOHN DORY	5	9.434	48	90.566	53
MACKEREL, ATLANTIC	3042	67.034	1496	32.966	4538
REDFISH	0	0	2	100	2
ROSEFISH,BLK BELLIED	0	0	5	100	5
POUT, OCEAN	0	0	40	100	40
SCULPINS	0	0	360	100	360
SCUP	1926	16.551	9710.5	83.449	11636.5
PORGY, NK	0	0	0.5	100	0.5
SEA BASS, BLACK	2089.5	94.071	131.7	5.929	2221.2
SNAPPER	2	40	3	60	5
SEA ROBIN, NORTHERN	9	0.159	5666	99.841	5675
SEA ROBINS	0	0	2487	100	2487
SEA ROBIN, STRIPED	5	0.718	691	99.282	696
SEA ROBIN, ARMORED	0	0	132	100	132
WEAKFISH, SQUETEAGUE	855	98.107	16.5	1.893	871.5
SHAD, AMERICAN	0	0	57	100	57
DOGFISH (NK)	0	0	6	100	6
DOGFISH SMOOTH	0	0	298	100	298
DOGFISH SPINY	150	1.588	9295	98.412	9445
SHEEPSHEAD	171	100	0	0	171
SKATE, ROSETTE	0	0	7	100	7
SKATES	300	11.278	2360	88.722	2660
SKATE, LITTLE	0	0	8508	100	8508
SKATE, BIG	30	0.467	6395	99.533	6425
SKATE, BARNDOOR	0	0	537	100	537
SKATE, THORNY	0	0	50	100	50
SKATE, CLEARNOSE	0	0	20370	100	20370
SPADEFISH	65	100	0	0	65
MACKEREL, SPAN	0	0	1.5	100	1.5
SPOT	150	61.475	94	38.525	244
PUFFER, NORTHERN	0	0	4.3	100	4.3
PUFFER, NK	0	0	21	100	21
TAUTOG	3	100	0	0	3
TILEFISH	69	63.889	39	36.111	108
TRIGGERFISH	5	100	0	0	5
SHARK, ANGEL	0	0	56	100	56
HAKE, SILVER	38781	73.883	13709	26.117	52490
OTHER FISH	0	0	0.2	100	0.2
HAKE, NK	1120	24.38	3474	75.62	4594
BATFISH, ATLANTIC	6	75	2	25	8

Table 143 (continued). Catch disposition for trips that kept 100 or more pounds of summer flounder, 1999, trawl gear.

Species	Landed (lbs)	% of Total Landed	Discarded (lbs)	% of Total Discarded	Total Catch (lbs)
COWNOSE RAY	0	0	135	100	135
REMORA, NK	0	0	126	100	126
DEBRIS, NK	0	0	207	100	207
DEBRIS, FISHING GEAR	0	0	2884	100	2884
DEBRIS, WOOD	0	0	78	100	78
STOMACH CONTENTS, UNID	0	0	14	100	14
ANCHOVY, NK	0	0	9	100	9
SNAIL, MOONSHELL, NK	0	0	21	100	21
CORAL, STONY NK	0	0	1360	100	1360
CRAB, BLUE	0	0	36	100	36
CRAB, JONAH	158	35.426	288	64.574	446
CRAB, ROCK	7	1.852	371	98.148	378
CRAB, NK	0	0	153.5	100	153.5
CRAB, SPIDER	0	0	395	100	395
CRAB, HORSESHOE	9	0.172	5217	99.828	5226
LOBSTER	128	66.667	64	33.333	192
SHRIMP (MANTIS)	0	0	1	100	1
CLAM NK	0	0	2	100	2
CONCHS	871	85.728	145	14.272	1016
OCTOPUS	5	6.173	76	93.827	81
SCALLOP, SEA	277.5	5.754	4545.5	94.246	4823
SQUID (LOLIGO)	19189	92.162	1632	7.838	20821
SQUID (ILLEX)	0	0	1354	100	1354
SQUIDS (NS)	7	63.636	4	36.364	11
SEA URCHINS	0	0	0.5	100	0.5
STARFISH	0	0	1668	100	1668

Table 144. Catch disposition for trips that kept 100 or more pounds of scup, 1999, trawl gear.

Species	Landed (lbs)	% of Total Landed	Discarded (lbs)	% of Total Discarded	Total Catch (lbs)
FLOUNDER, WITCH	0	0	3	100	3
FLOUNDER, SAND-DAB	0	0	10	100	10
FLOUNDER, FOURSPOT	0	0	2049	100	2049
HADDOCK	0	0	10	100	10
HAKE, RED	1538	10.595	12978	89.405	14516
HAKE, WHITE	0	0	8	100	8
HERRING (NK)	0	0	60	100	60
HERRING, ATLANTIC	0	0	1260	100	1260
SHAD, HICKORY	0	0	30	100	30
MACKEREL, ATLANTIC	60765	96.112	2458	3.888	63223
MENHADEN	0	0	15	100	15
SCUP	6401	20.924	24190	79.076	30591
SEA BASS, BLACK	1180	85.445	201	14.555	1381
SNAPPER	40	90.909	4	9.091	44
SEA ROBIN, NK	4	0.064	6263	99.936	6267
WEAKFISH, SQUETEAGUE	1056	55.288	854	44.712	1910
SHAD, AMERICAN	6	46.154	7	53.846	13
DOGFISH SPINY	0	0	2520	100	2520
SKATE, LITTLE	0	0	988	100	988
HAKE, SILVER	4482	78.084	1258	21.916	5740
HAKE, NK	0	0	7	100	7
LAMPREY, NK	4	66.667	2	33.333	6
DEBRIS, FISHING GEAR	0	0	60	100	60
CRAB, ROCK	6	1.929	305	98.071	311
LOBSTER	43	81.132	10	18.868	53
SCALLOP, SEA	203	4.412	4398	95.588	4601
SQUID (LOLIGO)	1936	94.995	102	5.005	2038
SQUID (ILLEX)	0	0	3	100	3
SQUIDS (NS)	20	100	0	0	20

Table 145. Catch disposition for trips that kept 100 or more pounds of black sea bass, 1999, trawl gear.

Species	Landed (lbs)	% of Total Landed	Discarded (lbs)	% of Total Discarded	Total Catch (lbs)
FLOUNDER, SUMMER	396	20.37	1548	79.63	1944
FLOUNDER, WITCH	0	0	9.5	100	9.5
FLOUNDER, FOURSPOT	0	0	293	100	293
HAKE, RED	820	21.382	3015	78.618	3835
HERRING, ATLANTIC	0	0	220	100	220
JOHN DORY	0	0	6	100	6
MACKEREL, ATLANTIC	11373	94.894	612	5.106	11985
SCUP	2508	16.798	12422	83.202	14930
SEA BASS, BLACK	1802	45.322	2174	54.678	3976
SEA ROBIN, NORTHERN	7	0.508	1371	99.492	1378
WEAKFISH, SQUETEAGUE	267	100	0	0	267
DOGFISH SPINY	0	0	640	100	640
SKATE, LITTLE	0	0	345	100	345
HAKE, SILVER	2557	78.412	704	21.588	3261
HAKE, NK	255	62.963	150	37.037	405
LAMPREY, NK	4	66.667	2	33.333	6
DEBRIS, FISHING GEAR	0	0	60	100	60
CRAB, JONAH	4	36.364	7	63.636	11
CRAB, ROCK	5	5.208	91	94.792	96
LOBSTER	12	85.714	2	14.286	14
SCALLOP, SEA	42	3.189	1275	96.811	1317
SQUID (LOLIGO)	978	93.858	64	6.142	1042
SQUID (ILLEX)	0	0	10	100	10

Table 146. Mean recreational anglers' ratings of reasons for marine fishing, by subregion.

	New England			Mid-Atlantic		
Statement	Not Important	Somewhat Important	Very Important	Not Important	Somewhat Important	Very Important
To Spend Quality Time with Friends and Family	4.4%	14.3%	81.3%	3.0%	12.0%	85.0%
To Enjoy Nature and the Outdoors	1.4%	10.1%	88.5%	1.1%	11.6%	87.3%
To Catch Fish to Eat	42.2%	37.4%	20.4%	29.3%	40.1%	30.6%
To Experience the Excitement or Challenge of Sport Fishing	6.2%	24.9%	68.8%	8.4%	26.0%	65.6%
To be Alone	55.0%	27.9%	17.1%	57.7%	25.8%	16.4%
To Relax and Escape from my Daily Routine	3.4%	13.3%	83.3%	2.6%	11.9%	85.5%
To Fish in a Tournament of when Citations are Available	78.6%	14.0%	7.4%	73.4%	17.1%	9.5%

Source: Steinback and O'Neil. MS.

Table 147. Mean recreational anglers' ratings of fishing regulation methods, by subregion.

	New England		Mid-Atlantic	
Type of Regulation	Support	Oppose	Support	Oppose
Limits on Minimum Size of Fish You Can Keep	92.5%	7.5%	93.2%	6.8%
Limits on the Number of Fish You Can Keep	91.1%	8.9%	88.3%	11.7%
Limits on the Times of the Year When You Can Keep the Fish You Catch	78.8%	21.2%	77.1%	22.9%
Limits on the Areas You Can Catch Fish	67.9%	32.1%	66.0%	34.0%

Source: Steinback and O'Neil. MS.

Table 148. Potential changes in black sea bass landings associated with the subregional allocation system.

Subregion	2000 Landings[1]	2002 allocation based on 88-97 landings	% Change	2002 allocation based on 93-97 landings	% Change
North	877,270	505,737	-42.35%	452,804	-48.38%
South	1,781,772	2,519,005	41.38%	2,571,938	44.35%
Total	2,659,042	3,024,742	13.75%	3,024,742	13.75%

Northern Region

Period	2000 Landings[1]	2002 allocation based on 88-97 landings	% Change	2002 allocation based on 93-97 landings	% Change
Jan-Apr	103,817	164,516	58.47%	175,145	68.71%
May-Dec	773,453	341,221	-55.88%	277,659	-64.10%
Total	877,270	505,737	-42.35%	452,804	-48.38%

Southern Region

Period	2000 Landings[1]	2002 allocation based on 88-97 Landings	% Change	2002 allocation based on 93-97 Landings	% Change
Jan-Apr	967,221	1,189,222	22.95%	1,133,196	17.16%
May-Dec	814,551	1,329,783	63.25%	1,438,742	76.63%
Total	1,781,772	2,519,005	41.38%	2,571,938	44.35%

[1]Preliminary Dealer Data.

Table 149. State-by-state allocations based on black sea bass commercial landings for various time periods and a hypothetical[1] commercial TAL of 3,024,742 pounds for 2002.

State	% Years 1988-1997	lbs	% Years 1993-1997	lbs	% Best 5-years[2] 1980-1997	lbs	% Best 5-years[3] 1988-1997	lbs
ME	0.02553	772	0.00078	24	0.05442	1,646	0.04009	1,213
MA	6.02379	182,204	1.75622	53,121	8.43915	255,262	8.48876	256,763
RI	5.30718	160,529	5.53435	167,400	11.54037	349,066	5.43565	164,415
CT	0.48724	14,738	0.34728	10,504	0.71951	21,763	0.59939	18,130
NY	4.87516	147,461	7.32968	221,704	4.77150	144,326	5.14870	155,735
NJ	34.95525	1,057,306	38.24540	1,156,825	24.65877	745,864	32.17333	973,160
DE	4.98318	150,728	4.83627	146,285	3.72852	112,778	4.70218	142,229
MD	13.25920	401,057	14.69033	444,345	10.04929	303,965	12.75725	385,874
VA	20.99862	635,154	21.24519	642,612	22.71508	687,073	20.59599	622,976
NC	9.08484	274,793	6.01449	181,923	13.32338	402,998	10.05866	304,249
Total	100.00000	3,024,742	100.00000	3,024,742	100.00000	3,024,742	100.00000	3,024,742

[1]This is the same commercial quota level that has been in place since the implementation of Amendment 9.
[2]Best 5-years commercial landings for each state during the 1980 to 1997 period.
[3]Best 5-years commercial landings for each state during the 1988 to 1997 period.

Table 150. Counties identified as having >= 4 impacted vessels as a consequence of various evaluated alternatives in this document (Section 4.0 of the PREE).

State	County[a]	Population[b]	Employment[c]	Total Personal Income[d] (million of $'s)	Commercial Fishing Employment	Percent of Personal Income Derived from Commercial Fishing	Fresh and Frozen Seafood Processing Employment	Percent of Personal Income Derived from Seafood Processing
MA	Barnstable	213,221	120,375	3,729.63	1,105	0.68%	32	0.03%
MA	Suffolk	656,503	699,650	35,168.70	219	0.01%	374	0.04%
VA	City of Norfolk	218,954	234,331	9,207.74	4	<0.01%	70	0.01%
VA	City of VA Beach	439,892	223,837	6,530.41	14	<0.01%	0	0

a = Data obtained from the Minnesota IMPLAN Group, Inc., IMPLAN System (data and software), 1725 Tower Drive West, Suite 140, Stillwater, MN 55082, www.implan.com, 1999.
b = Year-round population.
c = Includes both full-time and part-time workers.
d = Includes employee compensation (wage and salary payments and benefits paid by employers) and proprietary income (payments received by self-employed individuals as income).

Table 151. Counties containing one or more ports that showed 10% or more commercial revenue dependence on summer flounder, scup, and/or black sea bass, 1999 (Section3.4 in the DEIS).

State	County[a]	Population[b]	Employment[c]	Total Personal Income[d] (million of $'s)	Commercial Fishing Employment	Percent of Personal Income Derived from Commercial Fishing	Fresh and Frozen Seafood Processing Employment	Percent of Personal Income Derived from Seafood Processing
MA	Barnstable	213,221	120,375	3,729.63	1,105	0.68%	32	0.03%
MA	Dukes	14,208	11,020	321.495	30	0.26%	0	0
MA	Nantucket	8,025	8,128	260.903	188	1.53%	0	0
MA	All Other	6,053,331	3,821,066	157,987.07	5,658	0.10%	2,081	0.05%
RI	Newport	87,401	49,389	1,783.76	457	0.52%	0	0
RI	Washington	127,249	59,155	1,764.21	1,357	2.42%	77	0.15%
CT	Middlesex	155,232	84,700	3,389.06	58	0.04%	0	0
CT	New London	254,254	157,529	6,142.68	99	0.03%	0	0
NY	Nassau	1,355,236	748,564	31,851.12	153	0.01%	*	*
NY	Suffolk	1,427,096	695,522	27,877.06	563	0.03%	*	*
NJ	Cape May	100,736	52,277	1,497.58	698	1.09%	*	*
NJ	Essex	770,678	444,792	20,947.53	*	*	125	0.02%
NJ	Monmouth	619,846	304,465	12,480.74	81	0.01%	*	*
DE	Sussex	140,374	84,060	2,761.88	224	0.06%	*	*
MD	Worcester	43,470	30,109	694.625	83	0.10%	0	0
VA	Accomac	32,805	17,098	387.305	298	0.88%	337	1.15%
VA	City of Hampton	139,348	85,953	2,962.99	79	0.04%	116	0.09%
VA	City of VA Beach	439,892	223,837	6,530.41	14	<0.01%	0	0
NC	Carteret	62,315	30,253	657.077	61	0.02%	25	0.09%
NC	Dare	30,042	23,643	492.549	*	*	19	0.05%
NC	Hyde	5,823	3,764	3,839.13	269	0.05%	178	0.07%
NC	Pamlico	12,810	4,368	114.641	417	2.39%	96	1.54%

* = < 10 observations.

a = Data obtained from the Minnesota IMPLAN Group, Inc., IMPLAN System (data and software), 1725 Tower Drive West, Suite 140, Stillwater, MN 55082, www.implan.com, 1999.
b = Year-round population.
c = Includes both full-time and part-time workers.
d = Includes employee compensation (wage and salary payments and benefits paid by employers) and proprietary income (payments received by self-employed individuals as income).

Table 152. Threshold analysis of revenue impacts for participating vessels for the state-by-state quota allocation based on 1988-1997 landings data.

State-by-state allocations based on 1988-1997 landings data			Number of Impacted Vessels by Revenue Reduction Percentile (%)						
Total Vessels	Number of Vessels Impacted by ≥ 5% Reduction	Increased Revenues (number)	<5	5-9	10-19	20-29	30-39	40-49	≥50
727	27	560	140	3	3	3	2	4	12

Table 153. Review of revenue impacts under the state-by-state allocation based on 1988-1997 landings data, by home state.

State	Participating Vessels	Number of Vessels Impacted ≥5 percent	Increased Revenue (number)	Number of Impacted Vessels by Reduction Percentile (percent)						
				<5	5-9	10-19	20-29	30-39	40-49	≥50
DE	6	0	6	0	0	0	0	0	0	0
MA	137	20	41	76	3	3	1	1	4	8
MD	12	0	11	1	0	0	0	0	0	0
ME	4	1	2	1	0	0	1	0	0	0
NC	67	0	59	8	0	0	0	0	0	0
NJ	109	0	104	5	0	0	0	0	0	0
NY	160	0	155	5	0	0	0	0	0	0
PA	14	0	14	0	0	0	0	0	0	0
RI	132	0	129	3	0	0	0	0	0	0
VA	58	0	22	36	0	0	0	0	0	0
OTHER[a]	7	0	5	2	0	0	0	0	0	0
NOT KNOWN[b]	21	NK	NK	NK	NK	NK	NK	NK	NK	NK
Total	727	21	548	137	3	3	2	1	4	8

[a]States with fewer than 4 vessels were aggregated.
[b]Vessels have shown landings of black sea bass in 2000, but did not hold any commercial federal permits in 2000. These vessels may be fishing exclusively in state waters fisheries for black sea bass, and landings are indicated because of reporting requirements for their other federal permits or they do not hold a federal permit to participate in these fisheries any longer.

Table 154. Distribution of all impacted vessels by state, county and h-port for the state-by-state allocation based on 1988-1997 landings data. From 2000 NMFS permit files - h-ports with fewer than three vessels are not reported - only county-level data supplied; counties with fewer than three vessels are not reported.

