2000 Summer Flounder, Scup, and Black Sea Bass Specifications

Environmental Assessment
Regulatory Impact Review
Initial Regulatory Flexibility Analysis
Essential Fish Habitat Assessment

17 November 1999

Environmental Assessment

Introduction

The management measures contained in the Summer Flounder, Scup and Black Sea Bass Fishery Management Plan (FMP) are intended to address the overfished condition of these stocks. The summer flounder measures are based on a management plan drafted by the State/Federal Summer Flounder Management Program pursuant to a contract between the New Jersey Division of Fish, Game, and Wildlife, and the National Marine Fisheries Service (NMFS). The State/Federal draft was adopted by the Atlantic States Marine Fisheries Commission (Commission) in 1982. The Mid-Atlantic Fishery Management Council (Council) adopted the FMP in April 1988 and NMFS approved it in September 1988. The FMP has been amended several times since its initial implementation, with Environmental Impact Statements prepared to consider the impacts of the three major amendments relevant to this action. Amendment 2 enacted management measures for the summer flounder fishery through final regulations implemented on December 4, 1992 (57 FR 57358). Amendment 8 enacted management measures for the scup fishery through final regulations implemented on September 23, 1996 (61 FR 43420). Amendment 9 enacted management measures for the black sea bass fishery through final regulations implemented on December 16, 1996 (61 FR 58461). Each of these amendments enacted comprehensive management measures to attain annual fishing targets and address overfishing. Each of the amendments was adopted jointly by the Council and the Commission, so state regulatory actions complement federal management actions.

The management objectives of the FMP are as follows:

1) reduce fishing mortality in the summer flounder, scup and black sea bass fisheries 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 the fishery;
4) promote compatible management regulations between state and federal jurisdictions;
5) promote uniform and effective enforcement of regulations;
6) minimize regulations to achieve the management objectives stated above.

To attain these management objectives the FMP specifies the following measures that may be specified annually:

* commercial quotas;
* minimum sizes;
* gear regulations;
* recreational harvest limit;
* recreational possession limit, season, and no-sale provision.

This document is an examination of the impacts to the environment that would result from the implementation of the 2000 management measures recommended for the summer flounder, scup, and black sea bass fisheries. These measures include harvest limits (commercial and recreational) and other measures to ensure that the annual fishing targets specified in the FMP are attained. The Council met jointly with the Commission’s Summer Flounder, Scup, and Black Sea Bass Board (Board) and adopted recommended measures at the August, 1999, meeting.

1.0 Annual Specification Process

Comprehensive measures enacted by Amendment 2 and modified in Amendments 3 through 7 were designed to rebuild the severely depleted summer flounder stock. Amendments 8 and 9 to the Summer Flounder, Scup and Black Sea Bass FMP implemented recovery strategies to rebuild the scup and black sea bass stocks, respectively. These amendments established Monitoring Committees which meet annually to review the best available scientific data and make recommendations regarding the total allowable landings and other management measures in the plan. The Committee's recommendations are made to achieve the target mortality rates established in the amendments to reduce overfishing. The Committee bases its recommendations on the following information: (1) commercial and recreational catch data; (2) current estimates of fishing mortality; (3) stock status; (4) recent estimates of recruitment; (5) virtual population analysis (VPA); (6) target mortality levels; (7) levels of regulatory noncompliance by fishers or individual states; (8) impact of fish size and net mesh regulations; (9) sea sampling data; (10) impact of gear other than otter trawls on the mortality of each species; and (11) other relevant information.

Based on the recommendations of the Monitoring Committee, the Mid-Atlantic Council's Demersal Species Committee makes a recommendation to the Council which in turn makes a recommendation to the Regional Administrator. The Regional Administrator reviews the recommendation and may revise it if necessary to achieve FMP objectives. In addition, because the FMP is a joint plan with the Commission, the Commission's Summer Flounder, Scup and Black Sea Bass Board (Board) adopts complementary measures.

2.0 Methods of Analysis

The basic approach adopted in this analysis is an assessment of various management measures from the standpoint of determining the impacts upon the environment. In order to conduct a more complete analysis, impacts were examined in four alternatives (Table 1). The alternative examines the measures adopted by the Council and the Board, the preferred alternative. The second alternative examines the impacts of the Monitoring Committee's alternative. The third and fourth alternatives examine the highest quotas (least restrictive scenario) and the lowest quotas (most restrictive scenario) considered by the two bodies, respectively. A full description of these scenarios is given in sections 3.0, below.

Table 1. Comparison (in lb) of the scenarios of quota combinations reviewed. "FLK" is summer flounder.

	Commercial Quota*	**Percent of 1998 Landings**	**Percent Change**
Quota Scenario 1			
FLK Preferred Alternative	11,111,298	99.13	-0.87
Scup Preferred Alternative	2,534,160	60.74	-39.26
Black Sea Bass Preferred Alternative	3,024,742	118.16	18.16
Quota Scenario 2			

FLK Technical Recommendation	10,089,000	90.00	-10.00
Scup Technical Recommendation	2,497,000	59.85	-40.15
Black Sea Bass Preferred Alternative	3,024,742	118.16	18.16
Quota Scenario 3 (Least restrictive)			
FLK Non-Selected Alternative 2	13,227,736	118.01	18.01
Scup Non-Selected Alternative 2	3,510,000	84.14	-15.86
Black Sea Bass Non-Selected Alternative 2	4,527,600	176.87	76.87
Quota Scenario 4 (Most restrictive)			
FLK Non-Selected Alternative 1	8,598,027	76.71	-23.29
Scup Non-Selected Alternative 1	324,000	7.77	-92.23
Black Sea Bass Non-Selected Alternative 1	1,400,000	54.69	-45.31

* Note that quotas are provisional and would be adjusted in 2000 to account for 1999 overage.

3.0 Description of Management Scenarios

3.1 Scenario 1 (Preferred Alternative)

Scenario 1 analyzes the impacts of the harvest limits recommended by the Council and Board on vessels that are permitted to catch any of the three species. The Council and Board recommend a total allowable landings (TAL) level of 18,518,830 lb (8,400,000 kg) for 2000 for summer flounder. The recommended coastwide (TAL) for 2000 for summer flounder of 18,518,830 lb (8,400,000 kg) is equal to the level established for 1999. The TAL for 2000 would be divided between the commercial and recreational components of the fishery in the same proportion as it was each year from 1993 to 1999. In 2000, the commercial fishery would receive 11,111,298 lb (5,040,000 kg) as a quota, and the recreational fishery would receive 7,407,532 lb (3,360,000 kg) as a harvest limit.

The Council and Commission voted to establish a system in 1998 whereby 15 percent of each states quota for summer flounder would be set aside each year to reduce discards after the closure of the directed commercial fishery. In addition to this, the set aside system would allow for summer flounder landings to continue throughout the fishing season. This system would continue in 2000. In order for fishermen to land the incidental catch allowance in a state, the Commission recommended that a state implement trip limits such that summer flounder on board cannot exceed 10 percent of other species on board for any trip set under the incidental catch allocation. Trip limits must be sufficiently restrictive to allow the incidental catch fishery to remain open for the entire year without exceeding the state's overall quota. In addition, the Commission recommended that states implement programs to collect additional data on discards in the commercial fishery.

The Council and Board recommend a coastwide total allowable catch (TAC) of 5,922,000 lb (2,686,174 kg) for 2000 for scup. This TAC is equal to the TAC established for 1999. The 2000 TAC is divided between the commercial and recreational components of the fishery in the same proportion as in 1997, 1998, and 1999. The commercial TAC for 2000 is 4,619,160 lb (2,095,215 kg) and the recreational TAC is 1,302,840 lb (590,958 kg). Discard estimates are deducted from these TACs to set a TAL - what can be brought to the docks - for the commercial and recreational sectors. The commercial TAL is a quota; and the recreational TAL is a harvest limit. Both are shown below.

	Commercial (lb)	Recreational (lb)
TAC:	4,619,160 (2,095,215 kg)	1,302,840 (590,958 kg)
Less Discard Estimate:	2,085,000 (945,740 kg)	65,000 (29,484 kg)
TAL:	2,534,160 (1,149,475 kg)	1,237,840 (561,547 kg)

The Council also recommended regulated mesh areas to reduce the discards of small scup.

The Council recommend a coastwide total allowable landing (TAL) level of 6,172,943 lb (2,800,000 kg) for 2000 for black sea bass. This TAL is identical to the black sea bass TAC for 1999. Based on landings data from 1983 to 1992, 49 percent of the TAL is allocated to the commercial fishery as quota and 51 percent is allocated to the recreational fishery as a harvest limit. As such, the recommended quota for 2000 is 3,024,742 lb (1,372,000 kg) and the recommended recreational harvest limit is 3,148,201 lb (1,428,000 kg).

3.2 Scenario 2 (Monitoring Committee's or Technical Recommendation)

Scenario 2 analyzes the impacts of the harvest limits proposed by the Monitoring Committee on vessels that are permitted to catch any of the three species. Since the Council's summer flounder and scup recommendation (section 3.1 above) differs from that of the Monitoring Committee, the analysis considers the same black sea bass harvest levels as Scenario 1, but includes the Monitoring Committee's recommendation for summer flounder (harvest limit of 16,815,000 lb; 10,089,000 lb commercial, 6,726,000 lb recreational) and scup (TAC of 4,158,000 lb and a discard ratio of 23%; commercial TAL of 2,497,000 lb, recreational TAL of 1,237,840 lb).

The proposed coastwide landings limit for summer flounder under this scenario would result in 1,022,298 lb (463,706 kg) decrease in the commercial fishery, relative to the 1999 TAL. In addition, the recreational harvest limit associated with this alternative is 681,532 lb (309,137 kg) lower than the harvest limit established in 1999.

3.3 Scenario 3 (Least restrictive)

Scenario 3 analyzes the impacts of the harvest limits considered by the Monitoring Committee and the Council that resulted in the highest possible landings for 2000, regardless of their probability of achieving the targets. Thus, this scenario includes non-selected alternatives for all three species. More specifically, a summer flounder TAL of 22,046,226 lb (13,227,736 lb commercial; 8,818,490 lb recreational), a 3,510,000 lb commercial quota for scup (1,237,840 lb recreational), and a 9,240,000 lb TAL for black sea bass (4,527,600 lb commercial; 4,712,400 lb recreational).

3.4 Scenario 4 (Most restrictive)

Scenario 4 analyzes the impacts of those harvest limits that result in the greatest reductions in landings (relative to 1999). Thus, this scenario includes non-selected alternatives for all three species. More specifically, a summer flounder TAL of 14,330,045 lb (8,598,027 lb commercial; 5,732,018 lb recreational), a 324,000 lb commercial quota for scup (1,237,840 lb recreational), and a 2,857,143 lb TAL for black sea bass (1,400,000 lb commercial; 1,457,142 lb recreational).

4.0 General Fishery Description

4.1 Port and Community Description

In order to identify the ports important to fisheries managed by the Mid-Atlantic Council and to identify the fisheries relative importance to those ports, the Council retained Dr. Bonnie J. McCay of Rutgers University to prepare a background document (McCay *et al*. 1993). The research covered ports from Chatham, Massachusetts, to Wanchese, North Carolina. Dr. Bonnie J. McCay, is in the process of updating the 1993 background document. More specifically, her team is identifying and developing community profiles for major fishery dependent communities associated with fisheries managed by the Council. This project is expected to be completed in Fall 1999. These community profiles will be used to assess the probable socieconomic impacts of management options evaluated by the Council.

The principal approaches employed to compile the information presented in the report mentioned above were open-ended phone interviews, port visits, data analysis, and interviews of people involved in different aspects of the fishing industry. Landings statistics are from the National Marine Fisheries Service weighout data. Information about the ports is from interviews from key informants and from earlier studies conducted by McCay's research team (McCay *et al.* 1993). The quality of the port descriptions, therefore, depends on the information supplied by the informants. The port descriptions presented in this section are brief summaries of the material in McCay *et al.* (1993), and readers with questions are encouraged to obtain the original document. The port discussion includes a description of the fleet (number of vessels and type of gear employed), a description of the landings (species value) and general description of the community and port characteristics as permitted by the available information. The overall description may vary from port to port due to the need to maintain confidentiality of data in ports where there are few vessels.

The report (McCay *et al*. 1993) identified ports that appeared in the top 10, in terms of landed value, for any of the species that the Mid-Atlantic Fishery Management Council has full or shared responsibility for the preparation of Fishery Management Plans (tilefish, scup, black sea bass, summer flounder, dogfish, Atlantic mackerel, *Loligo* squid, *Illex* squid, butterfish, weakfish, bluefish, and angler or monkfish). The ports identified as relevant in the first report covered ports from Chatham, Massachusetts, to Wanchese, North Carolina.

For purposes of orientation, Barnstable County, MA includes all of Cape Cod, including the fishing port of Chatham. New Bedford is located in Bristol County, MA. The port of Newport is located in Newport County, RI. Stonington is located in New London County, CT. Freeport is located in Nassau County, NY. Brooklyn is located in Kings County, NY. Belford, Point Pleasant, Barnegat Light (Long Beach), and Cape May/Wildwood are located in New Jersey. Ocean City is located in Worcester County, MD. Virginia has a system whereby

certain cities exist apart from counties. Within the scope of this analysis, the City of Seaford, Hampton, Norfolk, Newport News and Virginia Beach all fall into this category. Wanchese is located in Dare County, NC.