State	County	Home port	Number of Vessels
Massachusetts	Barnstable	Chatham	4
		Other[a]	7
	Suffolk	Boston	5

[a]Five vessels located in different h-ports.

Table 155. Other permits held by the impacted vessels for the state-by-state allocation systems based on 1988-1997 landings data.

	Northeast Region Permit Status	Number of Vessels	Percent of permitted Vessels
Commercial	Black sea bass	9	43
	Multispecies	20	95
	Scallop	18	86
	Surfclam	13	62
	Squid/Mackerel/ Butterfish	20	95
	Quahog	12	57
	Bluefish	13	62
	Summer Flounder	11	52
	Scup	11	52
	Dogfish	13	62
	Monkfish	11	52
	Herring	5	24
	Lobster	20	95
Recreational	Summer flounder	1	5
	Squid/Mackerel/ Butterfish	1	5

Table 156. Threshold analysis of revenue impacts for participating vessels for the state-by-state allocation based on 1993-1997 landings data.

State-by-state allocations based on 1993-1997 landings data			Number of Impacted Vessels by Revenue Reduction Percentile (%)						
Total Vessels	Number of Vessels Impacted by ≥ 5% Reduction	Increased Revenues (number)	<5	5-9	10-19	20-29	30-39	40-49	≥50
727	31	477	219	7	2	2	2	2	16

Table 157. Review of revenue impacts under the state-by-state allocation based on 1993-1997 landings data, by home state.

State	Participating Vessels	Number of Vessels Impacted ≥5 percent	Increased Revenue (number)	Number of Impacted Vessels by Reduction Percentile (percent)						
				<5	5-9	10-19	20-29	30-39	40-49	≥50
DE	6	0	6	0	0	0	0	0	0	0
MA	137	24	40	73	7	2	2	0	1	12
MD	12	0	11	1	0	0	0	0	0	0
ME	4	1	1	2	0	0	0	1	0	0
NC	67	0	2	65	0	0	0	0	0	0
NJ	109	0	103	6	0	0	0	0	0	0
NY	160	0	155	5	0	0	0	0	0	0
PA	14	0	14	0	0	0	0	0	0	0
RI	132	0	129	3	0	0	0	0	0	0
VA	58	0	3	55	0	0	0	0	0	0
OTHER[a]	7	0	2	5	0	0	0	0	0	0
NOT KNOWN[b]	21	NK	NK	NK	NK	NK	NK	NK	NK	NK
Total	727	25	466	215	7	2	2	1	1	12

[a]States with fewer than 4 vessels were aggregated.
[b]Vessels have shown landings of black sea bass in 2000, but did not hold any commercial federal permits in 2000. These vessels may be fishing exclusively in state waters fisheries for black sea bass, and landings are indicated because of reporting requirements for their other federal permits or they do not hold a federal permit to participate in these fisheries any longer.

Table 158. Distribution of all impacted vessels by state, county and h-port for the state-by-state allocation based on 1993-1997 landings data. From 2000 NMFS permit files - h-ports with fewer than three vessels are not reported - only county-level data supplied; counties with fewer than three vessels are not reported.

State	County	Home port	Number of Vessels
Massachusetts	Barnstable	Chatham	5
		Other[a]	8
	Suffolk	Boston	7

[a]Six vessels located in different h-ports.

Table 159. Other permits held by the impacted vessels for the state-by-state allocation systems based on 1993-1997 landings data.

	Northeast Region Permit Status	Number of Vessels	Percent of permitted Vessels
Commercial	Black sea bass	9	36
	Multispecies	20	80
	Scallop	18	51
	Surfclam	13	52
	Squid/Mackerel/ Butterfish	20	80
	Quahog	12	48
	Bluefish	13	52
	Summer Flounder	11	44
	Scup	11	44
	Dogfish	13	52
	Monkfish	11	44
	Herring	5	20
	Lobster	20	80
Recreational	Black sea bass	1	4
	Summer Flounder	1	4
	Squid/Mackerel/ Butterfish	1	4

Table 160. Threshold analysis of revenue impacts for participating vessels for the state-by-state allocation based on landings data for the best 5-years for the 1988-1997 period.

State-by-state allocations based on best 5-year landings for the 1988-1997 period			Number of Impacted Vessels by Revenue Reduction Percentile (%)						
Total Vessels	Number of Vessels Impacted by ≥ 5% Reduction	Increased Revenues (number)	<5	5-9	10-19	20-29	30-39	40-49	≥50
727	26	564	137	4	3	2	5	0	12

Table 161. Review of revenue impacts under the state-by-state allocation based on landings data for the best 5-years for the 1988-1997 period, by home state.

State	Participating Vessels	Number of Vessels Impacted ≥5 percent	Increased Revenue (number)	Number of Impacted Vessels by Reduction Percentile (percent)						
				<5	5-9	10-19	20-29	30-39	40-49	≥50
DE	6	0	6	0	0	0	0	0	0	0
MA	137	19	43	75	4	2	1	4	0	8
MD	12	0	11	1	0	0	0	0	0	0
ME	4	1	2	1	0	1	0	0	0	0
NC	67	0	57	10	0	0	0	0	0	0
NJ	109	0	104	5	0	0	0	0	0	0
NY	160	0	159	1	0	0	0	0	0	0
PA	14	0	14	0	0	0	0	0	0	0
RI	132	0	129	3	0	0	0	0	0	0
VA	58	0	22	36	0	0	0	0	0	0
OTHER[a]	7	0	5	2	0	0	0	0	0	0
NOT KNOWN[b]	21	NK	NK	NK	NK	NK	NK	NK	NK	NK
Total	727	20	552	134	4	3	1	4	0	8

[a]States with fewer than 4 vessels were aggregated.
[b]Vessels have shown landings of black sea bass in 2000, but did not hold any commercial federal permits in 2000. These vessels may be fishing exclusively in state waters fisheries for black sea bass, and landings are indicated because of reporting requirements for their other federal permits or they do not hold a federal permit to participate in these fisheries any longer.

Table 162. Distribution of all impacted vessels by state, county and h-port for the state-by-state allocation based on landings data for the best 5-years for the 1988-1997 period. From 2000 NMFS permit files - h-ports with fewer than three vessels are not reported - only county-level data supplied; counties with fewer than three vessels are not reported.

State	County	Home port	Number of Vessels
Massachusetts	Barnstable	Chatham	3
		Other[a]	7
	Suffolk	Boston	5

[a]Five vessels located in different h-ports.

Table 163. Other permits held by the impacted vessels for the state-by-state allocation systems based on landings data for the best 5-years for the 1988-1997 period.

	Northeast Region Permit Status	Number of Vessels	Percent of permitted Vessels
Commercial	Black sea bass	9	45
	Multispecies	20	100
	Scallop	18	90
	Surfclam	13	65
	Squid/Mackerel/ Butterfish	20	100
	Quahog	12	60
	Bluefish	13	65
	Summer Flounder	11	55
	Scup	11	55
	Dogfish	13	65
	Monkfish	11	55
	Herring	5	25
	Lobster	20	100
Recreational	Fluke	1	5

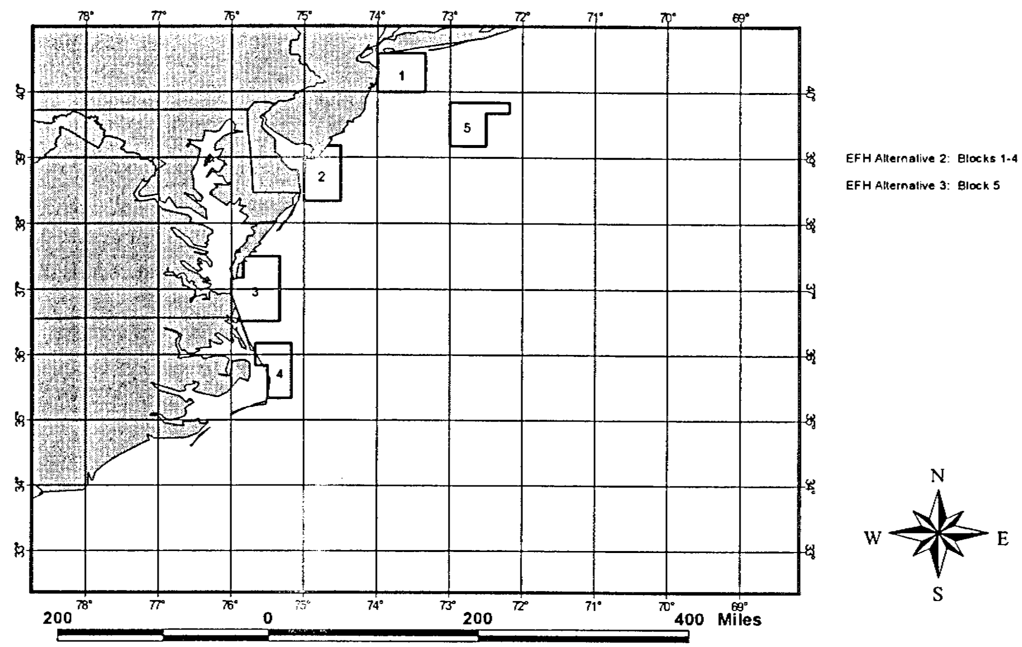


Figure 1 Closed areas under under EFH Alternatives 2 and 3. Alternative 2 is closed areas 1, 2, 3, and 4. Alternative 3 is closed area 5.

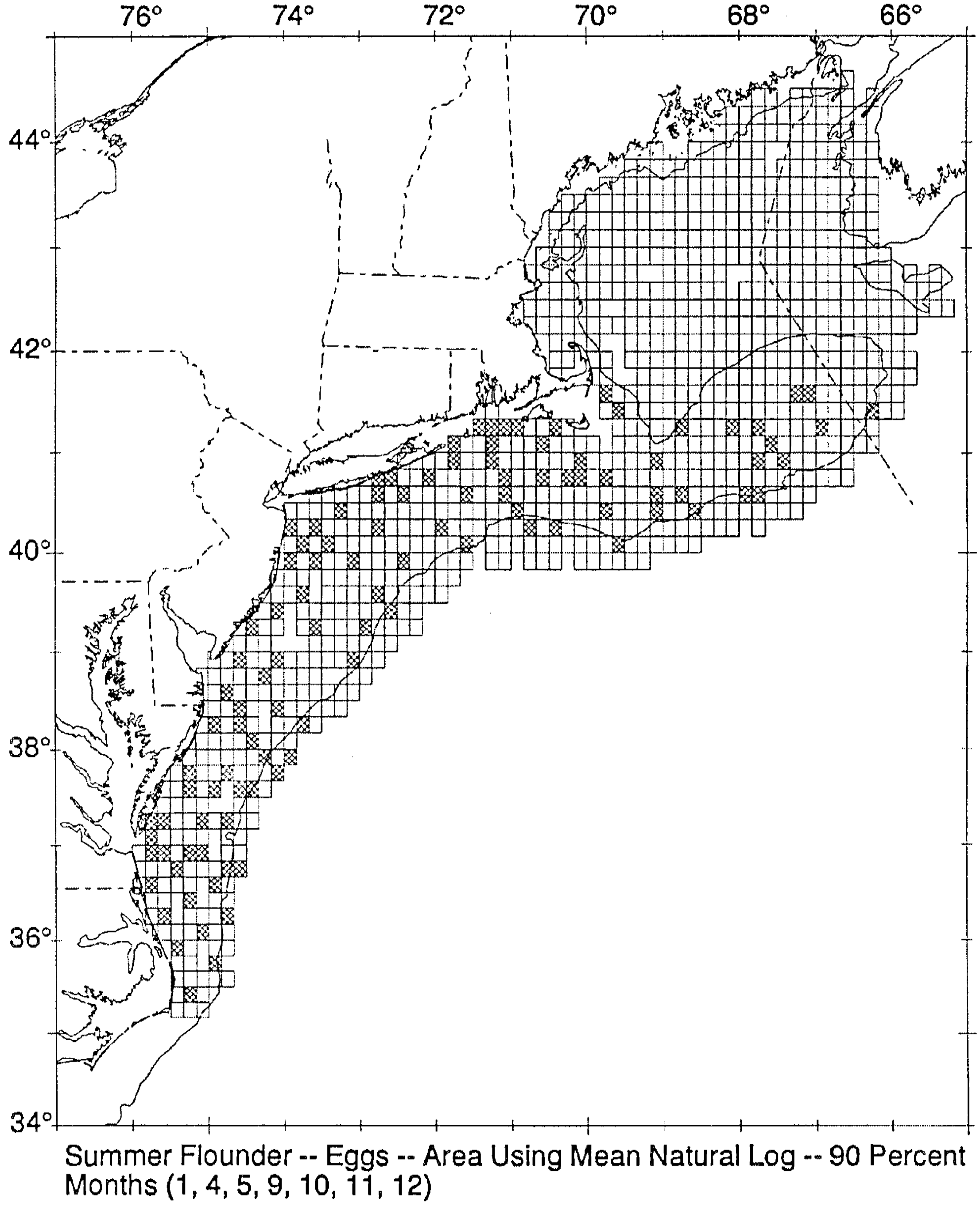


Figure 2a. EFH for summer flounder eggs; the area which encompasses the top 90% of the area where summer flounder are found in the MARMAP and NEFSC trawl surveys.

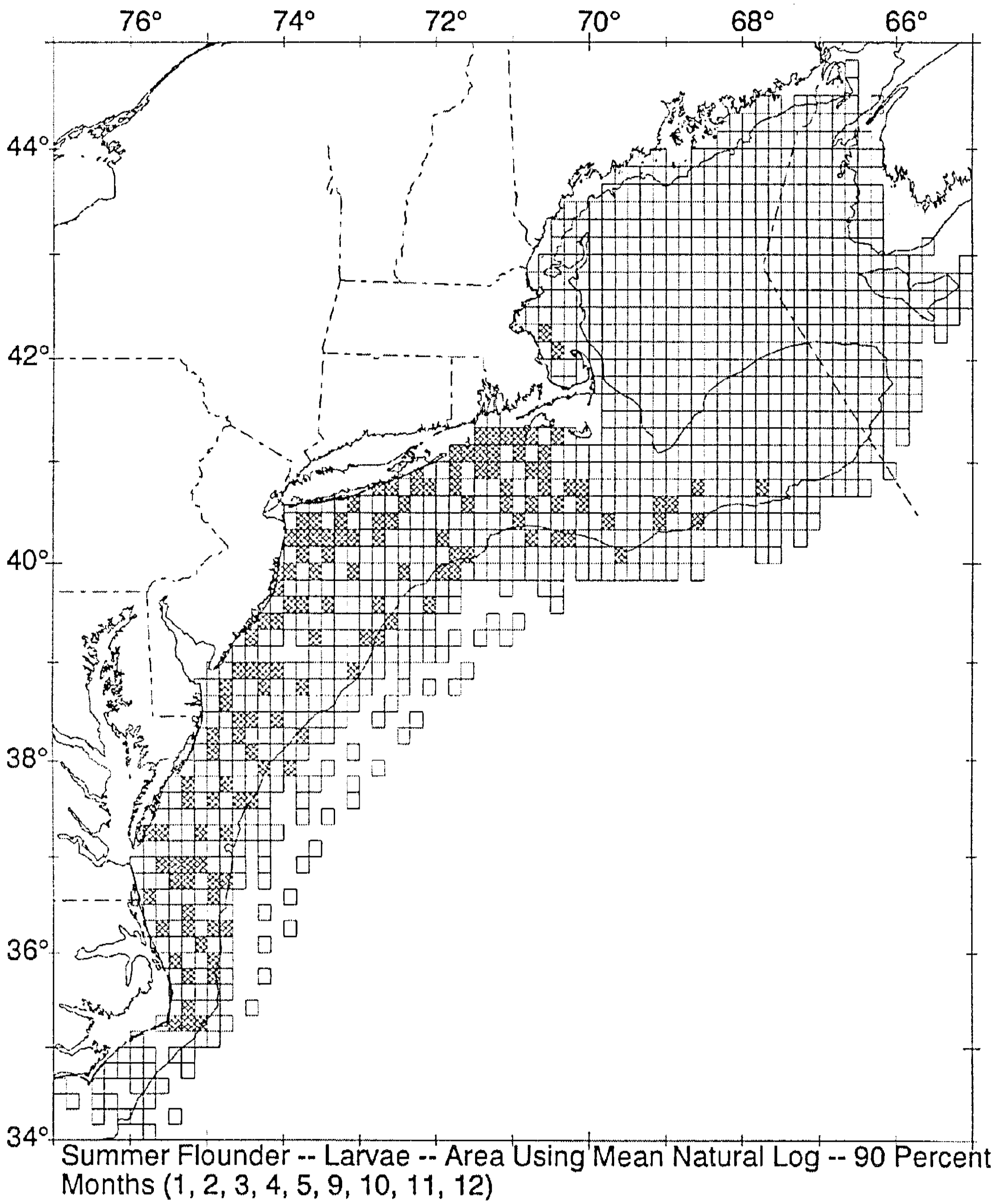


Figure 2b. EFH for summer flounder larvae; the area which encompasses the top 90% of the area where summer flounder are found in the MARMAP and NEFSC trawl surveys.