Wanchese, North Carolina

Wanchese is located on the southern end of Roanoke Island in North Carolina. "Wanchese has traditionally been a fishing community with commercial fishing operations since the late 1800s. Many of the current residents of Wanchese are descendants of people who settled here in the late 1600s and early 1700s." Many of the fishers are small, independent owner operators. "Informants have estimated that fifty percent of the men in Wanchese are in a marine related career." Wanchese has never developed the strong tourism sector seen in nearby areas. Wanchese is bounded on three sides by estuarine waters and is twenty minutes (by boat) from Oregon Inlet. Because of the periodic shallowness of Oregon Inlet, many of its larger trawlers stay in Hampton, Virginia or New Bedford, Massachusetts during the winter. "Wanchese is also the site of the Wanchese Seafood Industrial Park (WSIP) which was developed in the 1970s to be a major site for seafood processing activities. However, because of the uncertain nature of Oregon Inlet and the general decline in fisheries since the 1970s, very few businesses actually operate in WSIP. The catch is either sold at retail markets locally or it is packed in ice and sent to other markets. At least one of the Wanchese commercial fishing and packing operations has expanded to other ports such as Hampton, Virginia and New Bedford, Massachusetts." In recent years, some New Bedford vessels have moved south to base in Wanchese in response to shortages of groundfish and scallops in New England.

Much of the ocean fishing occurs in the winter months (November-April), and summer flounder is the principal species sought. However, the boats in Wanchese fish all year round. Summer flounder is caught with otter trawls which fish from shore out to 100 fathoms, and from Ocracoke, North Carolina to Cape May, New Jersey and New York. Alternative species include weakfish and *Illex* squid, but these require different nets. There are a half dozen fish houses and other marine-related businesses that handle species other than crabs, and a couple that handle crabs exclusively. McCay *et al.* (1993) reported that summer flounder (21 percent) was the most important species in Dare County in terms of landed value in 1991. The value of all species landed in Dare County was over $11 million in 1991. Blue crabs (hard) are second in importance (11 percent), followed by weakfish (9 percent). Bluefish accounted for about 4 percent of the total landed value in Dare County in 1991, sea basses (3 percent), dogfish (1 percent), and tilefish, scup, butterfish, squid, and Atlantic mackerel with less than 1 percent.

Generally, the boats that are owned by local companies are operated by hired captains. However, these boats may be operated by a relative in some instances. Independent boats are usually owner-operated, with family members often serving as crew. "The crew on these vessels are mostly local; 75-80 percent are from within the area. All are paid with some variation of a share system." The crews are mostly 18 to 40 years of age; captains are usually older, with some over 65. Most crew members are white, though there are some black fishers including black captains. Sometimes, members of a family will own boats and fish houses. In the fish houses, most of the work force is black women, except for the crab houses where Latino workers are more common."

"Recreational fishers use the inshore, offshore, and sound waters around Wanchese and Dare Counties." Those fishing from boats do not predominantly

target summer flounder, scup, or black sea bass. Some flounder are targeted by pier and surf fishers, who are primarily local residents and residents of nearby counties.

Hampton/Hampton Roads, Virginia

"The area in Virginia containing Hampton, Newport News, Seaford, and Virginia Beach is know as Hampton Roads. It is difficult to describe fishing in Hampton apart from the rest of the area. Hampton brings in the largest variety of fish species and the most pounds, but it is a small part of Hampton Roads." These ports have historically been fishing communities. The Hampton Roads area included five of the six major offloading ports in Virginia. However, the "fishing industry is but one of the many industries in the Hampton Roads area. While Hampton itself is not a big tourist spot, the town is trying to emphasize its waterfront area and its tourism potential. There is an Air and Space Museum, a marina for pleasure boats, a number of military installations. The military presence in the Hampton Roads area is also a large part of the economy, keeping this area from being totally dependent on tourism and fishing. Other industries in the area include: a large coal port in Newport News, CSX railroad, and shipping freight companies.

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

Much of the poundage of fish in Virginia is accounted for by menhaden, but other species are also important. Summer flounder is caught by otter trawls and gillnets. Draggers may switch between scallops and summer flounder by season, though small draggers usually specialize in either scallops or fish. Gillnets also target spot, croaker, weakfish, and some black sea bass. Summer flounder is also caught in pound nets, though these are primarily targeting mackerel, harvest fish and industrial fish. Overall, the fishers in this area are very opportunistic, targeting whatever seems available and marketable. As a result, there is generally no off season here, though summer flounder quota limits sometimes lead vessels to tie up for a couple of months.

The Hampton Roads area ports landed ninety-five different species in 1992. In terms of landed value, sea scallops (63 percent) and summer flounder (17 percent) were the two most important species landed in the Hampton Roads area in 1992. Black sea bass and scup accounted for approximately 2 percent and 0.3 percent of the total landed value by species for the same period, respectively.

In 1992, scallop dredgers accounted for 54 percent of the total landed value by gear type in Hampton Roads, followed by otter trawls (bottom fish) (20 percent), otter trawls (scallop) (12 percent), tong/clam (6 percent), crab pot (3 percent). Summer flounder accounted for 84 percent of the total landed value by species of bottom fish otter trawls in 1992, black sea bass ranked second with 6 percent of the total landed value, and scup ranked fourth with less than 2 percent of the total landed value.

Black sea bass are targeted in the EEZ by trawlers, potters, and hook and line fishermen. Draggers landed 66 percent of the total black sea bass landed in the area in 1992, while handliners landed 32 percent. For handliners, black sea bass accounts for well over 90 percent of their landings. Black sea bass is also an incidental catch for haul seiners and gill netters in coastal waters. Sea bass are also caught with otter trawl/fly nets. Most of these nets are equipped with rollers on the bottom and buoys on the nets. Commercial fishermen may also catch sea bass with pots or with hook and line at wrecks or other bottom structures. Sea bass pots are relatively new, the fishery having really developed in the early 1990s. They are similar to crab pot and are typically deployed close to wrecks

Many of the boats dragging for black sea bass in the Hampton Roads area are from North Carolina. These fishermen also shrimp in the summer and then flounder fish in the winter. Some commercial fishermen also employ pots and hook and line to catch black sea bass.

Summer flounder has been a major money species in the spring and fall in Hampton Roads. Weakfish is caught all summer and targeted by gill netters in the fall. *Illex* squid is targeted during the summer, *Loligo* squid is mainly targeted in the fall. Atlantic mackerel is mainly caught by draggers, but a small amount are also caught by sink gill nets and pound nets. Most of the scup landed in Hampton Roads are landed by draggers.

Scup are landed almost exclusively by draggers, and are targeted offshore and to the north outside of state waters. Most of the scup are landed in Hampton and Newport News in the winter. “The vessels involved are mostly the multi-gear vessels that in the summer go after scallops with a net or dredge and then flounder fish in the fall and when that is over they switch their net to go after scup. But these fishers must wait until the fish are accessible which usually occurs in the winter beginning in December...In the spring, scup can be a big fishery [but this varies by year].” “Informants have observed a shift toward scup and black sea bass by founder fishers as a result of summer flounder quotas.”

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

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

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

Family ties are important in choosing crew members on the smaller vessels. These boats tend to have very stable crews. Larger vessels, especially scallopers have a much higher turnover rate among crew. Crew are paid on a share system. Most of the captains and some of the crew have been fishing for most of their lives. Educational levels vary. "There is a mix of age groups in commercial fishing in Hampton Roads. There is a small but growing contingent of Vietnamese-owned boats, which is generating some resentment from longtime resident fishers. There are also a small number of Mexican-American fishers, most of whom are members of a single extended family.

"Trawlers unload at packing houses and these fish houses often serve as the wholesale buyer and distributor. One of the fish houses has government contracts and supplies the navy with all of its seafood. Summer flounder is distributed all over the United States, both here and in northern cities such as New York City and in Chicago. Many of the flounder are shipped to Japan and to St. Louis as well. Sea bass are mostly sold wholesale to New York. A few are sold locally. Scup and squid are shipped to northern markets. Two of the companies in Hampton own their own trucks and one of these is also a secondary buyer."

"Hampton Roads also has a large recreational fishery. Virginia Beach has a sports fishing center like Ocean City, Maryland but not as big as Oregon Inlet, North Carolina." Summer flounder is an important recreational species with hook and line, with the highest recreational landings in the spring near Chincoteague (eastern shore). Headboats go out for black sea bass, and some recreational fishers target scup. Other recreational species include bluefish and weakfish, with dogfish being an incidental catch.

Ocean City, Maryland

"The principal port in Maryland is Ocean City. Ocean City is a commercial fishing community with families that have been involved in fishing for at least sixty years. It has a permanent population of about 10,000 to 14,000 and a summer population of about 250,000 to 300,000. Many hotels, condominiums and summer homes as well as other service businesses for the summer tourists exist in Ocean City. One informant said that Worcester County is the wealthiest county in Maryland precisely because of the revenue generated by tourism. Major sources of employment such as work in tourist businesses and construction are thus related to the mainstay of the economy--tourism. However, new development is not taking place at the same levels it did in the past. Thus most of the construction jobs involve the maintenance of current structures. In fact, fishermen are also finding it hard to go into other industries such as crabbing or construction because these are depressed as well."

Surf clams and ocean quahogs are the two most important species, but summer flounder, black sea bass, sea scallops, bigeye tuna, swordfish, spiny dogfish, and yellowfin tuna are also species of interest.

Draggers take a variety of species, but primarily summer flounder and spiny dogfish. They trawl year round for summer flounder, black sea bass, and scup. From April through September they target summer flounder almost exclusively. Black sea bass are important species for inshore handline fishers. There has also been a significant sea bass pot fishery, with black sea bass landed value being second only to summer flounder in many years though it has seen some decline recently. The black sea bass pot fishery runs from April to September.

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

The total landed value of fish and shellfish in Ocean City and surrounding areas in 1992 was approximately $8 million. The top 10 species by percent landed value in 1992 were: surf clam (34 percent), ocean quahog (28 percent), summer flounder (5 percent), black sea bass (5 percent), sea scallop (4 percent), bigeye tuna (4 percent), swordfish (4 percent), dogfish (4 percent), yellowfin tuna (4 percent), and lobster (2 percent). Scup ranked 19th in importance, accounting for less than half of a percent of the total landed value in this port in 1992.

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

The Ocean City otter trawlers take a large variety of finfishes, topped with summer flounder (40 percent of the total landed value), and spiny dogfish (28 percent). Black sea bass and scup ranked fifth and eighth with approximately 3 percent and 2 percent. Horseshoe crabs make up an unusually large component of this catch.

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

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

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

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

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

The number of boats targeting summer flounder in Ocean City is small, mainly because Maryland's quota is small. Atlantic mackerel is targeted for about one week between March and April.

According to an informant, there have been no unusual changes in fishing in the Ocean City area. When a fishery is doing better, fishermen drift towards it in order to relieve pressure on another fishery.

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

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

"Businesses that serviced the surf clam and ocean quahog fishery such as trucking, fuel and ice have declined tremendously. There are unloading areas in Ocean City as well as local buyers. Fluke [summer founder] and black sea bass are taken to New York or Norfolk to bigger fish houses. During the summer, more summer flounder is sold locally and in Baltimore. Big-eye tuna and the best yellowfins go to Japan and bring a lot of money per pound."

"Ocean City is a well known recreational fishing port with many offshore charter boats." Headboats will hook for sea bass. However, the big money is in large pelagics. Pelagic boats target white marlin, as also tuna, bluefins, and big eyes. Atlantic mackerel are also popular targets.

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

Belford/Pleasant Point/Barnegat Light/Long Beach, New Jersey

Belford has 32 core boats in its port. The fleet is pretty much in the 40-60 foot range and made up of older boats. Draggers, poundnetters, and lobster potters make up the majority of the Belford fishing boats. Belford remains a family based fishing port. The Belford Seafood Co-op is the fish house for Belford. Most of the fish are handled by this local cooperative, with other firms handling lobster and shellfish. There is little or no tourism.

The total landed value for Belford in 1992 was about $9.2 million. In recent years ocean quahog vessels have moved to the port of Belford, with the result that the landed value for the port is now dominated by ocean quahogs (32 percent in 1992). The top species by value (excluding ocean quahog in 1992) landed in Belford was lobster (46 percent). Excluding ocean quahogs from the data, summer flounder, scup, and black sea bass accounted for 8 percent, 3 percent, and 1 percent of the total landed value by all species, respectively.

The otter trawl accounts for 19 percent of the total landed value (much higher if ocean quahog dredges were not included). The species composition of otter trawl catches varies seasonally and over the years. In 1992 it was dominated by summer flounder (26 percent), silver hake (22.5 percent), and *Loligo* squid (14 percent), winter flounder (11 percent), and scup (9.3 percent).

The town of Point Pleasant is located at the mouth of the Manasquan inlet in Ocean County. The town's economy is geared towards the summer tourist and recreational economy. Point Pleasant is more diverse and larger. It is less dominated by family businesses. There are half a dozen fish houses, including a cooperative. There are also a lot of marine-related industries and a strong tourist sector. There are 51 core boats at Point Pleasant. They run the gamut from inshore gillnetters to scallop boats, draggers, longliners and lobster potters. The commercial, party/charter boat, and recreational fishing industries are very important to the local economy, employing many of the local residents and supporting many related industries such as seafood markets, restaurants, marine supply houses, welders and salvage, and many of the tourist oriented industries.

For the ocean and bay fisheries of Point Pleasant, the entire landed value was about $16 million. The top species by value (1992) landed in Point Pleasant was ocean quahog (38 percent). Summer flounder, scup, and black sea bass accounted for 1 percent, <1 percent, and <0.5 percent of the total landed value by all species, respectively.

Loligo squid is caught in the winter, often mixed with whiting. In 1992, *Loligo* usurped silver hake's position as the most valuable species caught by the trawlers, and it now accounts for about 49 percent of the landed value of the trawlers from Point Pleasant. At first, it was caught as an incidental catch by those seeking silver hake in the Gully. Now it is targeted by a few of the trawler captains. As one trawler captain stated "You can't help but target squid sometimes, there is so much out there". Thus, the change to *Loligo* was initial de facto, now it is by choice.

In 1992 bottom fish otter trawl accounted for 15.73 percent of the total landed value for the Point Pleasant area. Major species caught include *Loligo* squid (50 percent), silver hake (21 percent), summer flounder (8 percent), and scup (4 percent).

The community of Barnegat Light is located on Long Beach Island, a barrier island along the New Jersey shore. The island up to and including Barnegat Light is intensely developed with summer and beach/boarding houses, and much of the community is heavily geared toward the summer beach economy. During the winter, Barnegat Light's economy slows significantly, and one of the major forms of employment becomes commercial fishing. It hires 150 people working on docks and is one of the biggest income generating businesses on the island during the winter.

Long Beach Island has a core of 30 steady boats that either longline, bottom trawl line, scallop, or gillnet. The gillnet boats are small, in the 30-45 foot range, but the vessel size in the fleet goes up to 100 foot scallop boats. The fleet remains a family based fleet, and the number of boats has remained constant over the years. Two docks pack fish in Long Beach, and there is an office for a swordfish and tuna dealer which purchases fish from the boats and has an offloading facility in Point Pleasant.

The larger region, including Barnegat Bay ports, had landings worth about $32 million in 1992. Major species, by percent of the landed value (excluding surf clams and ocean quahogs) were: sea scallops (28 percent), hard clams (17 percent), swordfish (13 percent), tuna (17 percent), and tilefish (8 percent). Black sea bass, scup, summer flounder accounted for 1.19 percent, 0.11 percent, and less than 0.01 percent of the total landed value by all species, respectively.

For the most all boats in these three ports are owner operated. And there are no freezer boats in any of these ports. Whiting is an important species at all the ports. It was the mainstay of the fisheries in the 1970s and 1980s but has declined. Some Jersey fishermen are suggesting that Rhode Island boats are catching much of the whiting before they migrate to their winter grounds off of New Jersey.

Most boats in these ports are owner-operated, and there are no freezer boats. Whiting is an important species, as are surf clams and ocean quahogs. “Summer flounder is big business for Belford and Pleasant Point.” Scup and black sea bass are incidental catch for these ports. Most summer flounder is caught in trawls, but some comes from gill nets. Captains tend to be aged 40-60. "Belford is a place where fishers have little other skilled work experience and thus are particularly dependent on fishing."

“Traditionally, summer flounder was pursued in the Mudhole in September and October. However, new quota laws have restricted fishing to just September. In the past a few captains specialized in summer flounder, but today it is only sought during quota time in a derby like fashion, It is marketed in the fresh fish markets of New York and Philadelphia, in local restaurants and fish stores, and in [the Point Pleasant Coop’s] retail store.”

“At one time there were a handful of trawlers that specifically targeted scup, partially because it took pressure off a supply burdened whiting market.” Today scup is primarily a winter incidental catch for trawls. Black sea bass are another occasional incidental catch, but not a common one. Barnegat Light has a pot fishery which is heavily dependent on black sea bass and also lands some scup.

There is a charter boat fleet in Barnegat Light which targets mostly bluefish, summer flounder and tuna.

Cape May/Wildwood, New Jersey

There are about 33 local draggers operating from Cape May docks, most of which are wet boats. There are some equipped with refrigerated sea water (RSW) capacity and seven boats are wet boats. The draggers are generally 50-75 feet long, steel hulled. Many transit boats (57 in 1992) land in the Cape May/Wildwood area from places like Point Pleasant, and Point Judith, mainly to take advantage of winter stocks of *Loligo* squid and to find safe harbor during storms. “In addition to local boats, a large number of transient boats from North Carolina, Virginia and some northern states land here.” The number of boats has been fairly stable recently, however, perhaps due to the great diversity of species landed here.

The total landed value of all species for the Cape May/Wildwood area was approximately $37 million in 1992. Cape May alone landed about $30.4 million, Wildwood landed $4.5 million, and other ports in the Cape May area landed $2.3 million. The landed value of the major species landed in 1992 included sea

scallops (28 percent), ocean quahog (11 percent), *Illex* squid (10 percent), *Loligo* squid (9 percent), and surf clams (8 percent). Summer flounder, scup, and black sea bass contributed xx percent, 3 percent, and 2 percent of the total landed value of all species, respectively. Other ports in the area and the statistics that follow include Cold Spring Harbor, near Cape May, and Sea Isle City, located to the north. There are now two tilefish boats, two fish trap (pot) boats and one dragger working out of Sea Isle City. Tilefish and black sea bass are species targeted.

"Tilefish are not landed in the Cape May/Wildwood area, except in Sea Isle City. Scup are targeted by draggers. Black sea bass are caught by pot boats and some draggers. Fluke are targeted by draggers. Dogfish are caught by gillnetters in November, December and in the spring at which time they switch from the spiny dogfish to the smooth dogfish. Draggers target dogfish in the early winter months. Some draggers may just catch them if they happen to run into them. Atlantic mackerel are targeted by draggers in the winter. *Loligo* squid is almost a year round fishery for draggers. But they may be going for either squid on a trip. *Illex* squid is caught by draggers from May to October. Butterfish are an incidental catch of squid and are rarely targeted. Gillnetters catch weakfish but there aren't many doing this any more because of state regulations. So there is a drop in these landings. Draggers also target weakfish. Bluefish are caught by gillnetters and they are an incidental catch for draggers." With the new quotas, some summer flounder fishers have moved into weakfish, though this has limited profitability. Scup fishers rely on summer flounder as an incidental catch, so are increasingly pressed. The pot fishers are highly dependent on black sea bass.

Bottom fish otter trawling, along with bottom sea scallop trawling accounted for 39 percent of the total landed value by gear in the Cape May/Wildwood area in 1992. The major species caught by value by bottom fish otter trawl in 1992 were: *Illex* squid (27 percent), *Loligo* squid (25 percent), and summer flounder (20 percent). Scup ranked fourth with 8 percent, and black sea bass ranked seventh with 2 percent.

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

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

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

Butterfish sometimes is an incidental catch of the squid fishery. When butterfish is caught with large amounts of squid, it is unmarketable

(sometimes it is consumed by the captain and crew of the vessel). However, if landed in considerably large quantities it can be marketed.

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

Cape May is the most southerly town in New Jersey. Cape May has a vibrant tourist and beach economy during the summer. While there are marinas in town there is little conflict for space with commercial fishers. The commercial docks are located along one stretch of the road separated from the rest of the community.

Brooklyn/Freeport, New York

Vessels originating from these ports are primarily draggers fishing for whiting, summer flounder, winter flounder, *Loligo* squid, and scup. There are also lobster boats in these ports. Most are day boats who take an occasional 48 hour trip for squid.

There is a total of 71 permitted commercial fishing vessels in Freeport and 33 in Brooklyn. The average length, gross tonnage and horse power are slightly larger in the Brooklyn vessels than in the Freeport vessels.

The total value of all species landed in the Freeport/Brooklyn area in 1992 was about $4 million. Surf calms represented the most important fisheries in terms of landed value (45 percent), followed by *Loligo* (13 percent), summer flounder (11 percent), scup (10 percent), and lobster (6 percent). Black sea bass accounted for less than 1 percent of the total landed value. In 1992, the majority of the landed value by gear type corresponded to bottom otter trawls with 48 percent, and surf clam dredges with 45 percent. The four major species targeted by otter trawlers in the Freeport area are whiting, winter flounder, summer flounder and squid.

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

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

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

Montauk, New York

Montauk is an isolated community at the tip of Long Island, New York. It has no major light industry or other capital generation sources besides commercial and recreational fishing and related tourist activity.

In Montauk, 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 thirty "seine gangs" in the early 1800s. 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 with 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. In 1993, offshore draggers harvested about 20 percent of all whiting landed by New England and Mid-Atlantic fishers (Drummond 1995). A large portion of the catch, which also includes 10 percent of the *Illex* and *Loligo* squid landings in the Northeast, is sold for export.

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, and summer rates for hotels and other seasonal housing reflect this. The average age for residents of Montauk is 37.9, while the number of people per square mile is 172.1. The average 1990 income was as follows:

Household $31,849
Family $39,292
Non-family $22,417
Per capita Income $20,502

As of February 1996 the total population of Montauk was 3,001 (Chamber of Commerce). Census Bureau data give a total 1990 population of 2,813. Of these, 798 claim Irish ancestry, with other dominant groups being German (640), Italian (408), English (252), Polish (174), Russian (158), and Yugoslavian (97). There were 1,673 individuals employed over the age of 16.

There are approximately 290 residents listed in the Census Bureau report that list their occupation as "fishing". A local community leader in the recreational sector estimated that 100 resident families make their living in recreational fishing services. 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, carpenters).

The winter community is small and insular, consisting of commercial fishers and their families, small businesses, and local charter boat owners/operators. Some of the recreational fishers 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 June to September, and least active 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. Many charter boat owners/operators also hold groundfish permits. A key respondent explained that this allows them to take groundfish for personal use and for customers when tuna is scarce. Small landings of groundfish are sold to local restaurants or used for subsistence purposes.

Targeted groundfish include summer flounder (fluke), cod, pollock, and yellowtail flounder. 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 fishers convert their boats for charter fishing and whale watching.

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 lb 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. 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.

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: 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 does go 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. One key respondent noted: "those practices have changed since the government take-over of the market." There are few marketing alternatives for fishers, 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 outmost of the inshore fish are gone." --Commercial Fisher

As of 1995, there were forty reported commercial vessels in Montauk (Drumm 1995). However, the according to a Coast Guard office and field counts of vessels, the functional ground fishing fleet consists of only 24 vessels, not 40 as reported by Drumm (1995). A 1996 NMFS permit file puts the number of commercial vessels counting Montauk as their port city[1] at 76. This includes all types of commercial MGF permits. Of these, 46 count Montauk as their home city, 27 other New York cities and towns while three reside in other states, including New Jersey, Connecticut, and Florida. However, the total number of groundfish permits held is 132.

In February, 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 in February, and another six reported out fishing. All commercial vessels observed were trawlers with the exception of two lobster vessels. Party boats, tuna head boats[2], and whale watching boats dominated the drydock area.

Fishing effort off Montauk and on commercial stocks targeted by Montauk fishers (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 fishers and these "outsiders" (key respondents--two commercial fishers, and Drumm 1995). 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 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

A major concern and source of potential conflict is the competition between the stabilized commercial fleet and an expanding recreational sector. The sportfishing industry on Long Island contributes about $1.1 billion to the economy, while commercial fishing contributes a yearly average $54 million in seafood for public consumption.

There are an estimated 174,000 saltwater fishing households on Long Island, and within the three mile limit, recreational catches of fluke, bluefish and scup regularly exceed harvests by commercial fishers (Fagin 1994). Recent state laws include a series of bills that ban trawling near Long Island inlets and some other prime fishing areas. The prime purpose of the law is not to conserve fish but "to help marina operators, bait shop owners and others by making more fish available for sport fishermen" (Fagin 1994:A51).

Commercial fishers are also concerned over the level of pollution in nearshore waters. Algal blooms, including "red tide," have wreaked havoc with bay waters and shellfish. In 1994, concerns centered around dioxin pollution and other pollutants which were forcing fishers offshore. A song written by Billy Joel

("The Downeaster Alexa") describes how Montauk fishers have to travel farther and farther off shore to make a catch because of environmental problems (Swift 1994).

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" (Fund president).

Communication with management was expressed as a lack of understanding of what fishers and fishing was all about. Interviews with local commercial fishers indicated a frustration with the management process, and that fishers felt their concerns were ignored even when they did have a chance to speak:

> "We hold our local meetings in a room above the firehouse. When the state reps 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." --Long-time (30-year) Commercial Fisher

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 fishers who sustainably participate). 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. Yet, the expansion of fishers 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.

Stonington, Connecticut

The Long Island sound and its estuaries and rivers are the major foci of Connecticut fisheries. There is a small traditional haul seine fishery for alewives and other fishes (unspecified, for "industrial" uses). Dip-nets are used for blue crabs (and a few alewives). Drift gillnets are used for menhaden, bluefish, weakfish, black sea bass, alewife, Atlantic mackerel, and other species. There is a specialized drift gillnet fishery for American shad. Quahogs (hard clams) are very important, and over 70 percent of Connecticut's landed value comes from oysters cultivated in Long Island Sound. Second to oysters are lobsters, most of which are caught inshore, in the

sound. Third in value is a mixed species otter trawl fishery, most of which is based in the port of Stonington.