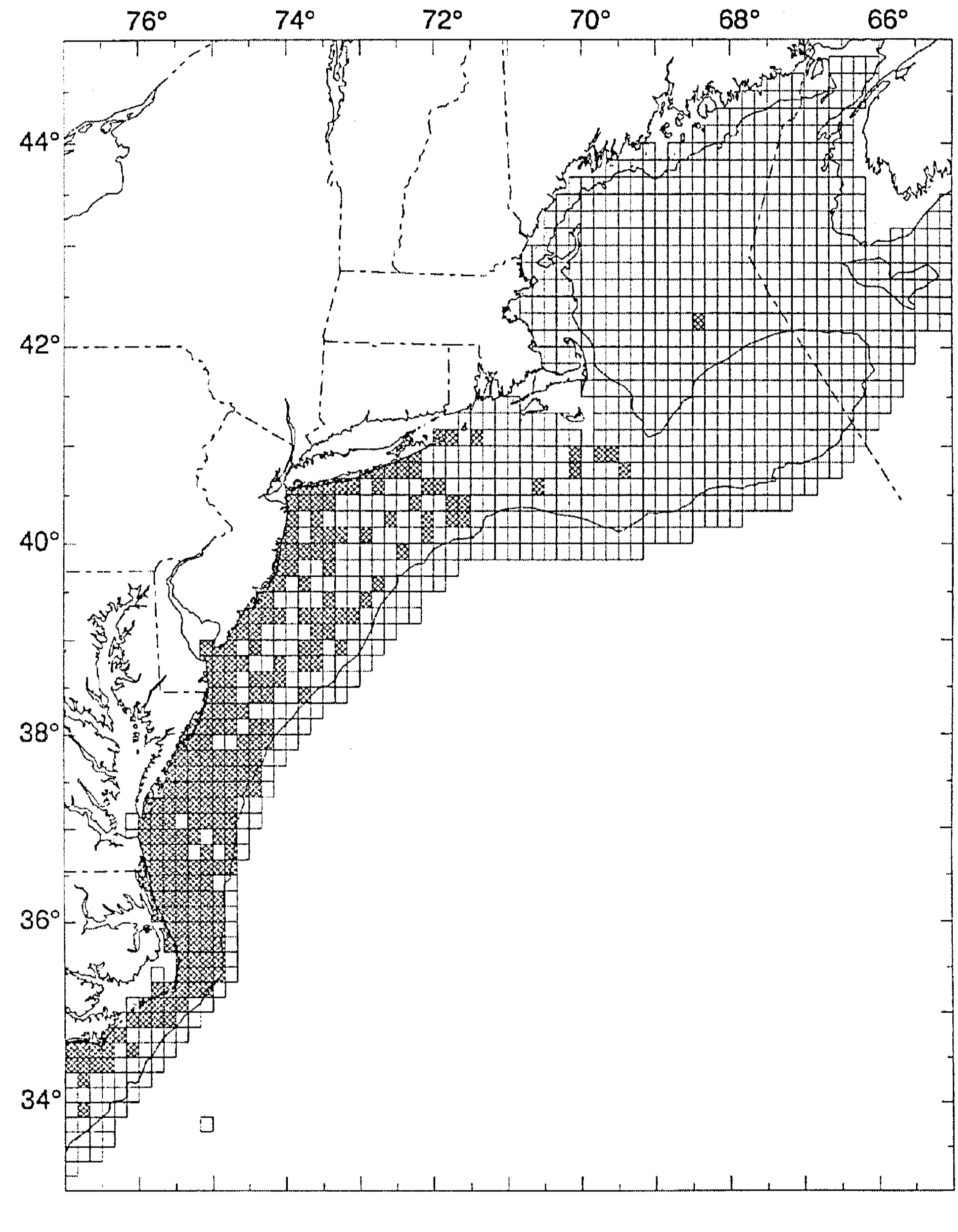
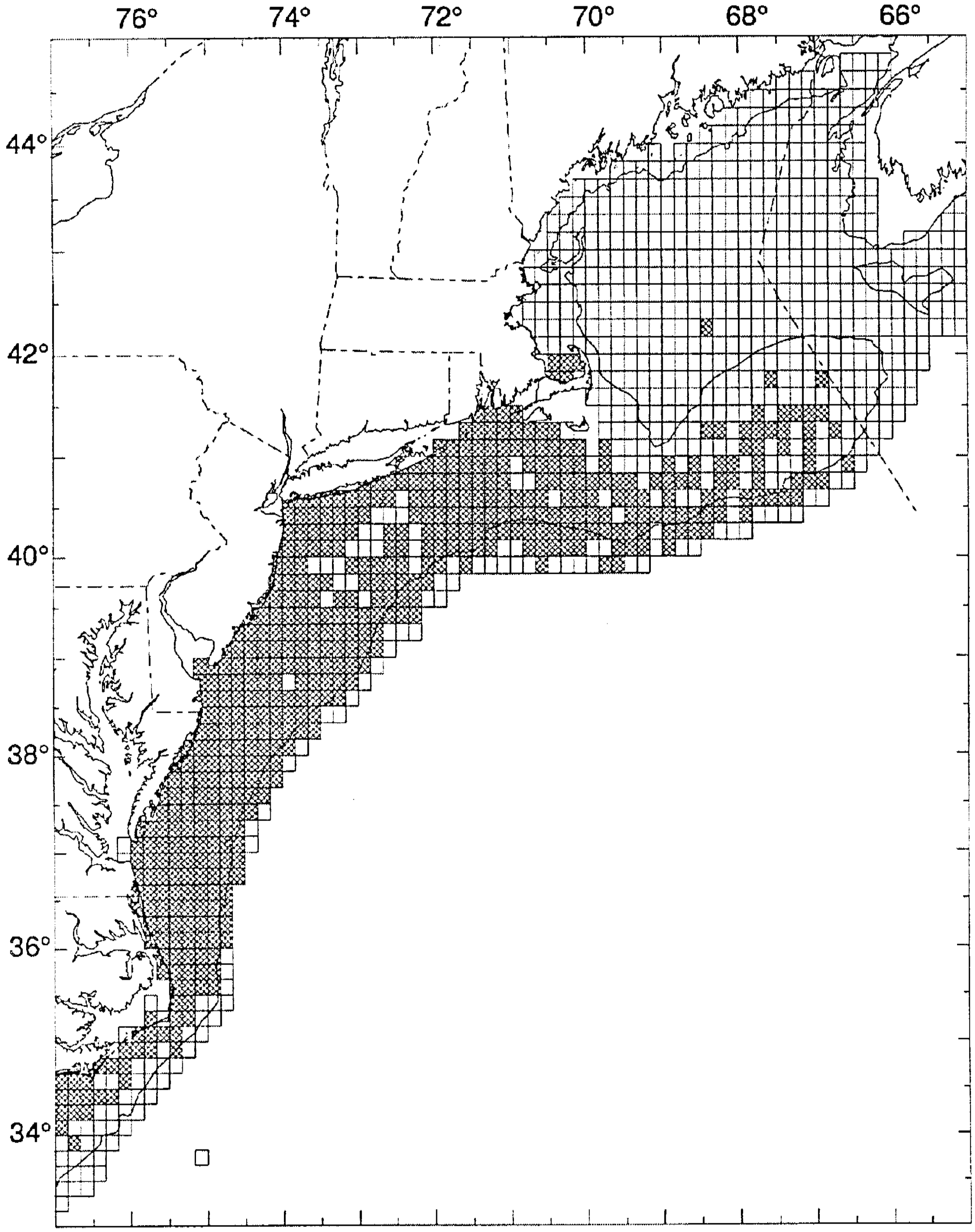


Figure 2c. EFH for summer flounder juveniles; the area which encompasses the top 90% of the area where summer flounder are found in the MARMAP and NEFSC trawl surveys.



Summer Flounder -- Adults (Spring and Fall) -- Area Using Mean Natural Log -- 90 Percent

Figure 2d. EFH for summer flounder adults; the area which encompasses the top 90% of the area where summer flounder are found in the MARMAP and NEFSC trawl surveys.

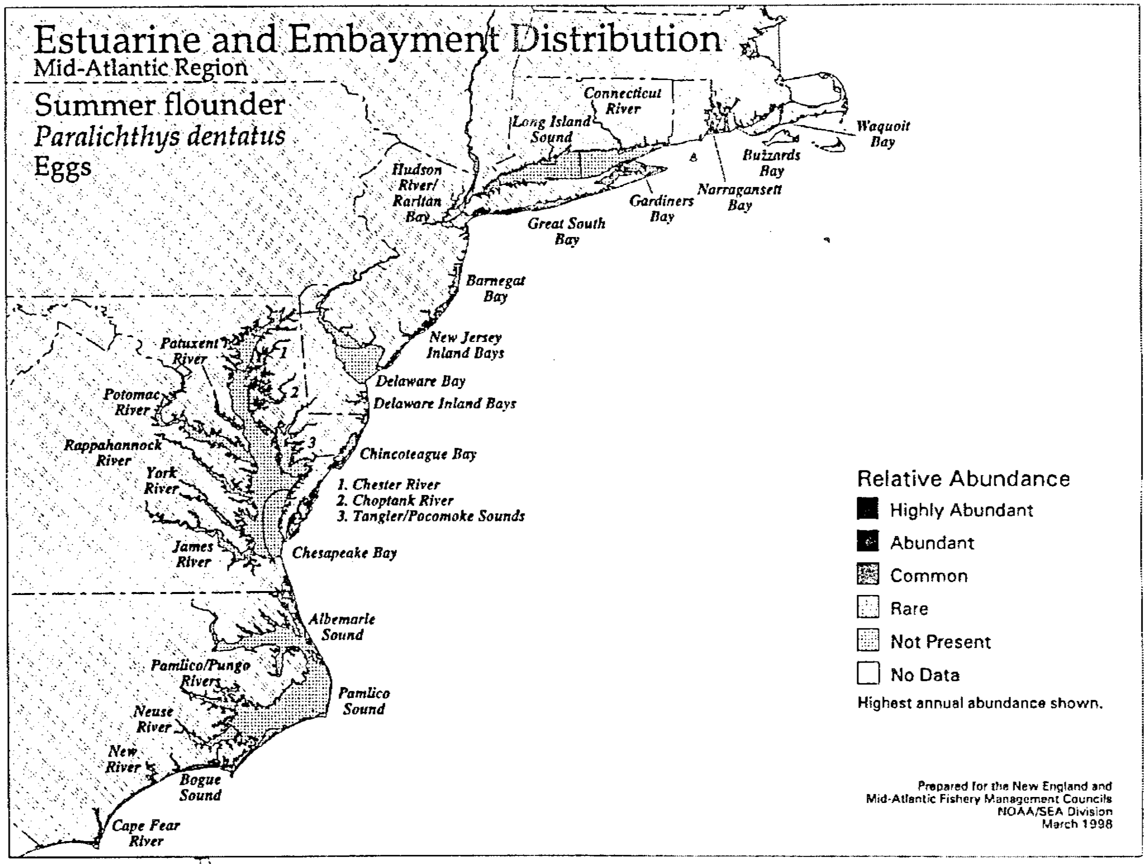


Figure 3a. Relative of abundance and distribution of summer flounder eggs in Mid- and South Atlantic estuaries. Those estuaries in which eggs are classified as highly abundant, abundant, common, or rare are designated as essential fish habitat.
Source: ELMR data.

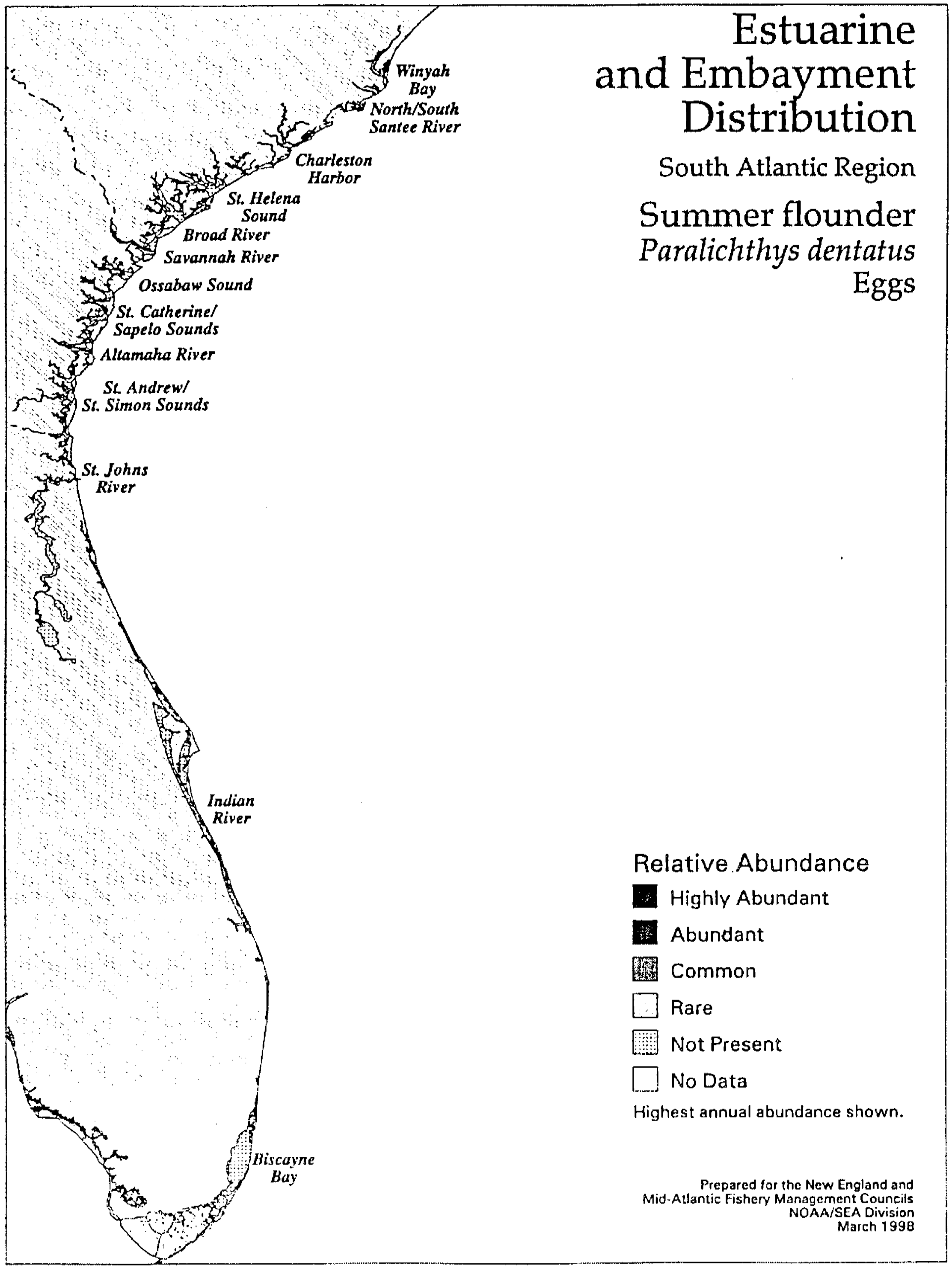


Figure 3a (continued). Relative of abundance and distribution of summer flounder eggs in North and Mid-Atlantic estuaries. Those estuaries in which eggs are classified as highly abundant, abundant, common, or rare are designated as essential fish habitat. Source: ELMR data.

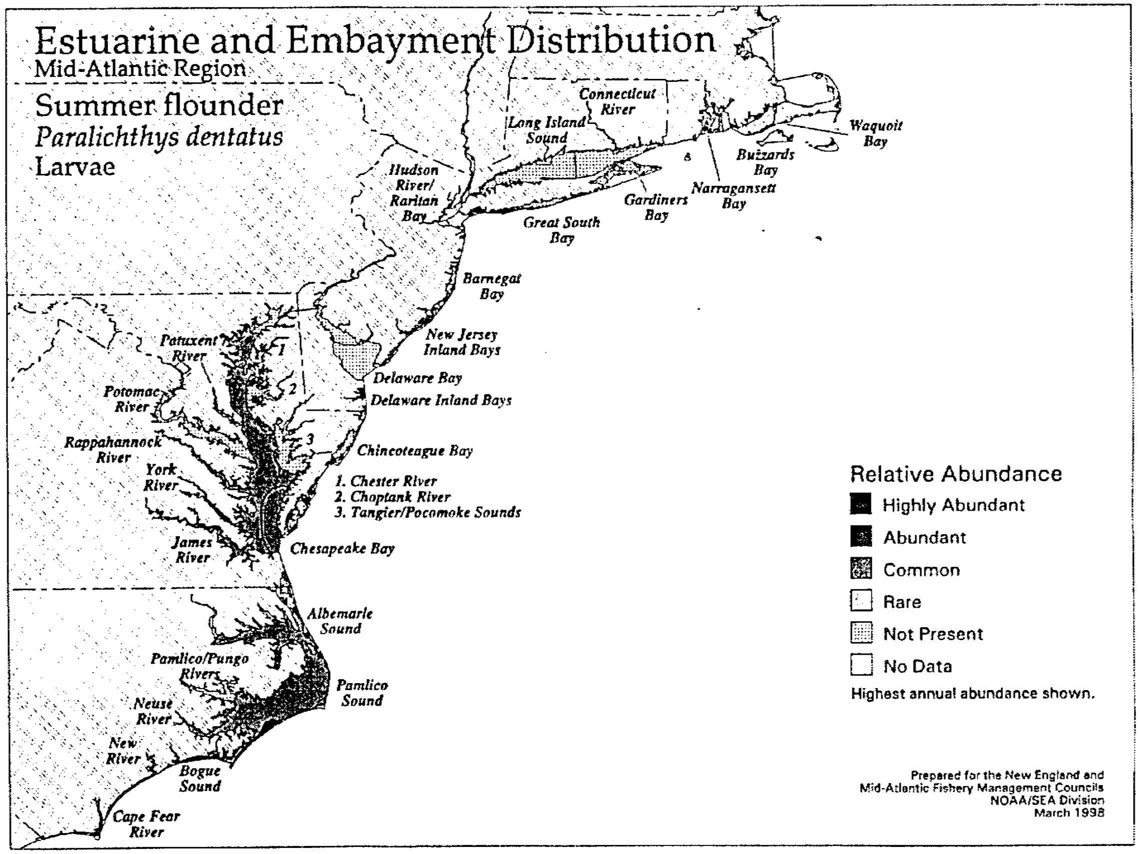


Figure 3b. Relative of abundance and distribution of summer flounder larvae in Mid- and South Atlantic estuaries. Those estuaries in which eggs are classified as highly abundant, abundant, common or rare are designated as essential fish habitat. Source: ELMR data.

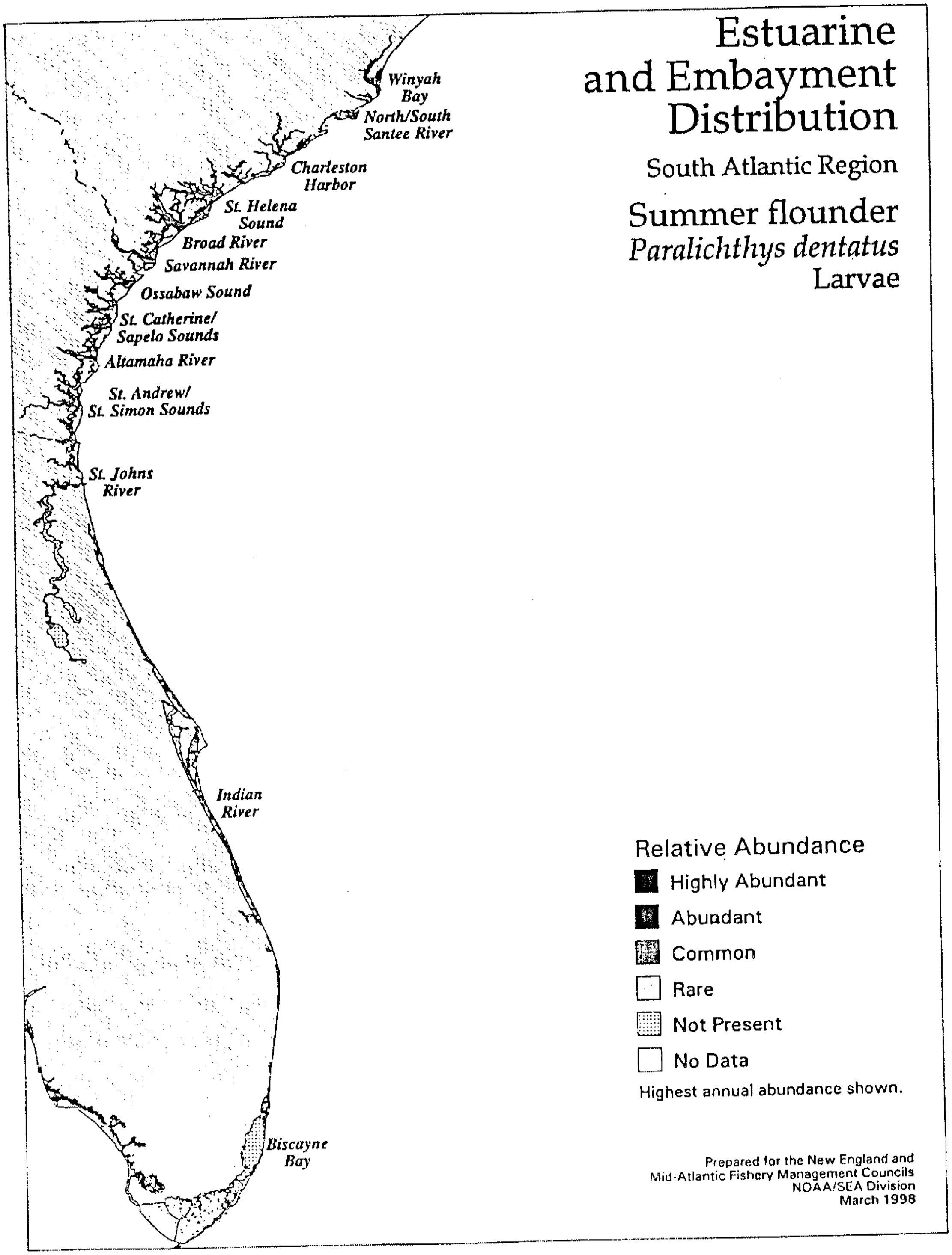


Figure 3b (continued). Relative of abundance and distribution of summer flounder larvae in Mid- and South Atlantic estuaries. Those estuaries in which larvae are classified as highly abundant, abundant, common, or rare are designated as essential fish habitat. Source: ELMR data.

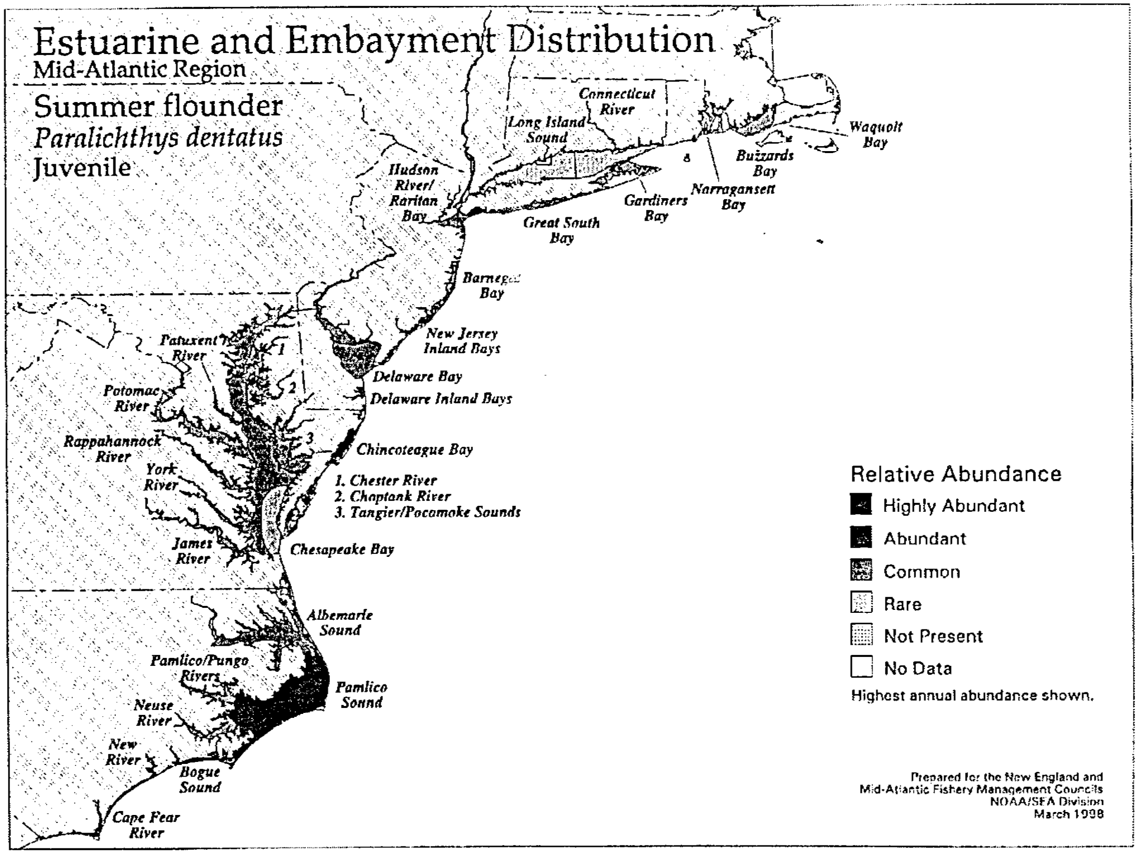


Figure 3c. Relative of abundance and distribution of juvenile summer flounder in Mid- and South Atlantic estuaries. Those estuaries in which juveniles are classified as highly abundant, abundant, or common are designated as essential fish habitat. Source: ELMR data.

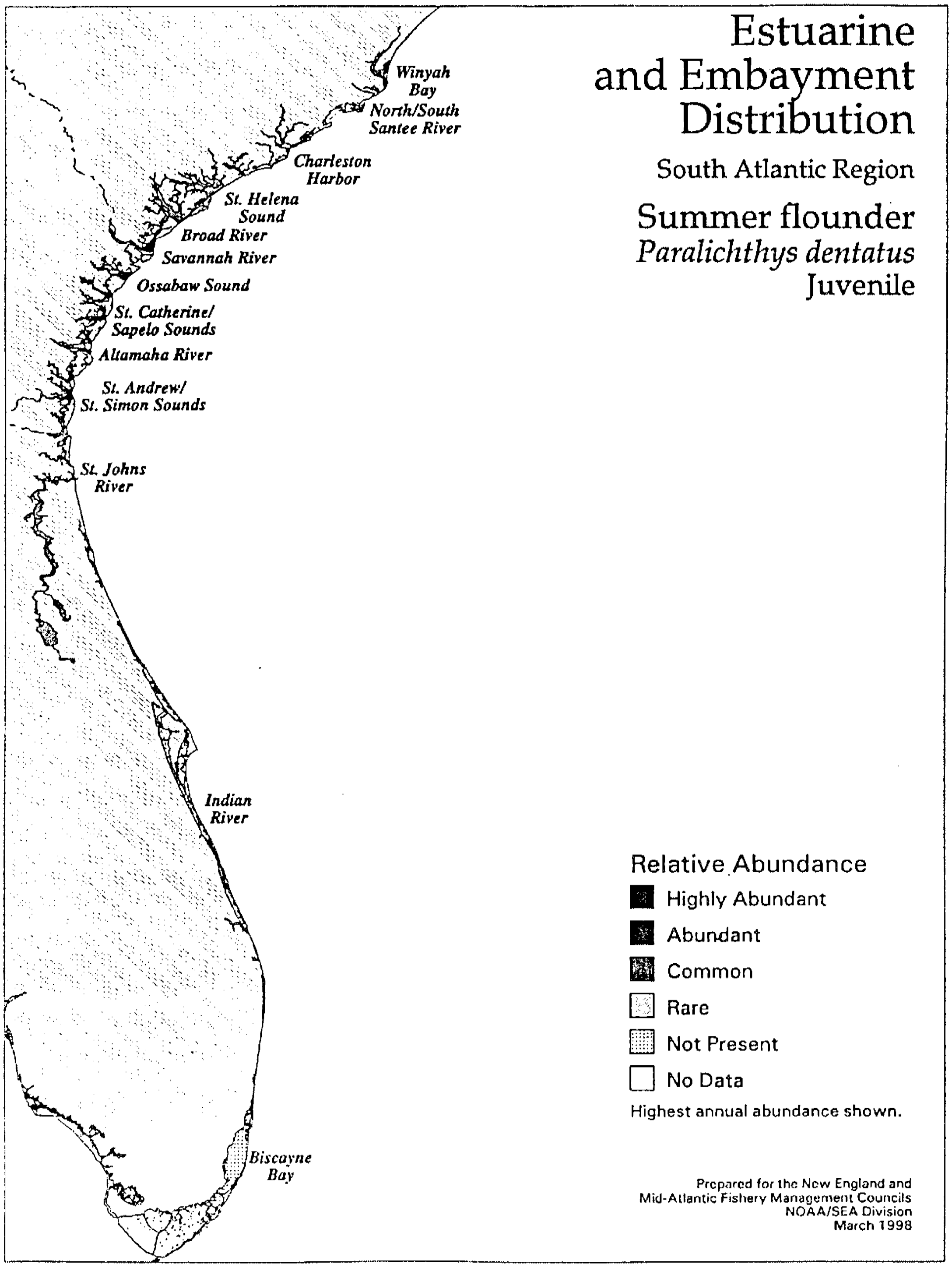


Figure 3c (continued). Relative of abundance and distribution of juvenile summer flounder in Mid-and South Atlantic estuaries. Those estuaries in which juveniles are classified as highly abundant, abundant, or common are designated as essential fish habitat. Source: ELMR data.

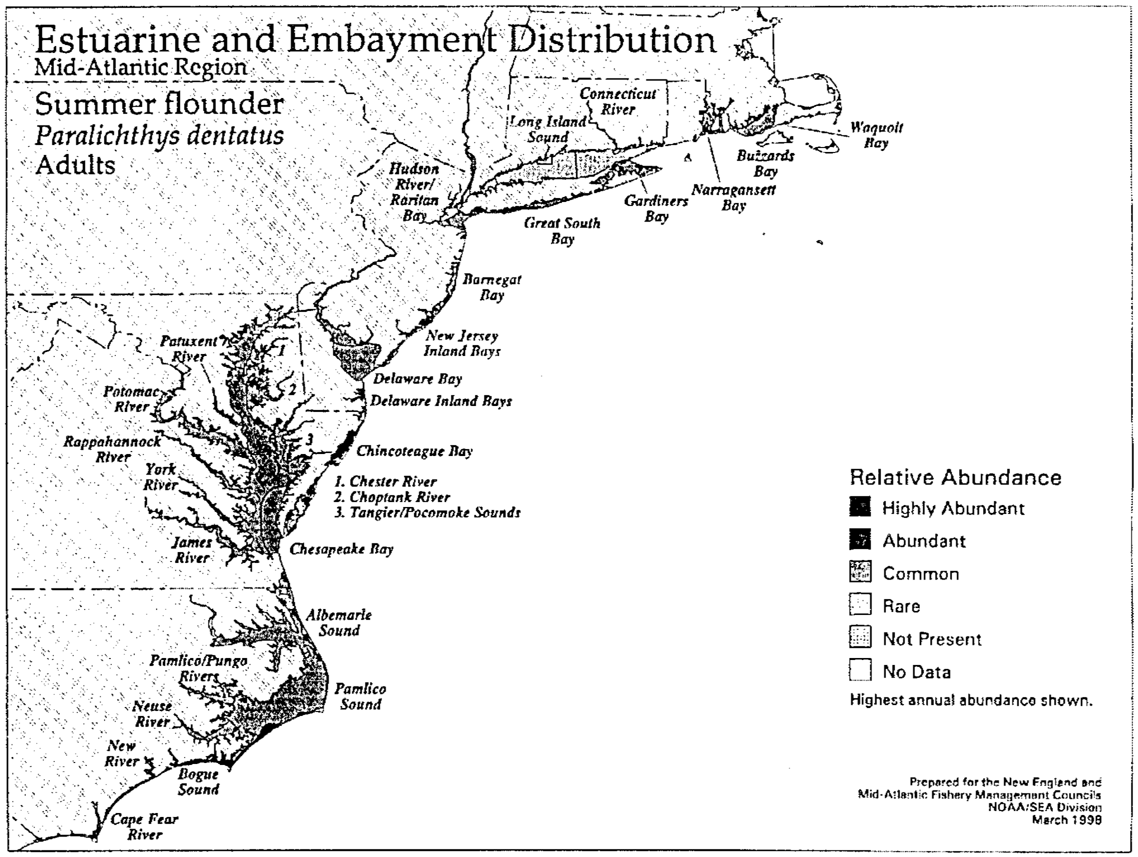


Figure 3d. Relative of abundance and distribution of adult summer flounder in Mid- and South Atlantic estuaries. Those estuaries in which adults are classified as highly abundant, abundant, or common are designated as essential fish habitat. Source: ELMR data.

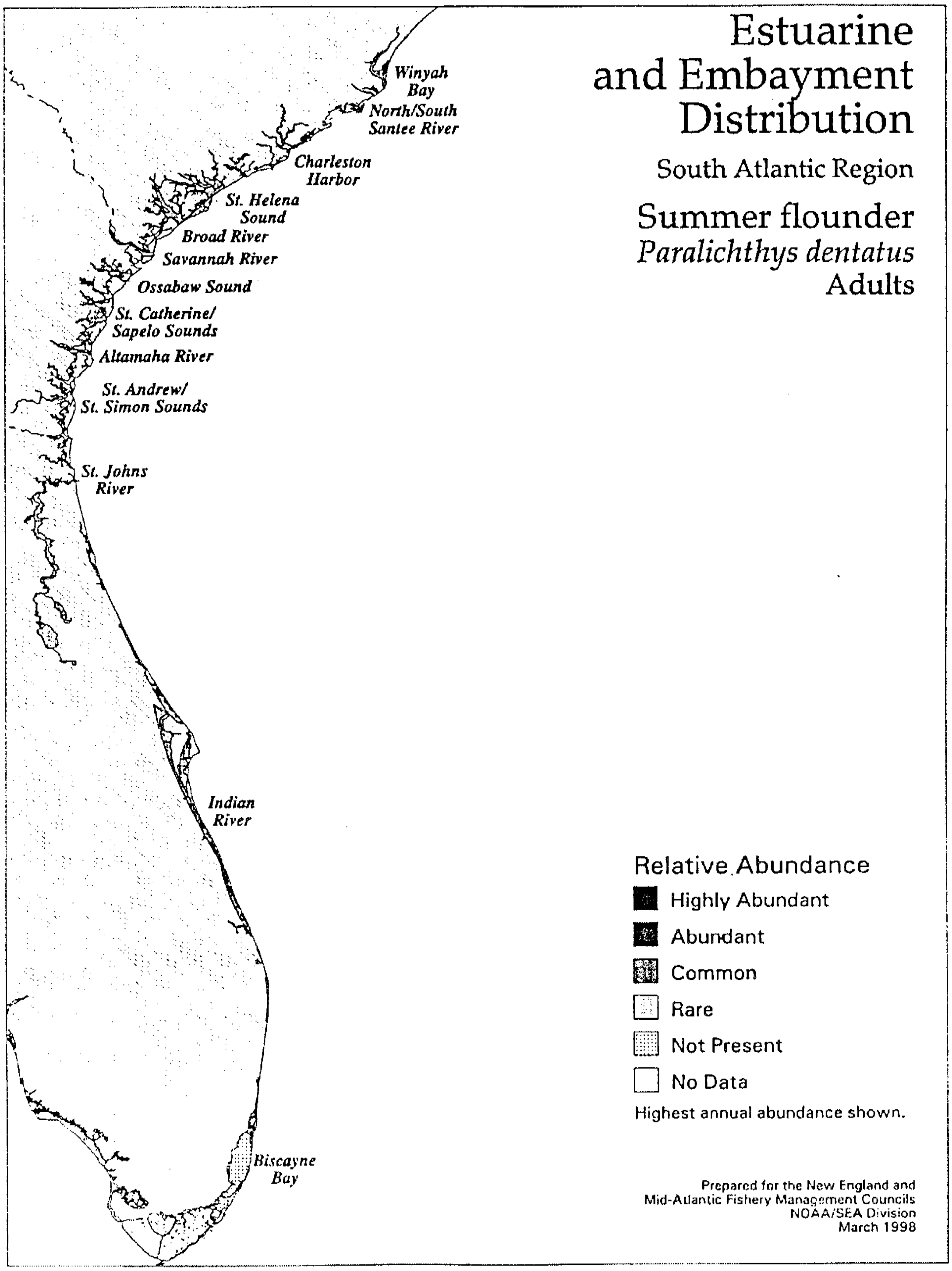


Figure 3d (continued). Relative of abundance and distribution of adult summer flounder in Mid- and South Atlantic estuaries. Those estuaries in which adults are classified as highly abundant, abundant, or common are designated as essential fish habitat. Source: ELMR data.