Stonington is the principal port in Connecticut. The main fishing fleet is out of Stonington. Stonington is the only off-shore port with a fleet consisting of trawlers, lobster boats, ocean scallopers. People are mostly going for groundfish such as cod, haddock, and flounder.

Species of importance in the area include lobster, quahog, summer flounder, winter flounder, and squid. The major species of fish caught in Stonington are flounder, summer flounder, squid, whiting and some codfish during the winter months. Over the past five years (1988-1993) the fishermen have caught an increasing number of monkfish. The three large scallop boats have landed the majority of the monkfish.

There is a small drift gillnet fishery which takes a minimal amount of black sea bass, and a mixed species trawl fishery whose landings include large amounts of summer flounder and a small amount of scup and sea bass. “As soon as the summer flounder fishery is open, fishers will go for it exclusively until the quota is filled.” In the past, summer flounder was the most important species caught by fishermen in Stonington. However, squid is increasing in importance as a result of the summer flounder quotas. During the summer of 1993, one boat attempted to specialize in dogfish but he discontinued this.

Although local otter trawlers may catch incidental tilefish in the winter, no boats specialize in catching tilefish in Stonington. Scup accounted for 0.9 percent of the landed value of all species in Other New London in 1992, and is caught in the spring fall and winter primarily by otter trawlers in Stonington. Black sea bass contributed with less than 0.1 percent (1992) of the total landed value Other New London. Before the quota system was implemented, summer flounder was the major species caught by Stonington fishermen. Summer flounder accounted for 6.53 percent of the landed value of all species in Other New London in 1992. Summer flounder was the most important species for draggers in terms of landed value in Other New London in 1992. Contributing with over 36 percent of the total landed value of all species. Squid is becoming increasingly important as a result of the summer flounder quotas.

The number of boats in Stonington is stable. Most fishers are of Portuguese descent, and family status is of moderate importance in crewing a vessel. The share system is typically used. There are several fish dealers, who sell to markets in Baltimore, Philadelphia, Boston and New York, or directly to local fish markets.

Newport/Other Washington County, Rhode Island

“Three ports make up the bulk of the landings in Rhode Island: Point Judith, Quonset Point, and Newport. Point Judith is generally a “wetfish” port, where the fish is most often landed on ice and packaged at port. Newport is similar. Quonset Point is strictly a large factory freezer vessel port.”

Newport traditionally landed groundfish and lobster, but in the early 1990s began targeting squid, mackerel, butterfish, scup and dogfish. "Groundfishing boats, a few scallopers, gill-netters, and draggers make up the range of boats in Newport. While Newport's fish potters rely almost entirely on scup, they also catch a little tautog, small amounts of black sea bass, bluefish, and

summer flounder, among other species." The dragger fishery mainly targets northeastern groundfish, as well as *Loligo* squid. Scup is a minor component of this fishery. In the summer time there is a scup pot fishery in Newport. The future of this fishery is in question given declines in scup landings. Sea bass are an incidental catch for these draggers. Scup is one of the half dozen or so species targeted by the floating trap fishery. Scup is also important to the small handline fishery in the area. The total landed value for all species in Newport in 1992 was $14.5 million. Lobster ranked first accounting for 44 percent of the total landed value. Summer flounder ranked fourth and scup fifth. In 1992, lobster pots accounted for about 50 percent of the landings in Newport. About 33 percent of the landings were associated with otter trawls.

The value of the landings at Other Washington County communities including Quonset Point in 1992 was around $20 million. Other Washington County including Quonset Point includes both traditional and innovative fisheries. Processing facilities for squid in the region have resulted in the dominance of both *Loligo* and *Illex* squid in terms of landed value, but lobster and bay quahogging and oystering remain important, as well as other inshore activities such as eel potting, trapping striped bass, and an unusual spearfishery for tautog (blackfish). There is some handlining for bluefin tuna and trolling for inshore species such as striped bass and summer flounder as well as yellowfin tuna. Atlantic mackerel, butterfish, scup, summer flounder, and angler are among the top ten species landed by value, and they figure importantly in the catch of the otter trawl vessels. The gillnet fishery for cod and tautog includes a small amount of angler and Atlantic mackerel. The fish pots are predominantly for scup, but some black sea bass, summer flounder, bluefish, and *Loligo* squid are caught in them too. Virtually all of the angler, butterfish, weakfish, Atlantic mackerel, and squid landed here are brought in by draggers. A major fishing location in Washington County is located at Quonset Point, an abandoned Navy Base which houses several isolated industrial developments, including a major offloading facility for car imports.

Point Judith has a large fishing fleet of trawlers, gillnetters and lobster boats. Estimates on the number of boats in the area vary. However, about 200 commercial boats dock in Point Judith, including 80 trawlers, 30 gillnetters, and approximately 100 lobster boats.

The total value of fish landed in Point Judith in 1992 was $37 million. The top 10 species by percent landed value in 1992 were: lobster (28 percent), *Loligo* squid (15 percent), silver hake (10 percent), angler (10 percent), summer flounder (8 percent), scup (5 percent), butterfish (4 percent), winter flounder (4 percent), yellowtail flounder (2 percent), and cod (2 percent). Black sea bass ranked 19th with less than 0.5 percent. Point Judith boats mainly target whiting, fluke, and monkfish. The commercial importance of monkfish is increasing. It is the second most available finfish after fluke. In 1992, six million dollars worth of monkfish was caught. Squid is also increasing in economic importance in the area.

Otter trawls accounted for 67 percent of the total landed value of all gear, while lobster pot fishing accounted for 28 percent of the total landed value in 1992. Of the total landed value by species caught with otter trawlers, *Loligo* squid was first with 23 percent of the total. Summer flounder ranked fourth with 12 percent of the total, and scup ranked fifth with 7 percent of the total. Black sea bass contributed less than 1 percent of the total.

Point Judith's boats are described by an informant as being diverse in their approach to the fisheries. The diverse approach to fisheries combined with full-time experienced fishermen means the fishermen are fishing year round even if they may switch fisheries and boats during the year.

Overall, the role of other types of gear in Point Judith is minor in all cases. Among these the highest levels are: fish pots which caught approximately 8 percent of the value of scup and 3.5 percent of the value of black sea bass. Gill-nets contributed with 7 percent of the value of anglers and 3 percent of the value of bluefish.

Point Judith draggers target whiting, summer flounder, and monkfish. There is also an established pot fishery in Newport and Point Judith which targets sea bass, scup, and squid, primarily during the summer. Pot fisheries, besides lobster, accounted for 0.48 percent of the total landed value for all gear in 1992. Pot fisheries are heavily dependent on scup. In 1992, scup contributed about 89-96 percent of the total landed value. Some summer flounder, scup, and black sea bass are taken in floating traps. A small amount are also taken by gillnets. The handline fishery relies heavily on black sea bass. Incidental takes of sea bass occur in lobster pots. Fishers from these ports tend to target a broad diversity of species and so are able to fish year round. "Scup, fluke, and sea bass are inside during the summer, offshore during the winter. There is no directed offshore fishery for sea bass in Rhode Island, but they are an incidental catch during the summer *Loligo* fishery. The majority of scup landings are in the spring and summer." Point Judith harbors some minor fisheries. Pot fisheries, besides lobster, are heavily reliant on scup, and pots catch a small percentage of black sea bass, as well as tautog, conger eel, and small amounts of bluefish. Point Judith's small gill net fishery depends heavily on angler, as well as cod, dogfish, tautog, and other species. Bluefish, Atlantic mackerel, summer flounder, black sea bass, weakfish, and butterfish in small quantities are landed in the gill-net fishery. Angler are caught predominantly by draggers, accounting for the bulk of the total landed value for the dragger fishery in 1992. Bluefish, butterfish, summer flounder, scup, black sea bass, squids, weakfish, are also landed by draggers.

The people who make up the crews in Newport are not necessarily fishermen from the area. Some crew members come from Point Judith, New Jersey, New York, and New Bedford. The owners of the boats do not typically work the boats. In Point Judith, most boats, are not family run. Most of the inshore boats dock in Point Judith. Newport has several commercial fish packing and distributing firms, but is also heavily oriented to yachting and tourism. Few non-fishing jobs are available, however. Newport is a reasonably large coastal community. The town is known for its colonial history. The town's water front is mainly occupied by various marinas, hotels, shops, and condominiums. "Point Judith, which is part of the Narragansett, is almost exclusively a fishing community, having a core group of fishermen who fish full-time. During the summers the streets are filled with tourists coming or going on the Block Island ferry. Yet there is little for tourists to do in Point Judith. The town does not have the condominiums, shops, and hotels that other ports such as Chatham, Newport, and Montauk have. Only one hotel stands out in Point Judith, the Dutch Inn, which is circa 1960. The few restaurants, shops, and tourist venues, such as fudge shops, are enough to take care of the summer onslaught of ferry passengers and the year round working population centered around commercial fishing." The Point Judith coop employed some local labor as well, but is now closed.

New Bedford, Massachusetts

In 1992 the total landed value in New Bedford was over $150 million, with sea scallops contributing 60 percent of the total. Summer flounder contributed 1.2 percent and 2.97 percent of the total with and without scallops, respectively. Scup contributed 0.01 percent and 0.02 percent of the total with and without scallops, respectively. "The dominant gear types in new Bedford are scallop dredges and otter trawls." Angler, summer flounder, spiny dogfish, *Loligo* squid, and scup are among the most important species landed in New Bedford. “Summer flounder (fluke) is mostly a summer fishery, but some fishers are now targeting summer flounder during the latter part of the year. Fluke are mostly caught in Nantucket Sound, especially by smaller boats with 1 or 2 man crews. New Bedford's *Loligo* fleet are those that summer flounder during the summer. They target squid during the spring and fall when they are not going for summer flounder. Scup is targeted during summer months by a few boats. Black sea bass is an incidental catch of scup or squid fishing, and it is caught in Vineyard and Nantucket Sounds by inshore boats. Black sea bass is also caught with pots.”

Chatham, Massachusetts

"Chatham is a seasonal resort community. It is a wealthy community, and property values are very high. Sportfishing and commercial fishing are important to the community. However, they do not seem to be the mainstays of the community’s economy. Chatham’s fishing community is divided between two ports, Chatham Harbor on the east coast of town, and Stage Harbor on the south side of town. Scup, fluke, sea bass, mackerel, butterfish, weakfish, and bluefish are caught as miscellaneous fish by Chatham Harbor boats. Squid, butterfish, mackerel, and scup landings in Chatham come almost exclusively from Stage Harbor.” Summer flounder, scup, and black sea bass are caught primarily with pots. There is also some traditional handlining for sea bass and scup. The sea bass fishers are really not concentrated in any one port, however.

The total landed value of fish in Chatham in 1992 was around $11 million. Groundfish and shellfish --bay scallops, quahogs, and mussels-- comprise the majority of the landed value for Chatham, accounting for over 80 percent of the landed value. Scup, black sea bass and summer flounder contributed 1.15 percent (harvested by fish pots, 73.5 percent; draggers, 5 percent; and bottom long-line, 4 percent), 0.28 percent (harvested by fish pots, 98 percent), and 0.10 percent (harvested by fish pots, 65 percent; and draggers, 27 percent) of the total landed value for all species in Chatham in 1992, respectively.

By gear type, scup, black sea bass contributed with 10.74 percent, 0.01 percent of the total landed value of all species landed with pound nets in 1992. Scup, black sea bass and summer flounder contributed with 29.73 percent, 9.75 percent and 2.37 percent of the total landed value of all species landed with fish pots in 1992, respectively.

Chatham boats are all under 50 feet and are owner-operated. Most crew are paid by the share system, but some are paid by the day or are wage workers.

Other North Carolina locations

In the work conducted by McCay *et al*. (1993), the only port described in North Carolina was Wanchese. This section further describes the general characteristics of fishing activities in North Carolina. The descriptive

information that follows is excerpted and paraphrased from a report prepared by Griffith (1996) and is based on visits to fishing centers around the state, surveys, and in depth-interviews.

The information presented in this section is based on the following visited locations: Swan Quarter, Englehard, Rose Bay, Germantown, and Ocracoke in Hyde County; Belhaven and Aurora in Beaufort County; Hatteras, Wanchese, and Alligator River in Dare County; Atlantic, Stacey, Beaufort, and Salter Path in Carteret County; Vandamere and Paradise in Pamlico County; Sneads Ferry, and Hampstead in Oslow County; and Varnumtown in Brunswich County.

The following are the seven most notable general characteristics of fishing activities in North Carolina according to Griffith (1996).