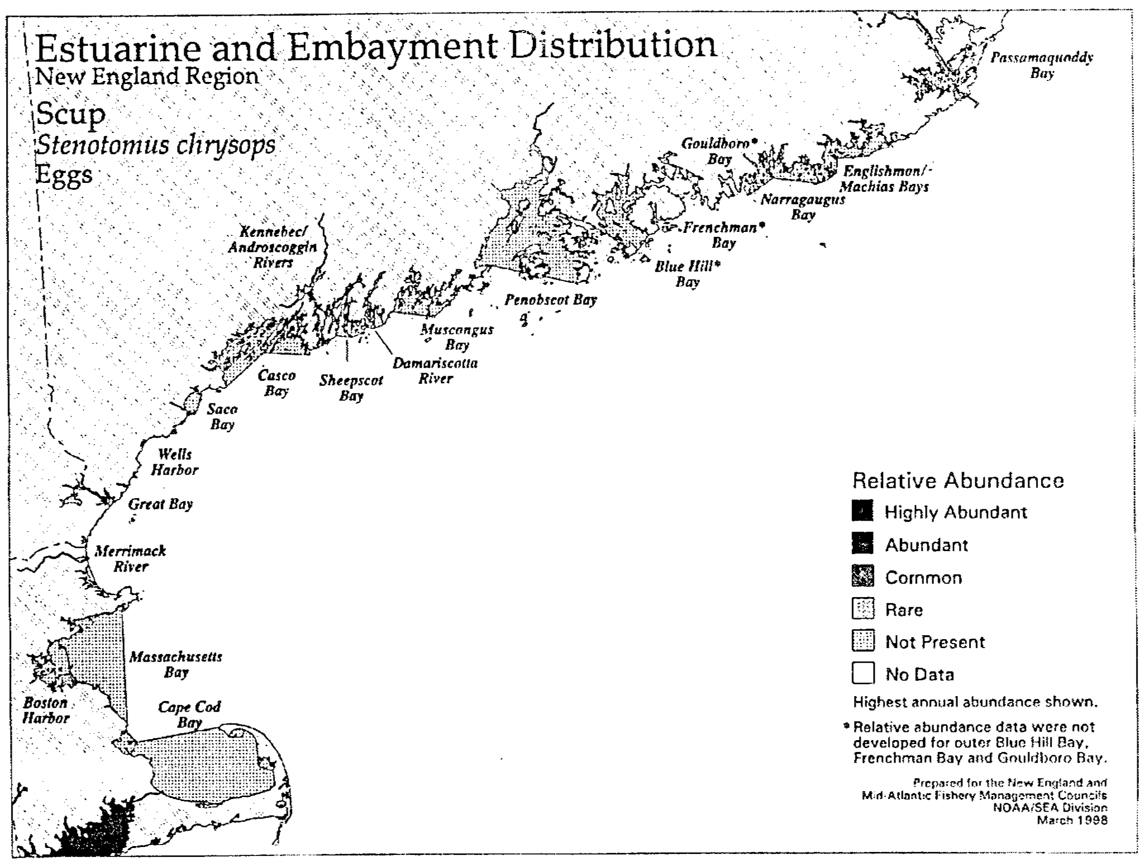


Figure 4a. Relative of abundance and distribution of scup eggs in North and Mid-Atlantic estuaries. Those estuaries in which eggs are classified as highly abundant, abundant, or common are designated as essential fish habitat. Source: ELMR data.

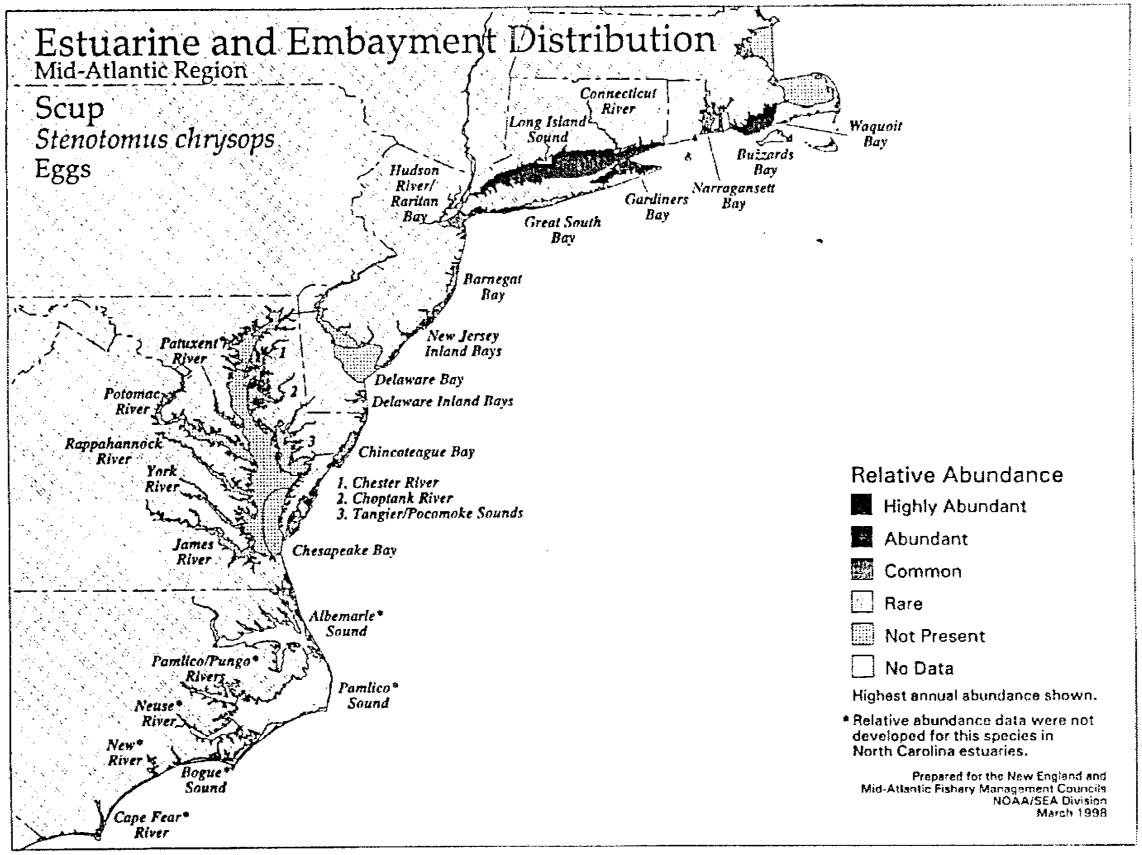


Figure 4a (continued). Relative of abundance and distribution of scup eggs in North and Mid-Atlantic estuaries. Those estuaries in which eggs are classified as highly abundant, abundant, or common are designated as essential fish habitat. Source: ELMR data.

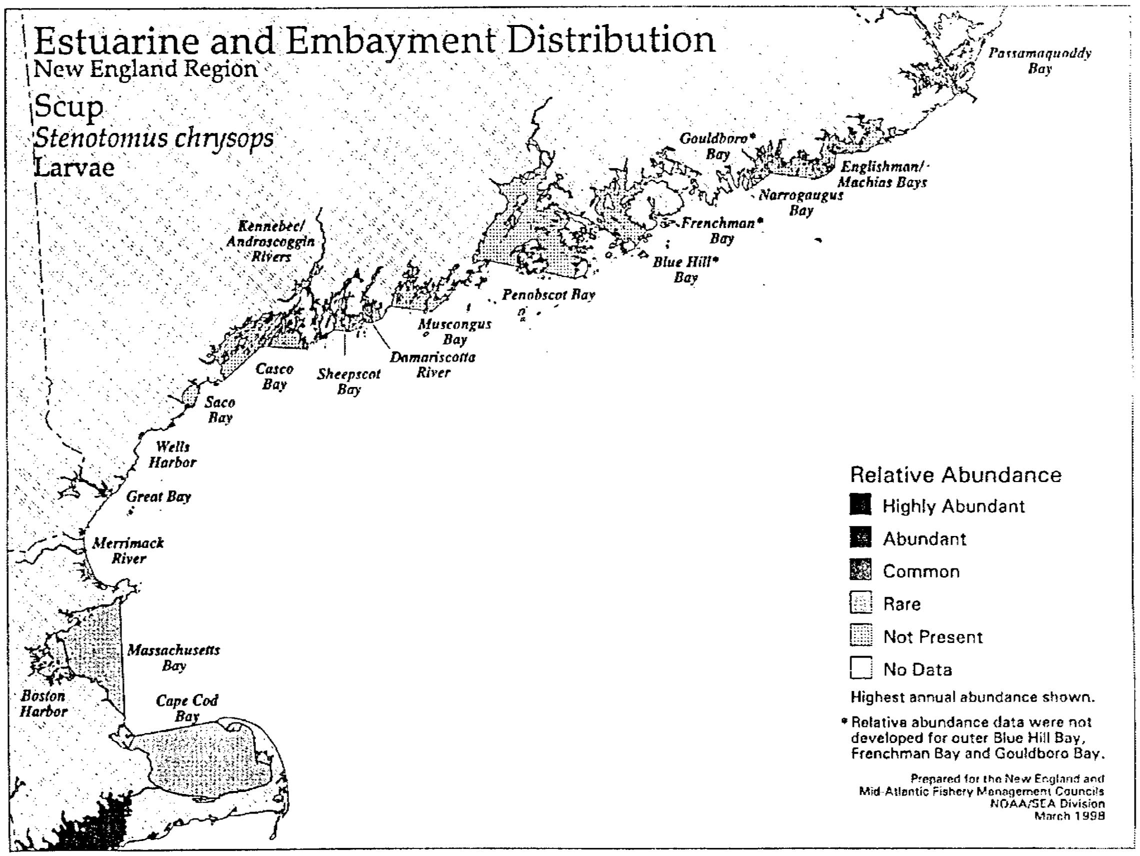


Figure 4b. Relative of abundance and distribution of scup larvae in North and Mid-Atlantic estuaries. Those estuaries in which larvae are classified as highly abundant, abundant, or common are designated as essential fish habitat. Source: ELMR data.

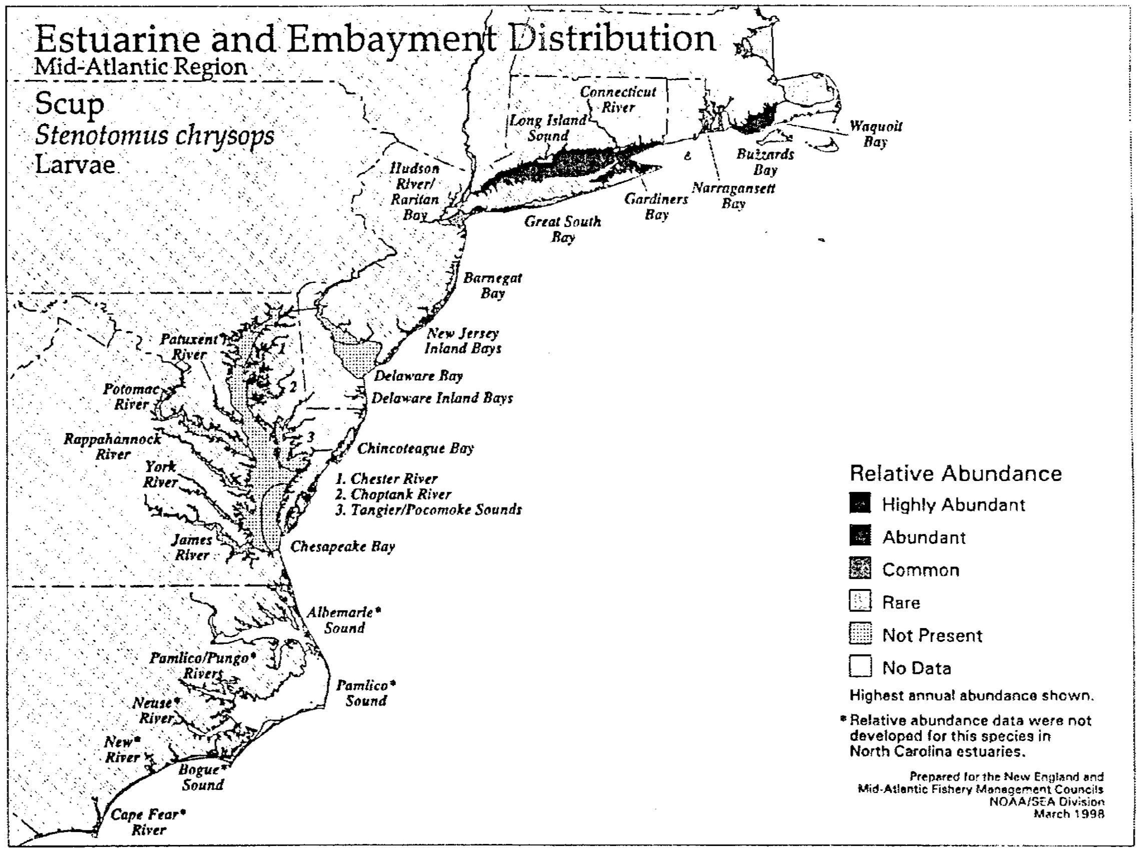


Figure 4b (continued). Relative of abundance and distribution of scup larvae in North and Mid-Atlantic estuaries. Those estuaries in which larvae are classified as highly abundant, abundant, or common are designated as essential fish habitat. Source: ELMR data.

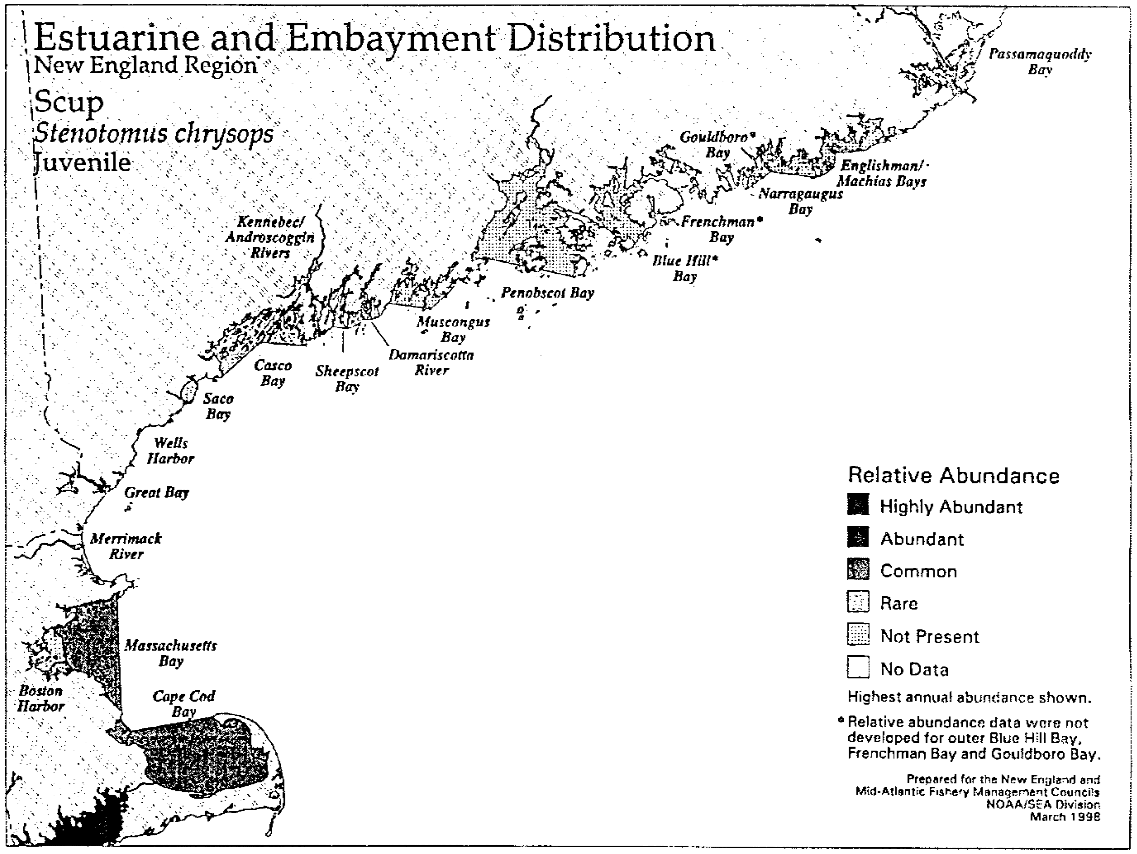


Figure 4c. Relative of abundance and distribution of juvenile scup in North and Mid-Atlantic estuaries. Those estuaries in which juveniles are classified as highly abundant, abundant, or common are designated as essential fish habitat. Source: ELMR data.