"First, most obviously, the busiest fishing season for almost all sites visited begins in the spring and lasts through summer, with December through February being relatively quiet in most locations. Exceptions to this are the fisheries of the Outer Banks, which tend to be net-based and to target winter species. Second, despite the fact that we find a number of extremely large vessels in the state, crews on most vessels tend to be small (<45'). Most crews consist of between one and three fishermen and many interviewed fishermen fish alone. The menhaden fishery, of course, is an exception to this (Garrite-Blake 1995). Third, relatively few sites we visited specialize in only one species, one type of gear, or one type of vessel. Crab pots and shrimp or otter trawls rank high among the principal gears used in the state, but others tend to be found in use alongside these either by the same fishermen or by others using the same docking and other facilities. Fourth, few full-time, owner-operator North Carolina fishermen rely on a single species or single gear for their livelihood, and many operate from more than one vessel; indeed, this diversity and flexibility constitutes one of the central defining characteristics of a full-time fishermen in North Carolina. Small crew sizes, especially those based on family and community relations, are adaptive under these conditions, where shifting among fishing gears and locations does not depend on mobilizing large numbers of crewmen. Fifth, this diversity and flexibility has some implications for managing the fisheries of the state. Although fishermen tend to be defined by the *primary* species they target and gear they use to capture those species, such as shrimpers using otter trawls or crabbers using crab pots, North Carolina fishermen become more alike one another, often, in the *secondary* species they target and, in particular, the gears they use for those species. Sixth, North Carolina fisheries are highly localized. Those sites with access to both inland and off-shore waters, such as fishermen based in Wanchese or the Outer Banks or Carteret County, have more options available to them to switch among fisheries and even between recreational and commercial sectors (such as operating as charter boat fishermen) than fishermen based along the Pamlico River or Albemarle Sound. Some fishermen, recognizing the advantages to these different locations, dock boats at more than one location or utilize more than one launching facility. However, several fishermen we interviewed had little or no idea about the character of fisheries fewer than fifty to sixty miles away. Seventh, regional differences occur among the fisheries as we move from north to south, yet are more pronounced as we move from east to west. For example, those fishermen who fish in the Albemarle Sound are more like fishermen of the Pamlico River than they are like those who operate out of Wanchese. Urban and rural distinctions also figure into these differences; fishing strategies of around the Nags Head/Manteo are more similar to Morehead City and Wilmington fishing strategies than they are toward those of Eastern Dare further down the Outer Banks. Finally, with the exception of crab

processing plants, most shore sites are staffed by relatively few people on land; most of the work of off-loading, icing, and other handling of the catch is done by fishermen."

Regarding the present aspects of the fishery in the area, it was found that "North Carolina's principal fisheries have changed considerably through time, yet certain historical continuities thread through the fishing lifestyles we find on the coast from prehistoric and colonial times to the present." Some families in the Tidewater area (Hyde County) still depend on combining commercial crabbing, eeling, gill net fishing, trapping, hunting, and hiring out as guides to hunters and sportfishermen. Individuals around the upper reaches of the Albemarle Sound still string together seasonal work in the herring fishery, hunting, logging, and from time to time, farming. "Two of the earliest fisheries in North Carolina provided an organizational template for fisheries that continue, in altered form, today. The early herring fisheries on the Chowan River and the Albemarle Sound were highly capitalized fisheries in which harvesting and processing were as tightly integrated as today's menhaden fishery."

Due to the lack of a license for sampling purposes, saltwater recreational fishing in North Carolina is hard to track and monitor. In order to assess recreational and other non-commercial (e.g. subsistence) fishermen, a structured interview with 178 individuals in these fisheries was conducted in order to address this lack of information. Interviewed fishermen were overwhelmingly white males (95 percent) between 21 to 79 years of age (average of 48 years). Twenty-five percent were between 20 to 41 years of age, 25 percent were between 40 to 48 years of age, 25 percent were between 47 to 59 years of age, and the remaining 25 percent were over 59 years of age. The majority (89 percent) were North Carolina residents; only 7 percent had not finished high school, and over 60 percent had some training or education after high school. About 77 percent were married at the time of the interview, with 11 percent never having married and the remainder either divorced/separated (7 percent) or widowed (4 percent). About forty-two percent lived in households with more than two children, and only 13 percent were retired. Influenced by the sampling methodology, 41 percent of the interviewed fishermen fish most frequently from manmade structure, 34 percent from private boats, 19 percent from the beach or bank, and the remainder from other places such as charter boats or a combination of the previous fishing modes. About 79 percent of those interviewed primarily fish in state waters (rivers, sounds, or less than 3 miles from shore), with 13 percent fishing more than 3 miles from shore, and the majority (83 percent) rarely fishing in freshwater. "Anglers interviewed fish from one to 330 days per year. Average fishing effort is around 42 days/year, which would be 80 percent of the weekend, yet this varies widely within the sample. When they do fish, although slightly more than a third of the population has no target species (35 percent), the most commonly sought species include: King mackerel, flounder, trout, spot, bluefish, and Spanish mackerel. They catch these species, of course, primarily with hook and line...around one third eat 100 percent of their catch and 3 percent eat none of their catch. Around three-fourths give their catch away (usually half what they catch), and under 10 percent sell their catch. Boat ownership is relatively common among those interviewed, with 58.4 percent reporting that they owned boats."

Regarding fishermen carrying passengers for hire, "charter boat captains occupy a position between recreational and commercial fishermen and, in fact, often move between winter commercial fishing and running charter during the summer. A few we interviewed for this study come from long family traditions

of fishing, both commercially and as recreational boat captains, and maintain strong social links with commercial fishing centers in the state. Of course, nearly all of their business as charter boat operators occurs during the summer months and most of their clients are tourists, but charter boat captains reported fishing heavily into the fall and beginning in the late spring."

4.2 Analysis of Permit Data

Human Environment

Federally Permitted Vessels

This analysis estimates that as of September 10, 1999, there were 1,889 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 930, 880, and 911 Federal commercial permits for FLK, SCP, and BSB, respectively, had been issued to Northeast region fishing vessels. For party/charter operators a total of 541, 406, and 432 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 1,899 vessels with at least one Federal permit there were 1,299 that held only commercial permits for FLK, SCP, or BSB while there were 480 vessels that held only a recreational permit. The remaining vessels(110)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 2.

Table 2. Summary of number of vessels holding federal commercial and/or recreational permit combinations for summer Flounder (FLK), scup (SCP) and black sea bass (BSB).

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	64	16	34	10	59	8	289	480
FLK Only	292	5	4	2	2	0	0	4	309
SCP Only	72	4	0	1	0	2	0	6	85
BSB	163	4	0	4	2	3	1	6	183
FLK/ SCP	101	2	1	0	0	0	0	0	104

FLK/ BSB	34	0	0	0	0	2	1	0	37
SCP/ BSB	175	8	0	2	1	1	2	22	211
FLK/ SCP/ BSB	462	3	1	3	0	0	0	11	480
Column Total	1299	90	22	46	15	67	12	338	1889

Row sums in Table 2 indicate the total number of vessels that have been issued some unique combination of commercial permits. For example, there were 309 vessels whose only commercial permit was for FLK. By contrast, there were 480 that held all three commercial permits. Column totals in Table 2 indicate the total number of vessels that have been issued some unique combination of Federal recreational permits. For example, there were 22 vessels whose only recreational permit was for scup while 338 vessels held all three recreational permits. Each cell in Table 2 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 3.

Table 3. Other 1999 federal northeast region permits held by FLK, SCP, and BSB commercial and recreational vessels.

	Commercial Only (n= 1,299)		Party/Charter Only (n= 480)		Commercial and Party/Charter (n= 110)	
Northeast Permits	Vessels (No.)	Percent of Total	Vessels (No.)	Percent of Total	Vessels (No.)	Percent of Total
Surfclam	609	49.6	61	12.7	20	18.2
Ocean Quahog	554	45.1	56	11.7	16	14.5
Scallop	244	19.9	0	0	4	3.6
Comm. Lobster	869	70.1	47	9.8	27	24.5
Party/ Charter Lobster	C	C	18	3.8	7	6.4

Party/ Charter Multi-Species	C	C	361	75.2	33	30.0
Comm. Multi-species	1,120	91.1	241	50.2	90	81.8
Party/ Charter Squid/ Mackerel/ Butterfish	5	0.4	367	76.5	65	59.1
Comm. Squid/ Mackerel/ Butterfish	1,043	84.9	173	36.0	77	70.0
C = fewer than 3						

Of the vessels that hold at least one Federal permit for FLK, SCP, or BSB the largest number of commercial permit holders (Table 4) are held by Massachusetts vessels, followed by New York, New Jersey, 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.

Table 4. 1999 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	29	16	3	383	22	45	138	18	170	188		166		111		7
No.of Permits by Home Port State	19	14	6	449	16	30	112	13	128	220	29	115		133	6	6
No.of Permits by Principal Port State	32	8		396	25	42	126	18	167	190		165		124		3
Average Length by Principal Port	57	38	82	59	51	60	60	46	57	45		57	47	64	N/A	N/A
Average Tonnage by Principal Port	73	16	127	82	35	77	77	29	72	41		69	33	96	N/A	N/A

Percent Home Port Equal Principal Port	59	25	67	69	68	49	44	56	60	57		45	100	43	N/A	N/A

For party/charter vessels (Table 5), 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.

Table 5. 1999 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	23	9	3	93	7	19	10	13	153	83	9	37	19	
No. of Permits by Home Port State	12	12	6	98	3	18	9	13	117	99	30	34	25	2
No. of Permits by Principal Port State	19	10		91	4	22	9	14	155	80	4	44	25	1
Average Length by Principal Port	48	36	65	38	65	37	37	31	45	47	50	35	39	N/A
Average Tonnage by Principal Port	29	13	79	22	51	20	19	9	29	34	37	17	21	N/A
Percent Home Port Equals Principal Port	65	67	67	67	29	63	60	92	60	48	67	49	74	N/A

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 6). 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.

Table 6. 1999 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		17				18	44		10	9	6

No. of Permits by Home Port State	3	3		23		4		15	45		5	8	4
No.of Permits by Principal Port State	3	3		17	1	3	2	15	45	2	11	8	5
Average Length by Principal Port	48	51		35	46	35	34	51	38	67	41	50	N/A
Average Tonnage by Principal Port	59	42		16	48	18	4	40	23	102	28	43	N/A
Percent Home Port Equal Principal Port	100	67		59		100	50	56	68		40	33	N/A

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 4), 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 5), 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 6) on their 1999 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 1998 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 7. Related data for the recreational fisheries are shown in Table 8, 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.

Table 7. Top ports of landing (in pounds), base on NMFS 1998 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
Cape May, NJ	777,009	71	1,477,147	41	389,617	61
Point Judith, RI	1,228,556	85	682,926	89	109,466	94
Newport News, VA	1,135,831	62	2,357	10	139,789	39

Hampton, VA	985,931	46	6,730	11	265,546	35
Wanchese, NC	877,300	45	14,332	6	132,408	42
Beaufort, NC	774,035	28	338	5	10,164	13
Point Pleasant, NJ	591,143	34	166,388	24	20,117	32
New Bedford, MA	307,440	125	381,037	29	27,427	26
Montauk, NY	340,795	43	212,250	69	56,893	79
Hampton Bay, NY	277,906	42	197,169	43	45,073	40
Ocean City, MD	173,745	8	11,364	6	313,427	20
Engelhard, NC	329,014	12	44	1	67,765	8
Belford, NJ	337,510	15	9,900	16	4,383	23
Chincoteague, VA	257,408	13	10	1	93,521	10
Virginia Beach, VA	7,857	0	5	0	325,424	18
Other Dukes, MA	143,975	23	91,899	16	84,598	12
Oriental, NC	308,005	13	63	1	3,294	5
Newport, RI	231,787	36	44,378	23	9,688	26
Stonington, CT	187,812	0	54,043	0	5,722	0
Vandamere, NC	234,298	9	7	1	41	0
Greenport, NY	88,189	15	65,537	11	16,593	12
Wildwood, NJ	83,962	5	16,213	2	69,316	5
Other Barnstable, MA	135,522	26	17,548	18	2,892	8
Freeport, NY	51,311	18	81,255	14	14,082	15

Table 8. MRFSS preliminary estimates of 1998 recreational harvest and total catch (in pounds).

State	FLK Harvest	FLK Catch	SCP Harvest	SCP Catch	BSB Harvest	BSB Catch
CT	261,401	529,890	189,812	356,957	3,491	18,052
MA	383,447	617,823	322,487	744,419	1,332	48,881
RI	394,907	639,935	234,821	518,778	25,637	52,132
DE	218,933	954,567	4,685	13,790	52,089	335,909
MD	206,057	1,921,728	0	2,457	354,203	1,108,665
NJ	2,728,286	9,248,192	10,235	66,727	272,808	1,507,758
NY	1,230,402	2,750,909	444,065	927,448	12,391	91,071
VA	1,164,527	5,016,682	1,202	34,749	398,010	1,729,729
NC	391,136	404,128	3,828	4,783	133,059	807,150

Dealers

There are 197 dealers who bought summer flounder, scup and/or black sea bass in 1998. They are distributed by state as indicated in Table 9. Employment data for these specific firms are not available. In 1998 these dealers bought

$16,989,304 worth of summer flounder; $5,229,331 worth of scup; and $4,149,966 worth of black sea bass.

Table 9. Dealers reporting buying FLK, BSB, and/or SCP, by state (from NMFS commercial landings database).

	DE, ME, NH, CT	MD	MA	NJ	NY	NC	RI	VA
Number of Dealers	9	3	45	23	43	27	30	17

5.0 Description of Fisheries

5.1 Summer Flounder

The commercial and recreational fisheries for summer flounder are outlined by principal port in section 4.1 of the EA, and additional information is found in Amendments 2, 10, and 12 (information on how to obtain these and other Council documents referred throughout this specifications package can be obtained from the MAFMC office).