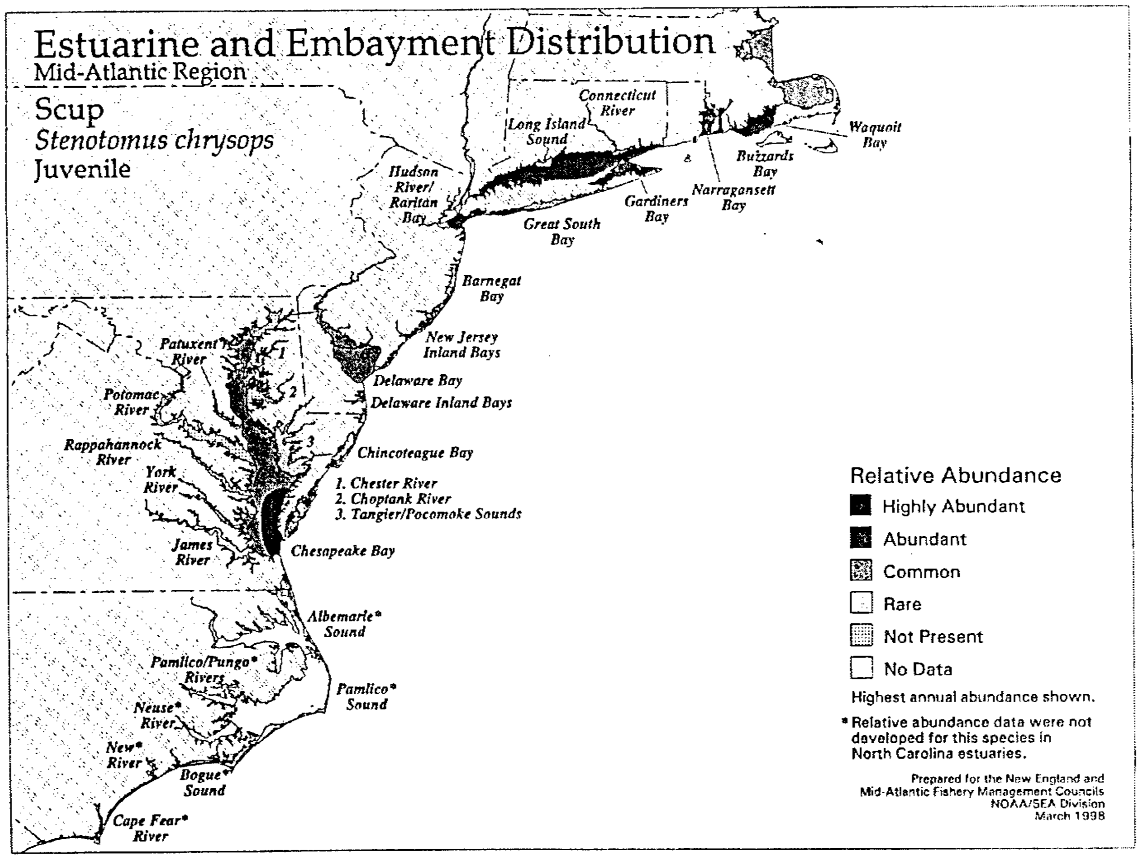


Figure 4c (continued). Relative of abundance and distribution of juvenile scup in North and Mid-Atlantic estuaries. Those estuaries in which juveniles are classified as hgihly abundant, abundant, or common are designated as essential fish habitat. Source: ELMR data.

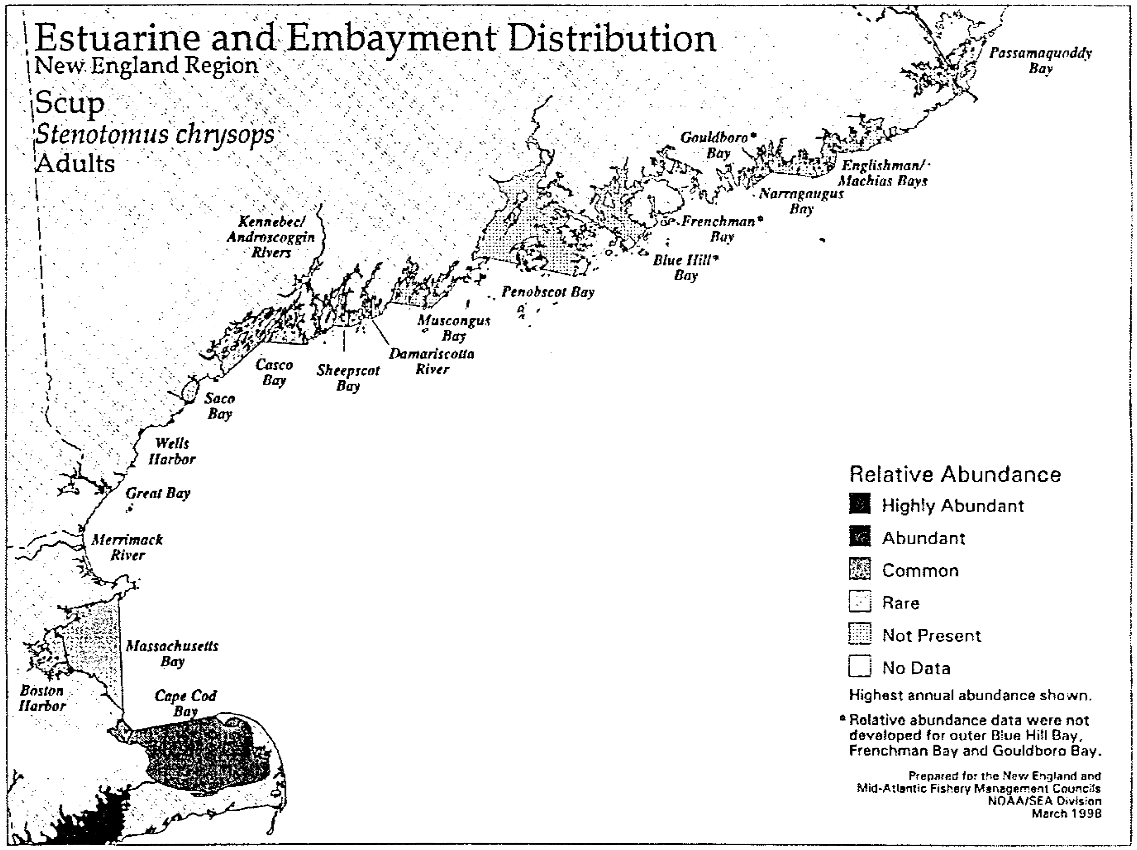


Figure 4d. Relative of abundance and distribution of adult scup in North and Mid-Atlantic estuaries. Those estuaries in which adults are classified as highly abundant, abundant, or common are designated as essential fish habitat. Source: ELMR data.

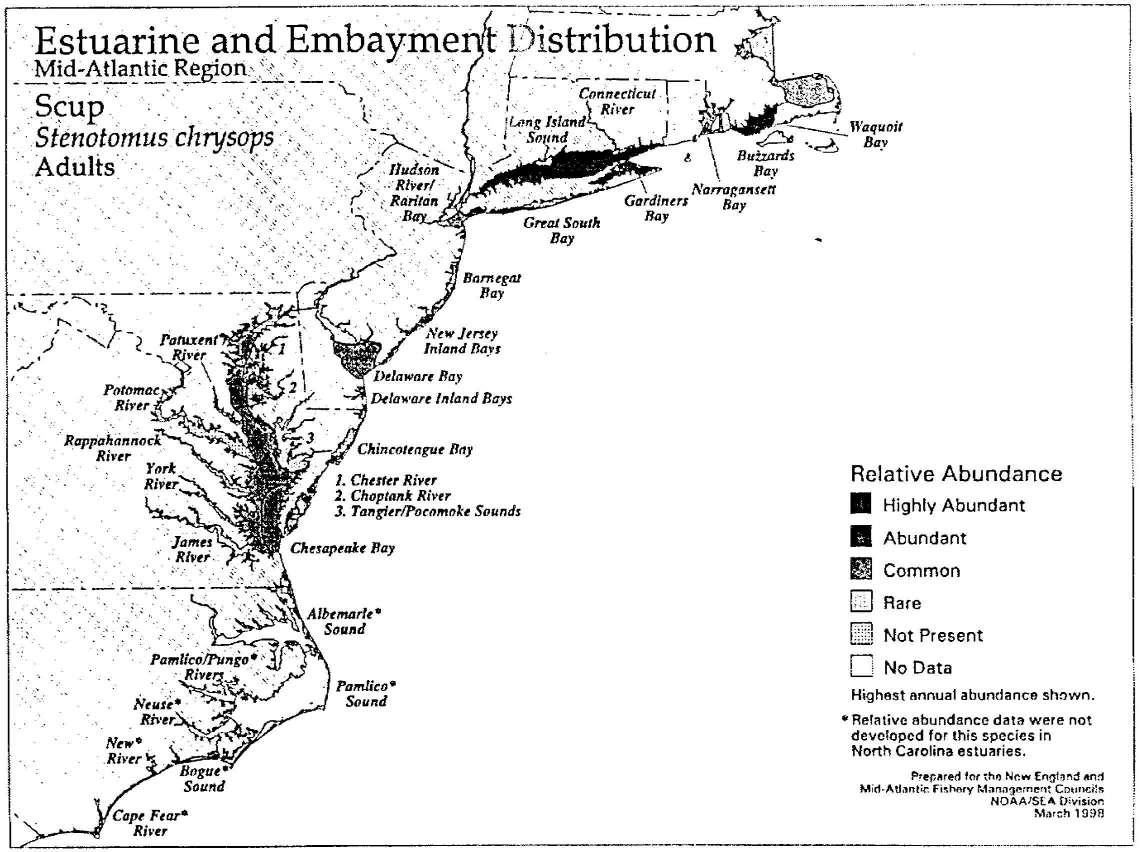


Figure 4d (continued). Relative of abundance and distribution of adult scup in North and Mid-Atlantic estuaries. Those estuaries in which adults are classified as highly abundant, abundant, or common are designated as essential fish habitat. Source: ELMR data.

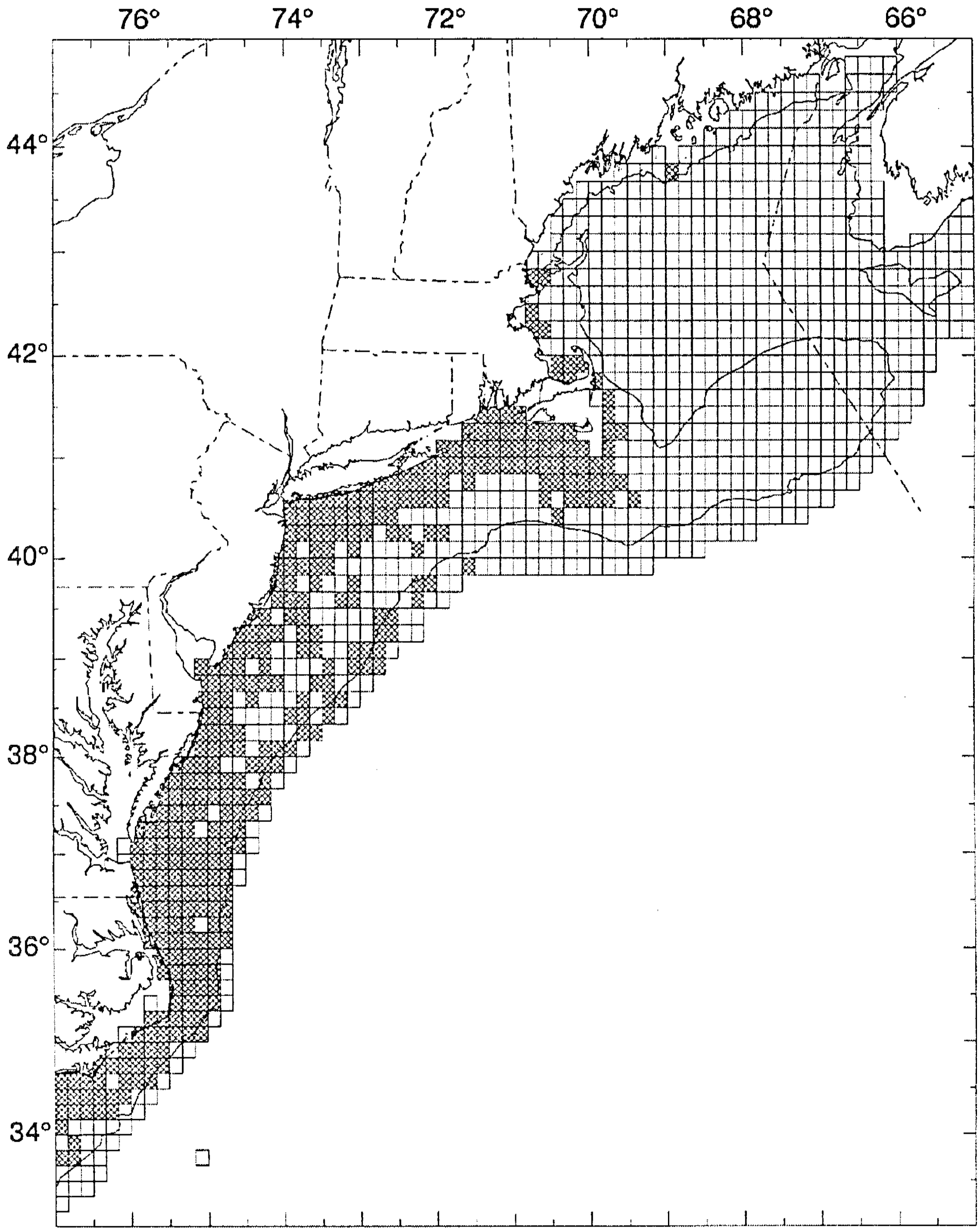


Figure 5a. EFH for scup juveniles; the area which encompasses the top 90% of the area of scup in the NEFSC trawl surveys.

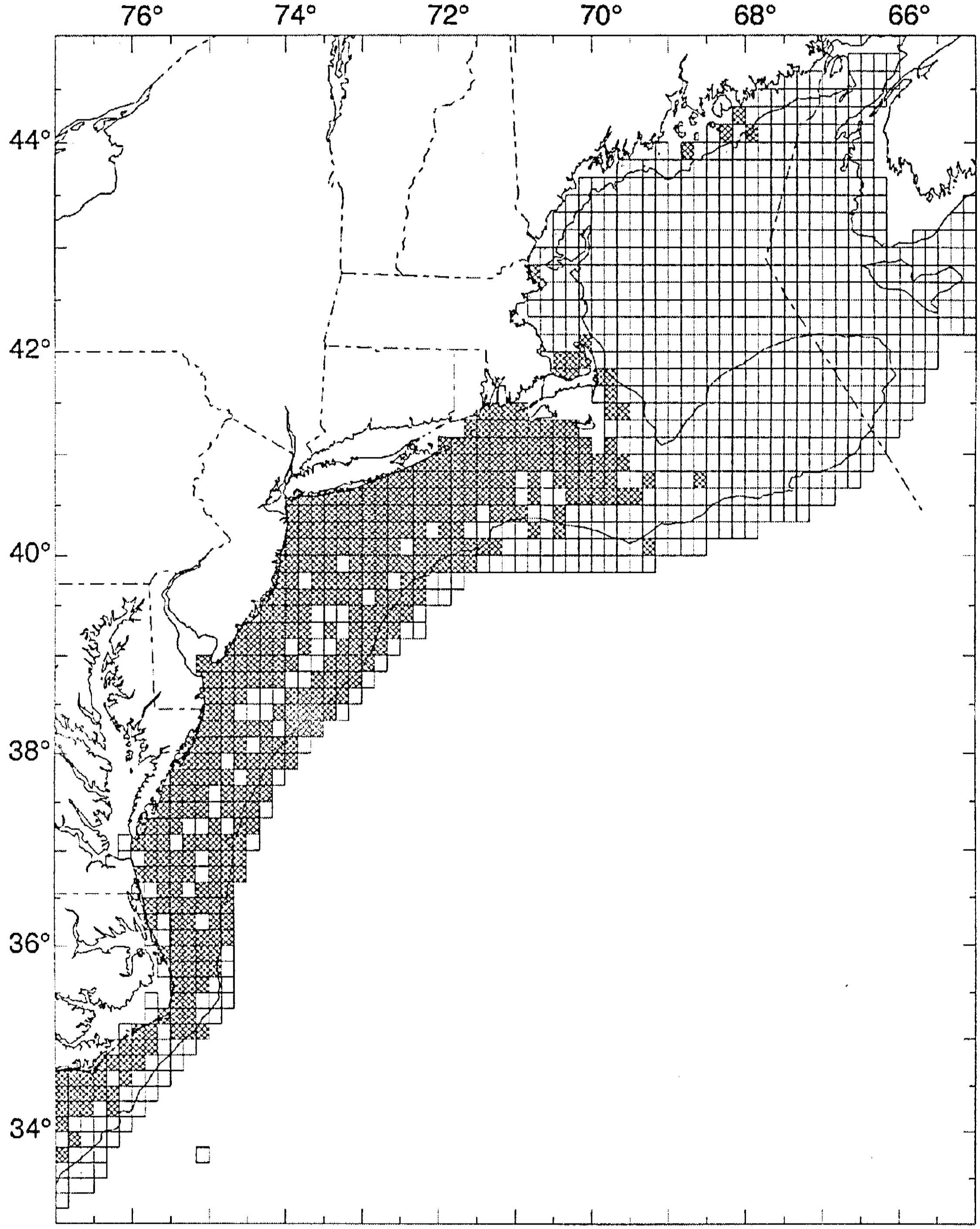


Figure 5b. EFH for scup adults; the area which encompasses the top 90% of the area of scup in the NEFSC trawl surveys.