In recent years, the commercial fishery has been managed under a quota system. In 1993, the first year that a coastwide quota was implemented, commercial landings were 12.59 million lb (5.71 million kg), slightly in excess of the quota of 12.35 million lb (5.60 million kg). Commercial landings in 1994 and 1995, were 14.52 and 15.38 million lb (6.58 and 6.97 million kg), respectively. In 1996, landings declined to 12.95 million lb (5.85 million kg) which were about 16 percent in excess of the initial quota of 11.11 million lb (5.04 million kg) for that year. In 1997, landings were approximately 8.81 million lb (4.08 million kg) which were about 5 percent in excess of the initial quota of 8.38 million lb (3.8 million kg) for that year. Commercial landings increased to 11.21 million lb (5.1 million kg) in 1998. Relative to previous years, annual commercial landings from 1993 to 1998 were less than the 16.59 million lb (7.52 million kg) landed in 1992, the year before quota implementation, but with the exception of 1997, were substantially larger than the 9.25 million lb (4.19 million kg) landed in 1990.

Recreational landings have fluctuated since Amendment 2 regulations were implemented in 1993. Landings increased to 7.68 million lb (3.48 million kg) in 1993 from the 1992 level of 7.14 million lb (3.23 million kg). In 1994, recreational landings increased again to 9.06 million lb (4.10 million kg) and then declined to 5.50 million lb (2.49 million kg) in 1995. In 1996 and 1997, landings were 10.38 million lb (4.70 million kg) and 11.86 million lb (5.37 million kg), respectively. In 1998, recreational landings increased to 12.53 million lb (5.68 million kg).

5.1.1 Status of the Stock

The status of the summer flounder stock is re-evaluated annually. The most recent assessment, completed in July, 1999 indicates that the summer flounder stock is overfished and overfishing is occurring with respect to the overfishing definition. The fishing mortality rate declined from 0.89 in 1995 to 0.52 in 1998 but is still in excess of the target and threshold F of 0.26. The complete assessment is detailed in the “Assessment of Summer Flounder for 1999.”

Total stock biomass on January 1 estimated by VPA (1982-1998) reached 106.92 million lb (48.5 million kg) in 1983 before falling to 35.27 million lb (16 million kg) in 1989. Total stock biomass has increased substantially since 1991 and in 1998 was estimated to be 85.1 million lb (38.6 million kg). The FMP Amendment 12 biomass target (B_{MSY}) required to produce maximum sustainable yield (MSY= 46.1 million lb or 20.9 million kg) is estimated to be B_{MSY} = 234.57 million lb (106.4 million kg) and the FMP Amendment 12 biomass threshold is one-half B_{MSY} = 117.29 million lb (53.2 million kg). Spawning stock biomass (age 0 and older) has increased from 11.24 million lb (5.1 million kg) in 1989 to 55.11 million lb (25.0 million kg) in 1998, the highest level in the 1982-1998 VPA time series. The age structure of the spawning stock has also expanded in recent years.

VPA estimates of recruitment indicate that the 1995 year class was above average (1982-1998) and the largest since 1986. The 1997 and 1998 year classes are estimated to be below average. However, recent recruitment per unit of SSB has been lower than that estimated at a comparable abundance of SSB during the early 1980s.

The assessment also provided information to develop stock projections and quota recommendations for the 2000 fisheries. This information indicates that the fishing mortality rate in 1999 could be 0.36 if the 1999 landing limits are not exceeded. The biomass projected for 2000 is about 94 million lb (42.8 million kg).

5.1.2 Stock Characteristics and Ecological Relationships

The stock characteristics and ecological relationships of summer flounder are fully described in section 5.3 of Amendment 2. Additional information is available on age distribution of the catch, recruitment, mortality and stock biomass.

In the most recent summer flounder assessment, commercial landings and discard at age and recreational landings and discards at age were summed to provide a total fishery catch at age matrix for 1982-1998. The catch at age data indicates that the percentage of age-3 and older fish in the total catch has increased in recent years from 3 percent in 1993 to 18 percent in 1998. Although recruitment was lower in 1997 and 1998 (i.e., fewer age 0 and age 1 fish), this increase in larger fish in the catch indicates that stock rebuilding is occurring. In fact, spawning stock biomass was estimated at 55.11 million lb (25.0 million kg) in 1998, the highest level in the 1982-1998 VPA time series.

The average recruitment from 1982 to 1998 was 40.6 million fish. The 1982 and 1983 year classes are the largest in the VPA time series, at 74 and 81 million fish, respectively. 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 1997 and 1998 year classes, at about 23 and 26 million fish, are estimated to be below average.

Fishing mortality on currently fully recruited ages 3 and 4 summer flounder has been high, varying between 0.8 and 2.2 during 1982-1996 (51%-83% exploitation), far in excess of the overfishing definition ($F_{threshold}$ = F_{target} =F_{max} = 0.26 or 21% exploitation). The fishing mortality rate has declined substantially since 1995 and was estimated to be 0.52 (37% exploitation) in 1998.

The fishing mortality rate on younger fish has declined substantially. The annual partial recruitment of age-1 fish decreased from near 0.50 during most of the VPA series to 0.18 during 1997-1998; the partial recruitment of age-2 fish has decreased to 0.62 during 1997-1998. In fact, the mortality estimates in 1997 and 1998 for these age groups were the lowest in the time series, 1982-1998. These decreases in mortality relate to the commercial and recreational fishery regulations that have increased the minimum fish size and mesh size in those fisheries. For these reasons, the age range considered to be fully recruited to the fisheries, considered to be ages 2 and older in previous assessments, has been revised to include only ages 3 and older in the current assessment.

The NEFSC spring survey stock biomass index (1968-1999) peaked during 1976-1977, and in 1999 the estimate was at 50% of that peak, and 40% above the time series mean. Total stock biomass has increased since 1991, and in 1998 was estimated to be 84.44 million lb (38.6 million kg), which is 36% of the biomass target of B_{MSY} = 234.57 million lb (106.4 million kg), and 73% of the biomass threshold of one-half B_{MSY} = 117.29 million lb (53.2 million kg).

5.1.3 Economic Environment

Since 1993 the commercial fishery has been managed under a quota system. The value of commercial landings of summer flounder in 1993 were estimated at $19.1 million. In 1994 and 1995 commercial exvessel value increased to $24.0 and $28.3 million, respectively. Estimated exvessel value for 1996 and 1997 was $20.8 million and $15.5 million, respectively. Adjusted average prices (1996 dollars) for summer flounder increased from $1.57 per pound in 1993 to $1.72 per pound in 1997, and ranged from $1.57 to $1.89 for the 1993-1997 period. In 1998, summer flounder commercial landings were valued at $18.7 million and average exvessel price (nominal value) for summer flounder was estimated at $2.82 per pound. In general, summer flounder landings for smaller tonnage vessels were higher in the summer months, while landings for larger tonnage vessels were higher in the winter months. Monthly price fluctuations were evident. On average, higher prices tended to occur during the summer months. This price fluctuation is likely associated with supply responses.

Summer flounder continues to be an important component of the recreational fishery. Estimation of primary species sought as reported by anglers in recent intercept surveys indicates that summer flounder has increased in importance in the U.S. North Atlantic and Mid-Atlantic subregions, while decreasing in the South Atlantic subregion. The number of recreational anglers indicating that summer flounder is their primary species sought in the North Atlantic and Mid-Atlantic subregions have increased by 152 percent and 16 percent, respectively, from 1991 to 1998. The recent increase in preference of summer flounder may result in an increase in the overall importance associated with this species in those regions.

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 (B. Ross pers. comm. 1997). 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.

Imports of flounders (all species combined) into the US decreased from 5.92 million lb ($4.54 million) in 1996 to 5.39 million lb ($4.44 million) in 1997. In 1998, 7.23 million lb of summer flounder valued at $4.67 million entered the country for consumption (NMFS). Importers generally tend to import flounders when domestic exvessel prices reach $2 per pound. South Atlantic flatfish (e.g., Argentina) are imported to the US when domestic prices are high. However, frozen imports may not make the grade for some restaurants and retail buyers that demand fresh flounder (National Fishermen, 1998).

5.2 Scup

The commercial and recreational fisheries for scup are fully described in section 7.1 and 7.2, respectively of Amendment 8, and are outlined by principal port in section 4.1 of the EA. 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 8.77 million lb (3.71 million kg) in 1989, increased to 15.61 million lb (6.86 million kg) in 1991 and then dropped to the lowest value in the time series, 4.174 million lb (2.19 million kg), in 1998.

The recreational landings declined steadily from a 1986 value of 11.61 million lb (5.26 million kg) to 1.31 million lb (0.59 million kg) in 1995, and then increased to 2.23 million lb (1.01 million kg) in 1996. In 1997, recreational landings were 1.19 million lb (0.53 million kg) and then dropped to 0.87 million lb (0.39 million kg) in 1998, the lowest value in the time series. Both the 1998 commercial and recreational landings were below the 1981 to 1998 average of 12.42 and 4.53 million lb (5.63 and 2.05 million kg), respectively.

5.2.1 Status of the stock

The most recent assessment on scup, completed in June 1998, indicates that scup are over-exploited and at a low biomass level. SAW 27 concluded that “current indices of spawning stock biomass are at record lows and less than one-tenth of the maximum NEFSC indices of spawning stock biomass observed during 1977-1979.” The complete assessment is detailed in the “Report of the 27th Northeast Regional Stock Assessment Workshop.”

An update of survey results was provided to the Council to guide management recommendations for the year 2000. Specifically, the NEFSC provided results for 1998 and 1999 from the spring trawl survey. Survey results indicate that

spawning stock biomass increased in 1999 (0.11 kg/tow) relative to 1998 levels (0.05 kg/tow). However, the 1999 index was identical to the 1997 value and much below the average of 0.76 for the time series, 1968 to 1999.

Amendment 12 to the Summer Flounder, Scup and Black Sea Bass FMP, which was partially approved by NMFS, established a biomass threshold based on this survey for scup. Specifically, a biomass threshold was defined as the maximum value of a 3-year moving average of the NEFSC spring survey catch per tow of spawning stock biomass (1977-1979 average = 2.77 kg/tow). The 1997-1999 index was about 3% of the biomass threshold.

Relative exploitation rates based on the spring survey (3 year moving average) and landings data suggest a general increase in exploitation from 1981 to 1997. However, exploitation rates dropped by almost half in 1998 relative to the 1997 value based on this index.

Council staff used an F for 1993 of 1.3 (exploitation rate of 67%) estimated by SARC 19 to derive an exploitation rate for 1997. Using the same 1993 estimate of F, and the relative exploitation index, the exploitation rate in 1998 was 50%.

Recently, the use of that 1993 F in deriving the 1999 TAC was criticized. The criticism focused on the use of the VPA to derive any estimate of mortality for scup given the uncertain nature of the input data. However, other estimates of F can be used to estimate an exploitation rate for 1998. Based on age based mortality estimates derived from CT trawl survey data, the ASMFC Scup Technical Committee concluded that F was 1.2 (exploitation rate of 65%) in 1991. Given this F and the relative exploitation index, the exploitation rate in 1998 was 49%.

5.2.2 Stock Characteristics and Ecological Relationships

The stock characteristics and ecological relationships of scup are fully described in section 5.3 of Amendment 8. In addition, the advisory report on scup from SAW-27 states that “current indices of spawning stock biomass are at record lows and less than one-tenth of the maximum NEFSC indices of spawning stock biomass observed during 1977-1979. Indices of recruitment have trended downward in recent years, except for a moderate 1994 year class and what may be a strong 1997 year class. The stock has a highly truncated age structure, which is a likely reflection of prolonged high fishing mortality.” Additional, detailed information is available in the SAW-27 documents.

5.2.3 Economic Environment

The socioeconomic characteristics of the various ports and communities along the Atlantic Coast that depend on the scup fisheries were described and assessed by McCay *et al*. (1993) and Finlayson and McCay (1994). A general description by principal port of the commercial and recreational importance of scup, summer flounder and black sea bass is given in section 4.1 of the EA. The degree of reliance on scup for selected ports from Gloucester, Massachusetts to Hampton Roads, Virginia was low in 1992. In 1992, scup accounted for approximately 10 percent of the value of total port landings in Freeport/Brooklyn, NY; 6 percent in Montauk, NY; 5 percent in Point Judith, RI; 3 percent in Cape May, NJ; 2 percent in Stonington, CT; and less than 2 percent for the rest of the sampled ports. Scup values and landings were higher for ports located in the northern part of the coast and three ports

accounted for 65 percent of all scup landed value in 1992: Point Judith, RI, Montauk, NY, and Cape May, NJ.

A detailed description of the economic aspects of the commercial and recreational fisheries was presented in sections 8.1 and 8.2 of Amendment 8.

5.3 Black Sea Bass

The commercial and recreational fisheries for black sea bass are fully described in section 7.1 and 7.2, respectively of Amendment 9, and are outlined by principal port in section 4.1 of the EA. Commercial black sea bass landings have varied without trend since 1981, ranging from a low of 2.03 million lb (0.92 million kg) in 1994 to a high of 4.33 million lb (1.96 million kg) in 1984. The 1998 landings of 2.56 million lb (1.16 million kg) were below the average for 1981-1998 of 3.18 million lb (1.44 million kg). Currently, landings are substantially below the peak landings of 21.80 million lb (9.89 million kg) estimated for 1952.

Recreational landings ranged from a low of 1.1 million lb (0.50 million kg) in 1998 to a high of 12.4 million lb (5.62 million kg) in 1986. Recreational landings in 1998 were about 3 million lb (1.36 million kg) less than the average for 1981-1998.

5.3.1 Status of the Stock

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.”

An update of NEFSC spring trawl survey was provided to the Council to guide management recommendations for the year 2000. Amendment 12 to the Summer Flounder, Scup and Black Sea Bass FMP, which was recently approved by NMFS, 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 a significant increase in black sea bass biomass in 1999; the 1999 value (0.434 kg/tow) was the highest value in the series since 1979. As a result, the three year moving average for 1997-1999 indicates the biomass almost doubled relative to the 1995-1997 average. 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, a value that is only slightly different from prior year values.

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 year class was about three times the average (.21) for the period 1968-1998 and the fourth largest value since 1968.

Relative exploitation based on the total commercial and recreational landings and the moving average of the spring survey index indicates a significant reduction in mortality in 1998 relative to 1996 and 1997 levels. If the

exploitation rate was 48% in 1997 as indicated in the last assessment, exploitation rates could have dropped to 12% in 1998 based on the relative exploitation index.

However, 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 (G. 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.

5.3.2 Stock Characteristics and Ecological Relationships

The stock characteristics and ecological relationships are fully described in section 5.3 of Amendment 9. 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." Additional, detailed information is available in the SAW-27 documents.

5.3.3 Economic and Social Environment

The socioeconomic characteristics of the various ports and communities along the Atlantic Coast that depend on the black sea bass fisheries were described and assessed by McCay *et al*. (1993) and Finlayson and McCay (1994). A general description by principal port of the commercial and recreational importance of scup, summer flounder and black sea bass is given in section 4.1 of the EA. The degree of reliance on black sea bass for selected ports from Gloucester, Massachusetts to Hampton Roads, Virginia was low in 1992. In 1992, black sea bass accounted for approximately 4.69 percent of the value of total port landings in Ocean City, MD; 2.02 percent in Cape May, NJ; 1.66 percent in Hampton Roads, VA; 0.85 percent in Freeport/Brooklyn; 0.62 percent in Montauk, NY; 0.61 percent in Monmouth County, NJ; and less than 0.5 percent for the rest of the sampled ports. Black sea bass values and landings were higher for ports located along the southern part of the coast and three ports accounted for 60 percent of all black sea bass landed value in 1992: Cape May, NJ; Hampton Roads, VA; and Ocean City, MD.

A detailed description of the economic aspects of the commercial and recreational fisheries was presented in sections 8.1 and 8.2 of Amendment 8.

6.0 Analysis of Impacts on the Environment

6.1 Impacts of Alternatives upon the Affected Environment

The environment in which these fisheries are prosecuted was described in detail by the Council in the FMP amendments that instituted fishery management for these fisheries (Amendment 2, 10 and 12, summer flounder; Amendment 8 and 12, scup; Amendment 9 and 12, black sea bass). The fishery management plans for black sea bass and scup regulate the fishery from Maine to Cape Hatteras, North Carolina, while the summer flounder fishery is regulated from Maine to the southern border of North Carolina. The fisheries are prosecuted by

vessels throughout the range, though the geographic focus of the fishery varies somewhat from year to year.

The principal gear used to harvest summer flounder, scup and black sea bass is the bottom otter trawl with other major gears including scallop dredge (for summer flounder) and fish pots and traps (for scup and black sea bass). There are potential impacts of otter trawling on the ocean bottom habitat. However, quantification of specific gear types on various bottom types is poorly understood. However, whatever the consequences for habitat, it can be assumed that increased trawling effort would tend to have greater negative consequences. Conversely, any action which acts to reduce fishing effort, would tend to reduce the negative impacts of trawling on the physical environment. There is no way to establish that one quota scenario will have fewer impacts on the environment relative to another. For instance, it could be concluded that a larger quota would result in a larger number of or longer fishing trips, and, therefore, the potential for greater habitat impacts. However, this is not necessarily the case. A larger quota could mean a state establishes a higher trip limit, thereby resulting in an equal number of fishing trips. Given this uncertainty, the various scenarios discussed in this document cannot be analyzed individually for impacts on the affected environment.

In addition to the issue of general habitat degradation, several habitats within the summer flounder management unit are protected under the National Marine Sanctuaries Act of 1973. National marine sanctuaries are allowed to be established under the National Marine Sanctuaries Act of 1973. 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, VA 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, MA 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, MD 20910.

6.2 Impacts of Alternatives upon Endangered or Threatened Species or Marine Mammal Populations

The impacts of the summer flounder, scup and black sea fisheries upon endangered and threatened species and marine mammal populations are described in detail by the Council in the FMP amendments that instituted fishery management measures for these fisheries (Amendments 2, 10 and 12, summer flounder; Amendments 8 and 12, scup; Amendments 9 and 12, black sea bass).

Numerous species of marine mammals and sea turtles occur in the Northwest Atlantic Ocean. A comprehensive study of this areas was completed from 1979-1982 by the Cetacean and Turtle Assessment Program (CETAP), at the University of Rhode Island, covering the area of Cape Sable, Nova Scotia, to Cape Hatteras, North Carolina, from the coastline to 5 nautical miles seaward of the 1,000 fathom isobath.

Four hundred and seventy one large whale sightings, 1,547 small whale sightings and 1,172 sea turtles were encountered in this survey. CETAP concluded that both large and small cetaceans were widely distributed throughout the study areas in all four seasons, and grouped the 13 most commonly seen species into three categories, based on geographical distribution. The first group contained only the harbor porpoise, which is distributed only over the shelf and throughout the Gulf of Maine, Cape Cod, and Georges Ban, but probably not southwest of Nantucket. The second group contained the most frequently encountered baleen whales (fin, humpback, minke and right whales) and the white-sided dolphin. These were found in the same areas as the harbor porpoise, and also occasionally over the shelf at least to Cape Hatteras or out to the shelf edge. The third group indicated a “strong tenancy for association with the shelf edge” and included the grampus, striped, spotted, saddleback and bottlenose dolphins, and the sperm and pilot whales.

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

This problems may become acute when climatic conditions result in concentrations of turtles and fish in the same area at the same time. These conditions apparently are met when temperatures are cool in October, but then remain moderate into mid-December and result in a concentration of turtles between Oregon Inlet and Cape Hatteras, North Carolina. In most years, sea turtles leave Chesapeake Bay and filter through the areas a few weeks before the fall fisheries become concentrated. Efforts are currently under way (by VIMS and U.S. Fish and Wildlife Service refuges and Back Bay, Virginia and Pea Island, North Carolina) to more closely monitor these mortalities due to trawls. Fisherman are encouraged to carefully release turtles captured

incidentally and to attempt resurrection of unconscious turtles, as recommended in the 1981 Federal Register (pages 43976 and 43977).

The only other endangered species occurring in the northwest Atlantic is the shortnose sturgeon (*Acipenser brevirostrom*). The Councils and NMFS urge fishers to report any incidental catches of this species to the Regional Administrator, NMFS, One Blackburn Drive, Gloucester, Massachusetts 01930, who will forward the information to persons responsible for the active sturgeon database.

As for protected marine mammals, species that may be potentially impacted by these fisheries included bottlenose dolphin, pilot whale, fin whale, humpback whale, right whale, harbor porpoise, harbor seal and four species of beaked whales. For detailed discussions of these species, please refer to Amendments 2, 8, 9 and 10 to the Summer Flounder, Scup and Black Sea Bass FMP.

The gears managed under this FMP are all in the third category or not listed at all for the final List of Fisheries for 1998 for the taking of marine mammals by commercial fishing operations under section 114 of the Marine Mammal Protection Act (MMPA) of 1972 (63 FR 5784). Section 114 of the MMPA establishes an interim exemption for the taking of marine mammals incidental to commercial fishing operations and requires that NMFS publish an annual update to the List of Fisheries, along with the marine mammals and the number of vessels or persons involve in each fishery, arranging the according to the following categories: 1) The fishery has a frequent incidental taking of marine mammals; 2) The fishery has an occasional incidental taking of marine mammals; or 3) The fishery has a remote likelihood, or no known taking, of marine mammals.

The range of the species discussed above and the species managed under this FMP overlap, and there always exists a potential for an incidental kill. Except in unique situations, such incidental catches should have a negligible impact on marine mammal or abundances of endangered species, and NMFS has concluded in the previous consultations that implementation of this FMP will not have any adverse impact upon these populations.

The measures in the alternatives do not revise existing management measures and would not result in any increases in effort for these fisheries. As such, it is concluded that the preferred alternative will not have any negative impact on any endangered or threatened species or marine mammal populations.

6.3 Impact of Scenario 1 (the Preferred Alternative) on the Environment

This scenario examines the impacts on the environment that would result from a total allowable landing limit (TAL) of 18.518 million lb for summer flounder (11.11 million lb commercial; 7.41 million lbs recreational); a total allowable catch of 5.92 million lbs for scup (which results in a TAL of 2.53 million lbs commercial; 1.24 million lbs recreational), and a TAL of 6.17 million lbs for black sea bass (3.02 million lbs commercial; 3.15 million lbs recreational).

6.3.1 Impact of Preferred Summer Flounder Measures upon the Environment

The preferred alternative would set the coastwide limit at 18.518 million lb (8.4 million kg). Based on this limit, 11,111,298 lb (5,040,000 kg) would be allocated to the commercial fishery and 7,407,532 lb (3,360,000 kg) to the recreational fishery in 2000.

Based on stochastic projection results, a TAL of 18.518 million lb has a 25% probability of achieving the target F of 0.26 in 2000. However, the Council believes that the stock size projected for 2000 based on the current assessment is underestimated. Specifically, an analysis of previous assessment results indicate a retrospective pattern in which estimates of stock size were underestimated and the fishing mortality rate overestimated. The Council believes that this is the case for the 1998 estimates of stock size and fishing mortality. A greater stock size estimate for 1998 would increase the projected stock size in 2000 and increase the probability that a TAL of 18.518 million lb would achieve the target F in 2000.

In addition, the Council noted that the projections were very dependent on the recruitment level estimated for 1997 and 1998. Although VPA results indicate that recruitment for 1997 and 1998 may be poor (23 and 26 million compared to an average of 40 million), these estimates are the most uncertain in the series. It is possible that the size of the year class is underestimated. For example, previous assessment results indicated that the 1996 year class was poor. In the 1997 assessment the year class was estimated to be 23 million fish. The latest assessment indicates that the size of the year class was 40 million fish. Such an underestimation may be the case for the 1997 and 1998 year classes. A larger year class size would allow for a larger stock size and a greater likelihood that the target F would not be exceeded in 2000.

The Commission also has measures in place to decrease the level of discards in the commercial fisheries in 2000. Specifically, the Commission established a system whereby 15% of each states quota would be set aside each year to reduce discards after the closure of the directed commercial fishery. In order for fishermen to land the 15% bycatch allowance in a state, the Commission recommended that states implement trip limits that were sufficiently restrictive to allow the bycatch fishery to remain open for the entire year without exceeding the state's overall quota. In addition, the Commission recommended that states implement programs to collect additional data on discards in the commercial fishery. As such, the states are required to submit plans to meet these requirements so that the plans are approved before the beginning of the commercial fishery in 2000.

These measures would decrease discards of sublegal fish as well as reduce regulatory discards that occur as the result of landing limits in the states. A decrease in the amount of discards would increase the likelihood that the target F would be achieved in 2000, because true incidental catch would now be landed and apply to the quota reducing the amount of fish killed by commercial fishermen.

The summer flounder measures should not result in any negative impacts on other fisheries. The commercial fishery for summer flounder is primarily prosecuted with otter trawls and often harvests a mixed fishery, including summer flounder, scup, black sea bass, squid, Atlantic mackerel and silver hake. Given the mixed fishery nature of the summer flounder fishery, incidental catch of other species does occur. Because these measures will result in a reduction of effort in the directed summer flounder fishery, the incidental catch rates of other species should also decrease.

These factors, increased stock size and a reduction in discards in 2000, will increase the likelihood that a landing limit of 18.52 million lb (9.16 million kg) will achieve the target fishing mortality rate in 2000. In addition, this TAL of 18.52 million lb (8.40 million kg) will allow for a stable landings pattern from 1999 to 2000. Stable landings from one year to the next are

desirable from both a management and industry perspective. Drastic reductions in the quota from one year to the next could lead to increased levels of noncompliance by both commercial and recreational fishermen. Under reporting and high grading, as well as landings in excess of recreational possession limits, could increase as fishermen attempted to maintain levels of income or personal satisfaction. In addition, a stable landings pattern would allow fishers, processors, party/charter boat operators, equipment and bait suppliers to make business decisions.

A recreational harvest limit of 7.41 million lb (3.36 million kg) in 2000 would be identical to the recreational harvest limit for 1997, 1998, and 1999 and about 5.12 million lb (2.32 million kg) below the recreational landings for 1998. As such, it is likely that more restrictive limits (i.e., lower possession limits, greater minimum size limits, and/or shorter seasons) would be required to prevent anglers from exceeding the recreational harvest limit in 2000. At the present time there are neither behavioral or demand data available to estimate how sensitive party/charter boat anglers might be to proposed fishing regulations. It may be possible that, given the popularity of summer flounder among anglers as the most frequently sought species in the Mid-Atlantic, and third in the North Atlantic in 1998 (MRFSS), more limiting regulations could affect the demand for party/charter boat trips. However, party/charter activity for most of the 1990s have remained relatively stable, so the effects may be minimal.