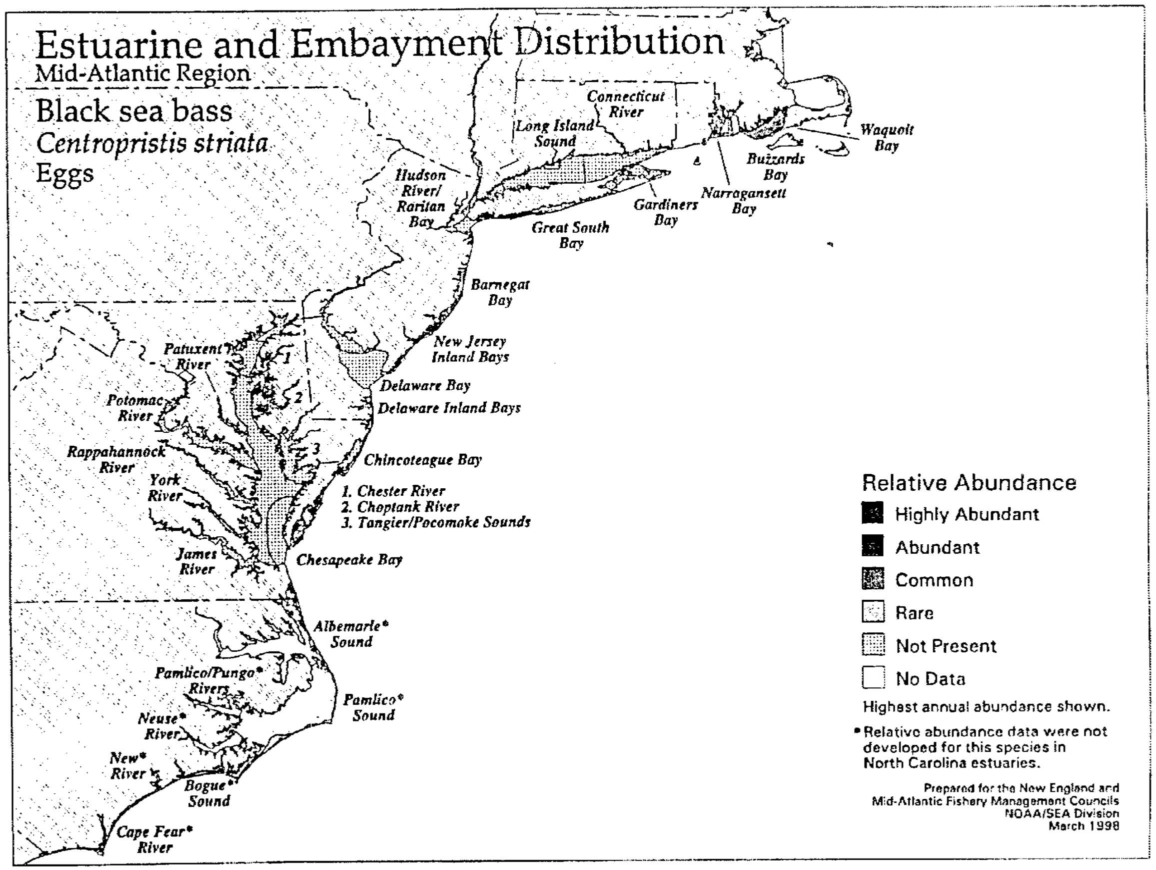


Figure 6a. Relative of abundance and distribution of black sea bass eggs in Mid-Atlantic estuaries. Those estuaries in which eggs are classified as highly abundant, abundant, or common are designated as essential fish habitat. Source: ELMR data.

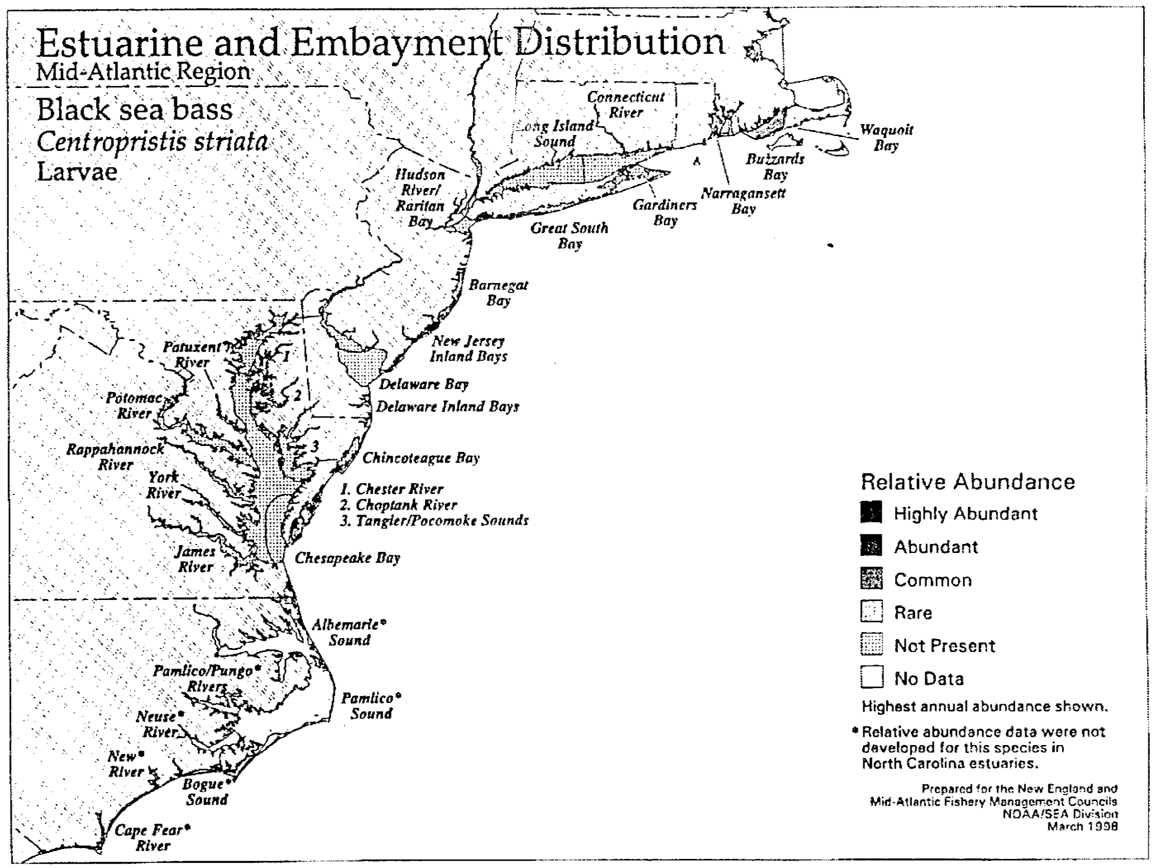


Figure 6b. Relative of abundance and distribution of black sea bass larvae in Mid-Atlantic estuaries. Those estuaries in which larvae are classified as highly abundant, abundant, or common are designated as essential fish habitat. Source: ELMR data.

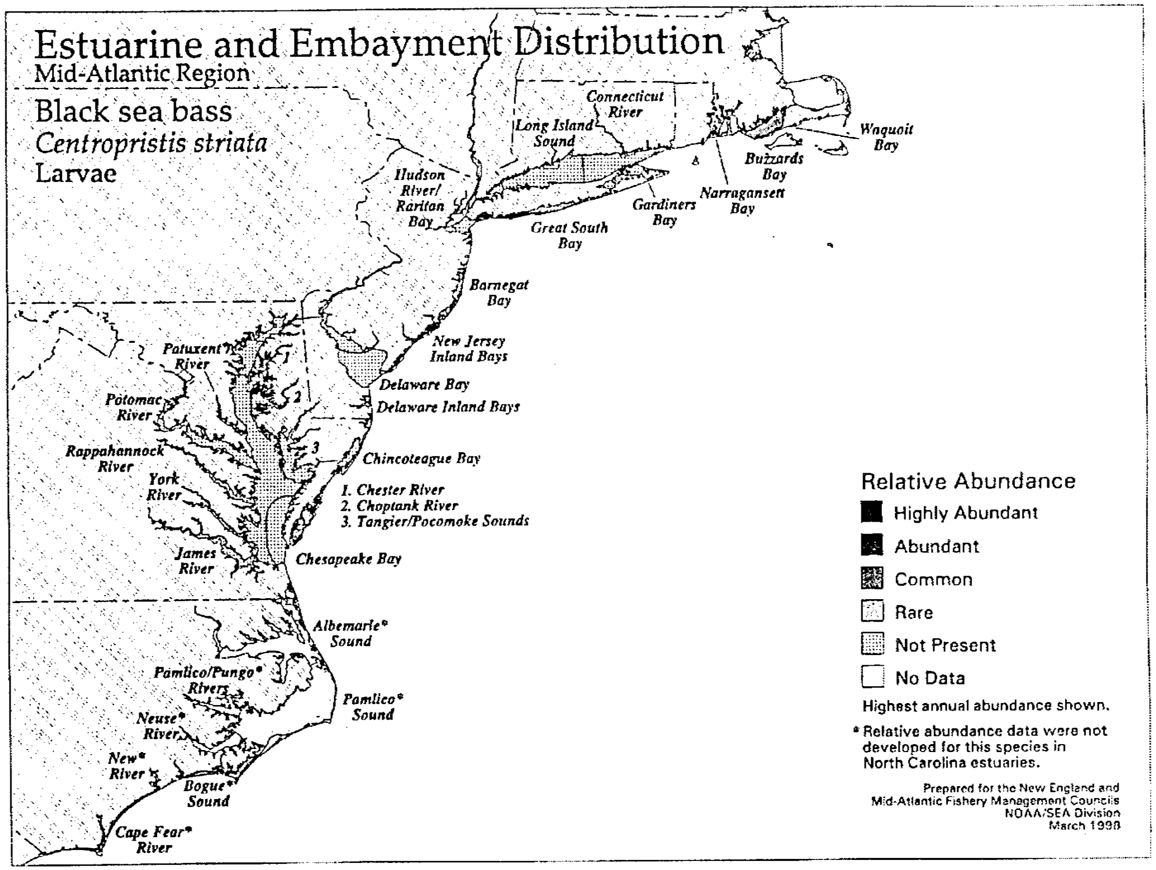


Figure 6c. Relative of abundance and distribution of black sea bass in Mid-Atlantic estuaries. Those estuaries in which juveniles are classified as highly abundant, abundant, or common are designated as essential fish habitat. Source: ELMR data.

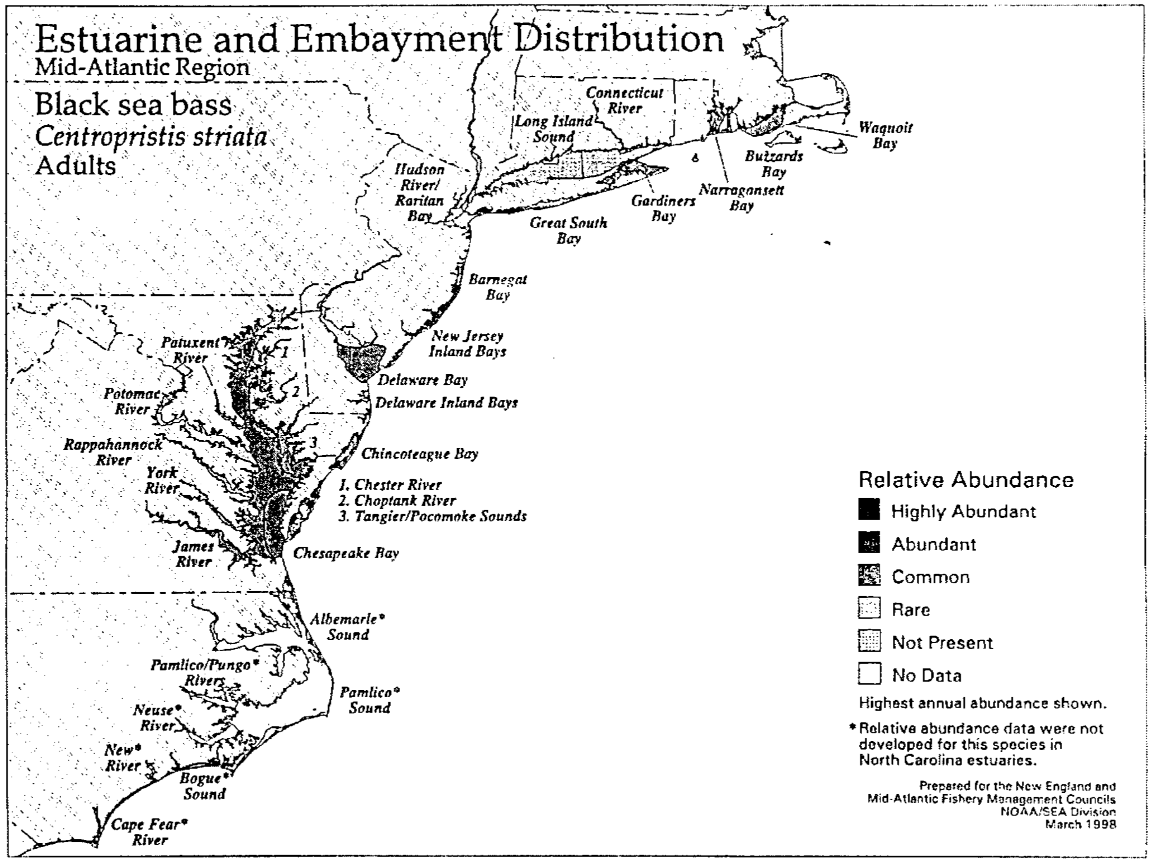


Figure 6d. Relative of abundance and distribution of adult black sea bass in Mid-Atlantic estuaries. Those estuaries in which adults are classified as highly abundant, abundant, or common are designated as essential fish habitat.
Source: ELMR data.

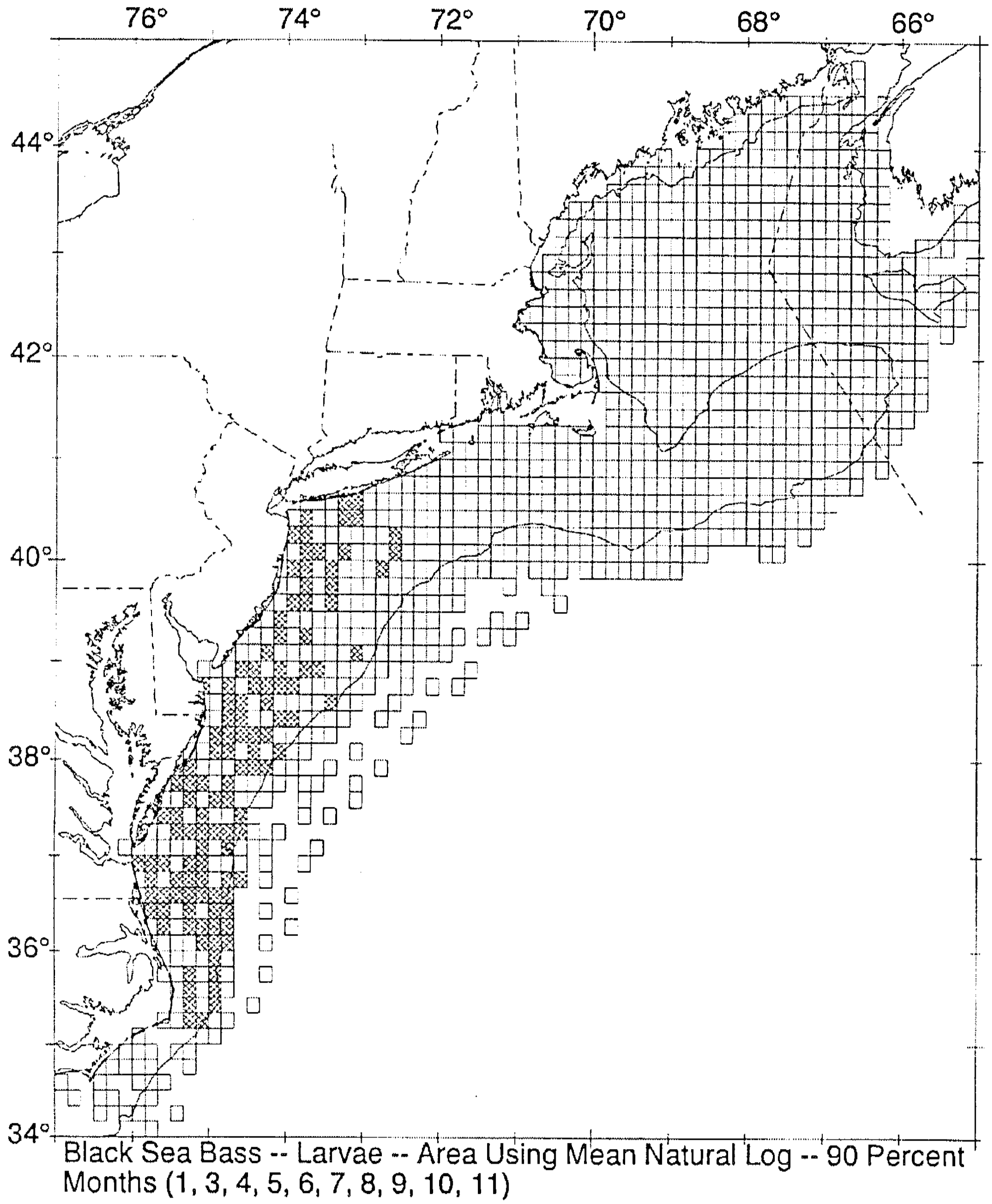


Figure 7a. EFH for black sea bass larvae; the area which encompasses the top 90% of the area where black sea bass are found in the MARMAP and NEFSC trawl surveys.

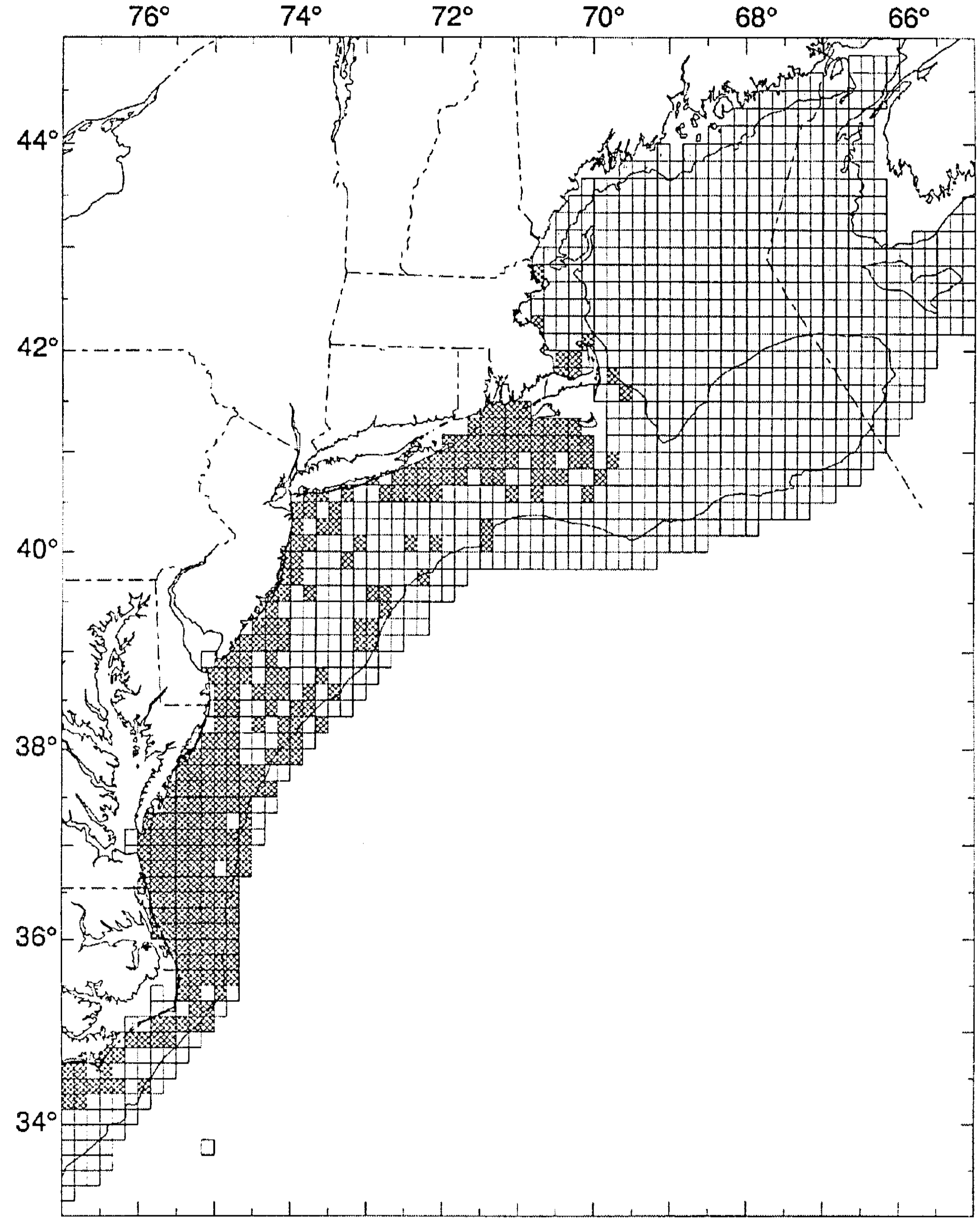


Figure 7b. EFH for black sea bass juveniles; the area which encompasses the top 90% of the area where black sea bass are found in the MARMAP and NEFSC trawl surveys.

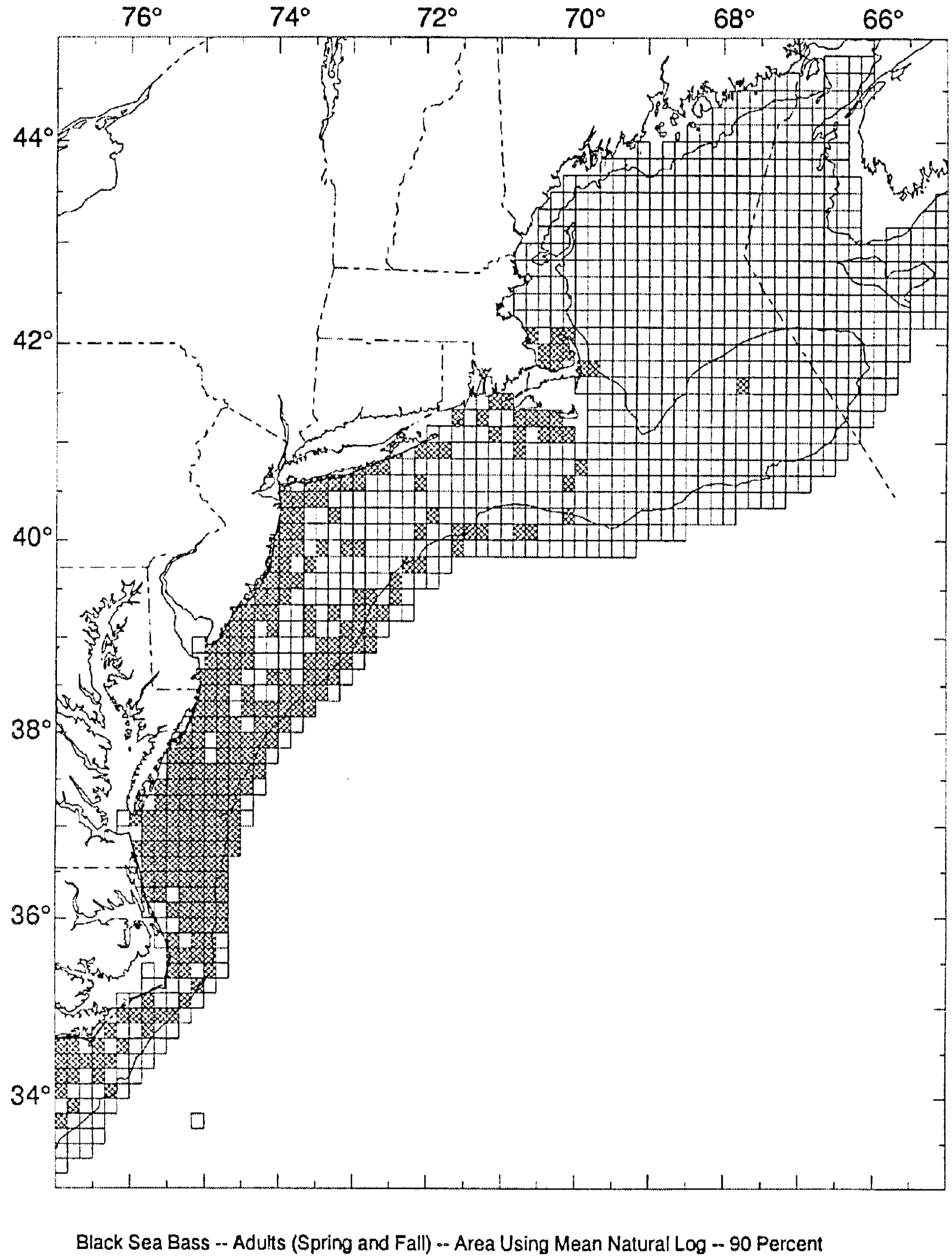


Figure 7c. EFH for black sea bass adults; the area which encompasses the top 90% of the area where black sea bass are found in the MARMAP and NEFSC trawl surveys.

All Bottom Trawls
1995 - 2000, Trips>50
N = 198,927

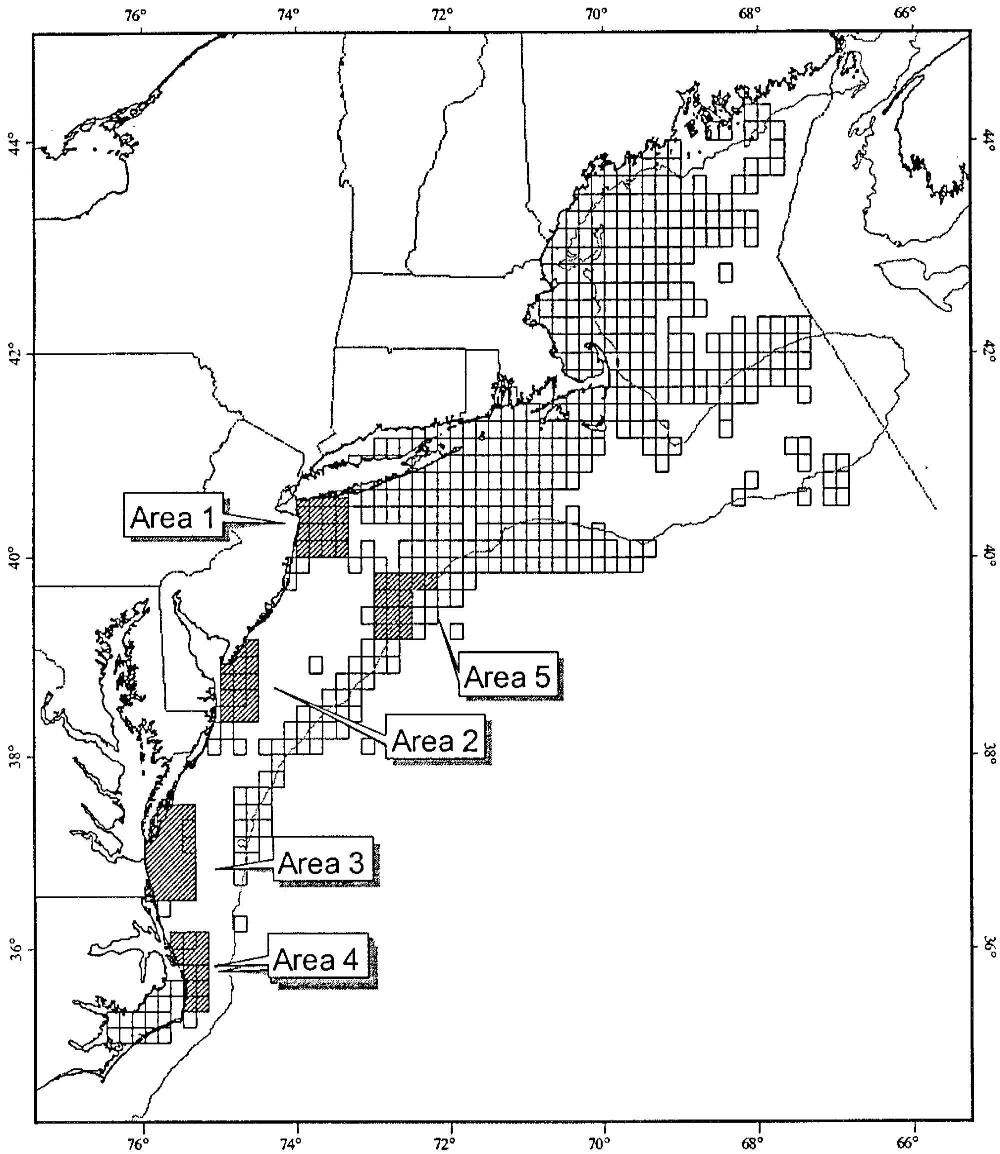


Figure 8. Ten minute squares with 50 or more bottom otter trawl trips, 1995-200 VTR data.

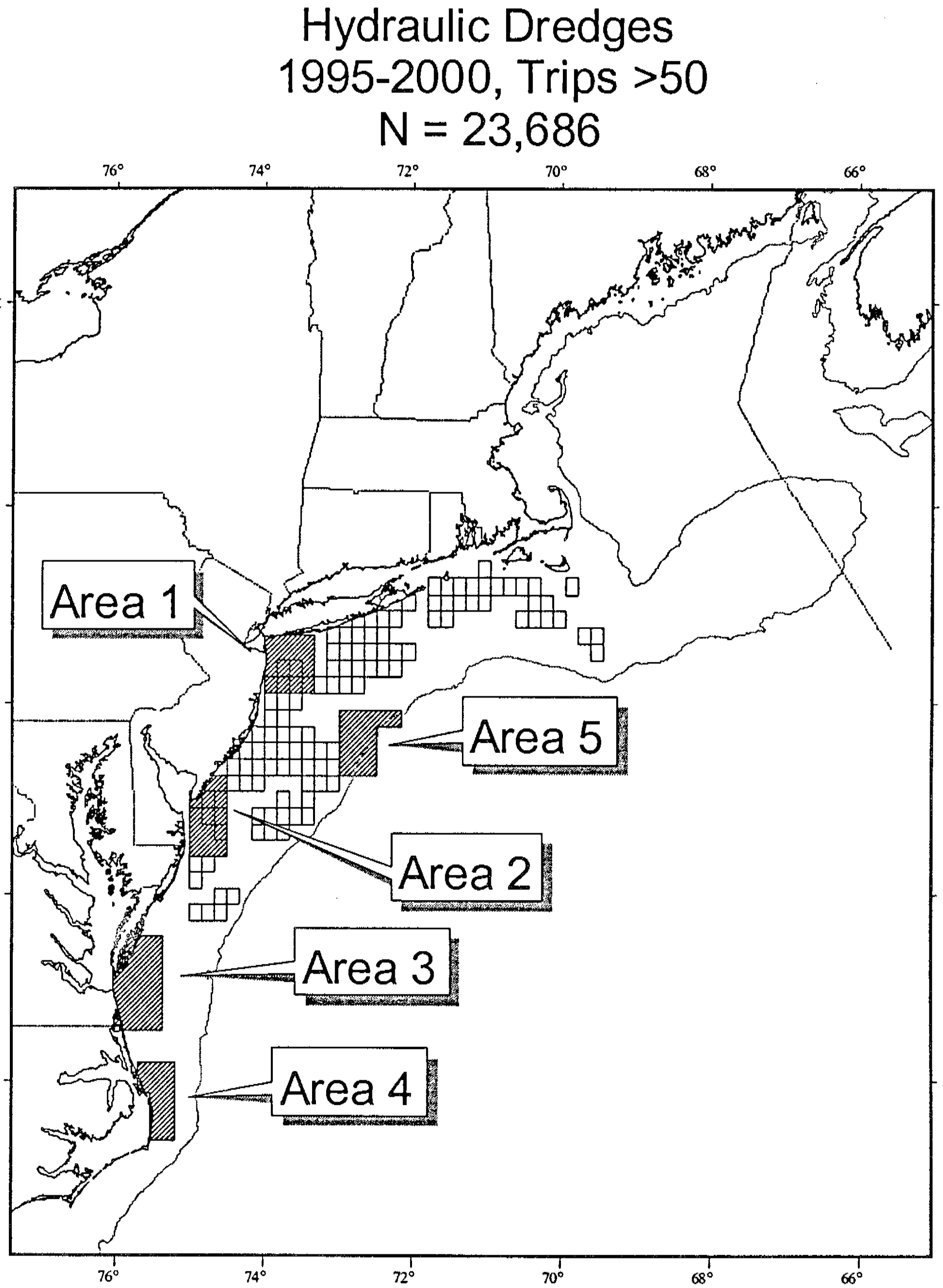


Figure 9. Ten minute squares with 50 or more hydraulic clam dredge trips, 1995-200 VTR data.

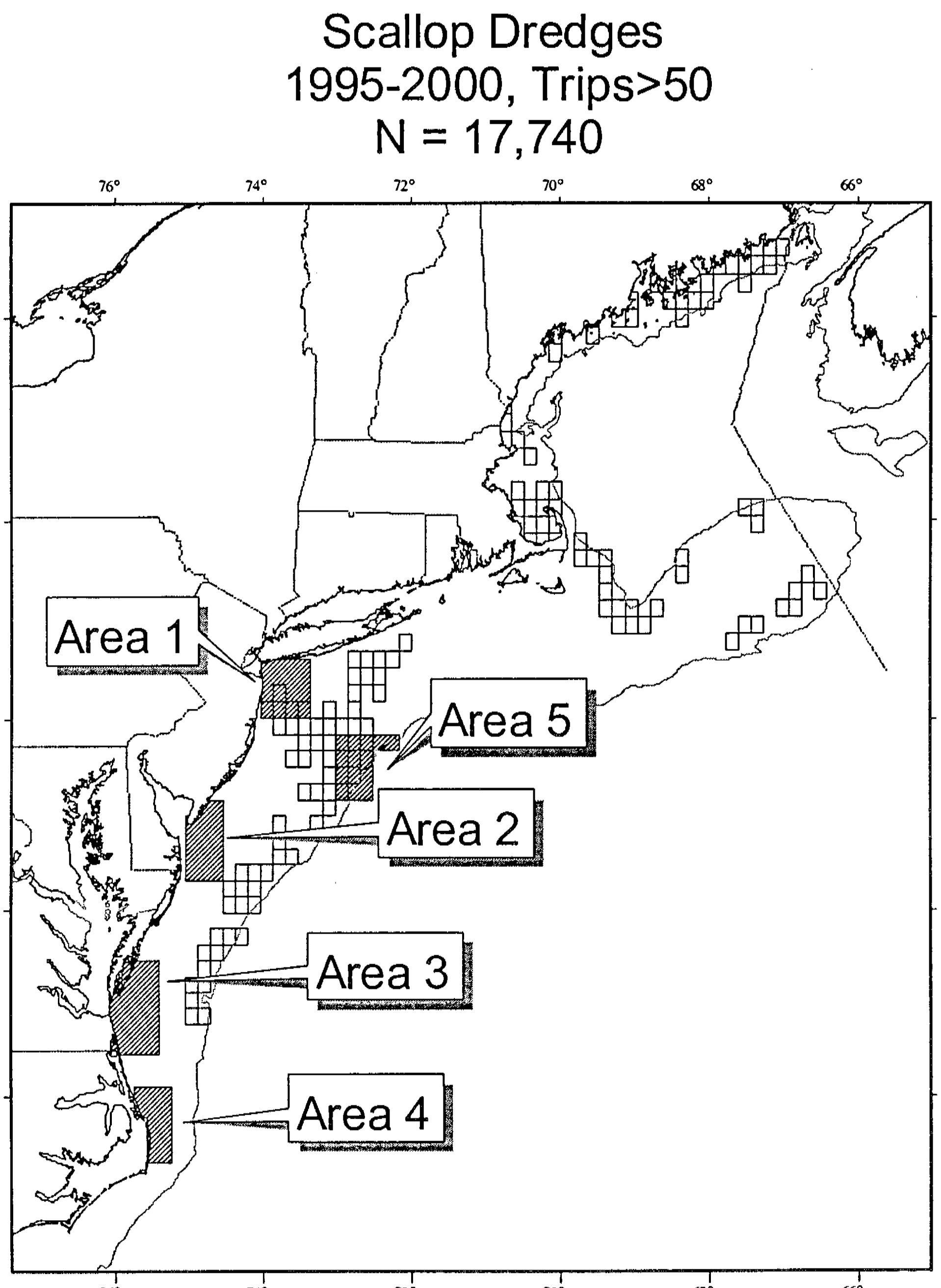


Figure 10. Ten minute squares with 50 or more scallop dredge trips, 1995-200 VTR data.