6.3.2 Impact of Preferred Scup Measures upon the Environment

The preferred alternative considered in this document for the 2000 scup specifications would allow for a TAC of 5.92 million lb (2.68 million kg). This TAC is identical to the TAC established for 1999. The TAC is allocated to the commercial and recreational fisheries based on the proportions of commercial and recreational catch (landings plus discards) for the years 1988-1992. Based on this data, 78 percent of the TAC is allocated to the commercial fishery and 22 percent to the recreational fishery. As such, based on a TAC of 5.92 million lb (2.69 million kg), 4.61 million lb (2.09 million kg) would be allocated to the commercial fishery and 1.30 million lb (0.59 million kg) to the recreational fishery for 1999.

Amendment 8, which was approved by NMFS on July 29, 1996, established a recovery schedule which would reduce overfishing on scup over a 7 year time frame. The target exploitation rates established by this schedule were 47% for 1997-1999 and 33% for 2000. Recently, NMFS disapproved this schedule as “unacceptably risk-prone.” As such, exploitation rates may be reduced in future years to allow for more rapid stock rebuilding.

The exploitation rates derived estimated for 1998 suggest that exploitation was close to the target of 47% for 1998 and above the exploitation rate target of 33% that is set for 2000. However, if the 1999 TAL is achieved (3.77 million lb), the exploitation rate could drop in 1999. Based on the 1998 average biomass and the 1991 F, exploitation rates in 1999 could be 38%; below the 1999 target and slightly above the 33% target for 2000. If the average biomass is at least identical to the 1999 value of 0.11 in 2000, then exploitation rates could drop to 30% if the landings do not exceed 3.77 million lb. As such, the Council and Commission did not recommend any change in the TAC for 2000.

Commercial and recreational discards are subtracted from the commercial and recreational TAC to derive the commercial quota and the recreational harvest

limit. Commercial discards for 2000 are projected to be 2.085 million lb (0.946 million kg) and recreational discards are estimated to be 0.065 million lb (0.0029 million kg). The commercial and recreational discards were derived using the same proportion of discards to catch from 1997 catch and discard data. Given this level of discards, the commercial quota would be 2.534 million lb (1.149 million kg) and the recreational harvest limit would be 1.238 million lb (0.562 million kg) for 1999.

The other management measure addressed in this scenario is the regulated mesh areas to reduce scup discards. This management measure is detailed below in section 6.3.4 below.

These scup measures should not result in any negative impacts on other fisheries. The commercial fishery for scup is primarily prosecuted with otter trawls and pots/traps and often harvests mixed species, including summer flounder, scup, black sea bass, squid, Atlantic mackerel and silver hake. Given the mixed species nature of the scup fishery, incidental catch of other species does occur. Because these measures will result in a reduction of effort in the scup flounder fishery, the incidental catch rates of other species should also decrease.

The preferred alternative would implement a recreational harvest limit of 1.30 million lb (0.59 million kg). In 1998, scup recreational landings were estimated at 0.87 million lb (0.39 million kg). As such, this harvest limit would increase recreational landings by over 49 percent relative to the landings estimated for 1998. Recreational landings of scup have declined in recent years; from 1991 to 1998 recreational landings dropped by approximately 89 percent. This decrease occurred before the implementation of the coastwide harvest limit in 1998 and is probably due largely to a reduction in stock biomass over this time period. Because the recreational harvest limit is identical to the 1999 level and substantially above the 1998 landings this harvest limit should have minimal impacts in 2000.

6.3.3 Impact of Preferred Black Sea Bass Measures upon the Environment

Amendment 9, which was approved by NMFS on November 15, 1996, established a recovery schedule to reduce overfishing on black sea bass over an 8 year time frame (the first year was 1996). That same schedule was used in Amendment 12 to meet SFA requirements. The target exploitation rate established by this schedule for 2000 is 48%. In 2001, the target exploitation rate will drop to 37%.

Based on this TAL, the commercial quota would be 3.02 million lb (1.37 million kg) (49 percent) and the recreational harvest limit would be 3.14 million lb (1.42 million kg) (51 percent) for 2000. The commercial quota and recreational harvest limit would be identical to the 1998 and 1999 level.

The recreational harvest limit of 3.14 million lb (1.42 million kg) is almost double the 1998 recreational landings of 1.13 million lb (0.51 million kg). As such, it is not expected that this recreational harvest limit would have a significant impact on the recreational fishery.

This alternative is likely to achieve the target exploitation rate for 2000. Although the status of the stock is uncertain, and projections of 2000 stock size were not conducted, best available information on stock status indicates that stock size has increased in recent years and is likely to increase in 2000. Given this increase and the fact that this TAL is less than the 1997

landings, this TAL should result in an exploitation rate of 48 percent on the black sea bass stock.

The black sea bass measures should not result in any negative impacts on other fisheries. The commercial fishery for black sea bass is primarily prosecuted with otter trawls and pots/traps and often harvests a mixed fishery, including summer flounder, scup, black sea bass, squid, Atlantic mackerel and silver hake. Given the mixed species nature of the black sea bass fishery, bycatch of other species does occur. Because these measures will result in no increase in effort for the black sea bass fishery, the bycatch rates of other species should not increase.

6.3.4 Regulated Mesh Areas

In an April 28th letter to the Council, NMFS indicated that the scup bycatch provisions in Amendment 12 to the Summer Flounder, Scup, and Black Sea Bass plan had been disapproved. NMFS stated that "the measures in the current FMP do not reduce adequately bycatch or minimize bycatch mortality." They noted that the 27th SAW had indicated that F should be reduced "substantially and immediately" and "that reducing discards (especially in small mesh fisheries) would have the most impact in that regard." Also, NMFS argued that although "the data with respect to identifying primary discard sources sufficient to implement management measures are limited ... it is envisioned that the Council would take the precautionary approach to develop measures to reduce discards." As such, NMFS recommended that the Council continue to pursue the development of management measures such as gear modification and season/area closures to reduce bycatch in small mesh fisheries.

The Council staff described the available discard data for scup in Amendment 12 and a subsequent report (Attachment 1). The report also described a study by Kennelly (1999; Attachment 2) that identified areas, depths and times of high discard rates for scup based on sea sample data from 1990 to 1994. Both the Council staff report and the Kennelly paper discuss the data limitations for scup as well as the use of area/season closures and gear modifications to reduce scup discards.

The *Loligo* fishery has been identified as a primary source of scup discards. Although the magnitude of the discards is unknown, it is probable that the areas where scup and *Loligo* are caught at the same time may also be the areas/times where scup discards occur. As such, Council staff examined 1997 VTR data to determine possible times and locations for scup/*Loligo* overlap.

The 1997 VTR data indicate that significant scup/*Loligo* overlap occurs in areas 537, 539, and 613 in November and December (Tables 10a)1998 VTR data is similar (Table 10b). In fact, area 613 in November and December was the one area and time identified by Kennelly (1999) as having consistently high discard rates from 1990 through 1994. Areas 537 and 539 were also identified in the report as areas of high discards. Kennelly notes scup spawn in estuaries, bays, and inshore areas south of Cape Cod and in the autumn migrate south to their wintering rounds from southern New Jersey to Cape Hatteras. Catch and discard of scup by small mesh fisheries for *Loligo* would be coincident with this migration. A total of 74% of the *Loligo* landings came from these areas during these months in November/December of 1997. A total of 88% of the scup discards occurred in those areas in those months, or 35% for the entire year.

A similar analysis indicates that discards of scup could be significant in areas 616 and 622 from January through April. A total of 74% of the scup landings and 63% of the *Loligo* landings came from these areas during these months from January through April in 1997. A total of 73% of the scup discards occurred in those areas in those months, or 33% for the entire year.

Based on this information, the Scup Monitoring Committee recommended that the Council implement regulations to close areas to trawl gear with codend mesh size less than 4.5 inches. The specific times and areas were statistical areas 537, 539, and 613 from November 1 through December 31, and statistical areas 616 and 622 from January 1 through April 30.

The Council passed a motion to accept the Monitoring Committee's recommendation for time and area closures, beginning in the year 2000, with the inclusion of the development of an exempted fishery program to allow fisheries to continue that do not exceed a 10% scup bycatch. The Council also created a Scup Working Group, comprised of Council, Commission, and members of industry, to determine if sub-areas within the larger restricted areas could be closed to minimize the impacts on other fisheries and reduce scup bycatch. Fisheries potentially affected by such closures, identified by Council members, advisors, and members of the public include herring, mackerel, black sea bass, *Loligo*, and whiting.

At the August 24, 1999 Scup Working Group meeting, Council staff presented additional analyses that identified the ten minute squares with highest scup discards in statistical areas 537, 539, and 613 in November and December, and statistical areas 616 and 622 from January through April (Tables 11a-e; Figure 1). The analyses were based on the NMFS sea sample data from January 1989 thru April 1999. Industry representatives also presented information indicating when and where they believed scup occurred. They indicated that in November and December in statistical areas 537, 539, and 613, scup were located in depths of 30 to 50 fathoms, and from January through April in statistical areas 616 and 622, scup were located in depths of 50 to 70 fathoms. After considerable discussion and debate, the Scup Working Group developed a recommendation to regulate a number of sub-areas within the statistical areas for different periods during the year (Figure 2). These sub-areas and periods became the Council and Commission's preferred alternative (Alternative 1).

Table 10a. Otter trawl landings of scup and *Loligo* for statistical areas where scup and/or *Loligo* represented greater than 2% of the total landings and/or discards, based on 1997 VTR data.

Area		Jan	%	Feb	%	Mar	%	Apr	%	May	%	Jun	%	Jul	%	Aug	%	Sep	%	Oct	%	Nov	%	Dec	%
537	Scup landings	271	0.1	8,257	1.7	8,275	2.9	20,743	3.5	23,365	13.1	1,934	7.0	125	1.1	216	4.7	22	0.2	10,157	24.3	138,705	37.6	57,837	46.3
	Loligo landings	170,545	18.9	217,915	9.4	570,935	30.7	580,393	35.0	131,198	12.4	78,199	16.0	134,999	11.7	102,947	8.4	451,175	20.1	1,087,136	18.7	314,776	10.1	587,662	20.4
	Scup discards	0	0.0	60	0.6	60	2.1	95	4.1	325	15.3	0	0.0	0	0.0	0	0.0	0	0.0	165	6.3	2,238	22.1	365	7.4
	Loligo discards	415	10.5	650	11.6	1,245	43.5	2,045	70.2	55	3.5	10	0.6	10	0.2	10	0.2	360	3.3	2,450	15.9	135	2.8	325	8.9
538	Scup landings	0	0.0	0	0.0	0	0.0	1,255	0.2	66,920	37.5	19,877	72.2	9,888	86.5	73	1.6	8,442	69.8	13,818	33.0	1,511	0.4	5,400	4.3
	Loligo landings	0	0.0	0	0.0	0	0.0	73,960	4.5	664,938	63.1	163,438	33.4	3,000	0.3	475	0.0	11,000	0.5	31,363	0.5	10,285	0.3	9,200	0.3
	Scup discards	0	0.0	0	0.0	0	0.0	10	0.4	564	26.5	55	47.8	228	93.8	1	0.8	75	64.1	750	28.5	200	2.0	0	0.0
	Loligo discards	0	0.0	0	0.0	0	0.0	0	0.0	320	20.1	50	3.1	0	0.0	0	0.0	0	0.0	55	0.4	0	0.0	0	0.0
539	Scup landings	26	0.0	249	0.1	19	0.0	1,141	0.2	26,736	15.0	2,502	9.1	1,183	10.3	3,887	84.4	2,950	24.4	11,291	27.0	69,575	18.8	8,296	6.6
	Loligo landings	24,653	2.7	4,787	0.2	400	0.0	233	0.0	40,974	3.9	8,081	1.7	7,708	0.7	16,974	1.4	20,643	0.9	199,482	3.4	101,076	3.3	52,353	1.8
	Scup discards	0	0.0	0	0.0	0	0.0	20	0.9	370	17.4	50	43.5	7	2.9	120	95.2	30	25.6	459	17.4	3,547	35.1	171	3.5
	Loligo discards	0	0.0	0	0.0	0	0.0	0	0.0	45	2.8	80	4.9	115	2.7	160	3.4	710	6.5	5,780	37.5	570	11.9	25	0.7
612	Scup landings	8,889	4.3	12,900	2.7	4,558	1.6	1,491	0.3	5,195	2.9	2,180	7.9	219	1.9	12	0.3	37	0.3	398	1.0	812	0.2	135	0.1
	Loligo landings	4,145	0.5	123	0.0	1,485	0.1	5,531	0.3	1,947	0.2	71,603	14.7	550,206	47.7	479,478	39.0	352,048	15.7	31,348	0.5	127,529	4.1	246,747	8.6
	Scup discards	30	2.4	0	0.0	0	0.0	2	0.1	0	0.0	0	0.0	8	3.3	5	4.0	10	8.5	1,100	41.8	15	0.1	0	0.0
	Loligo discards	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	796	18.9	610	12.8	0	0.0	0	0.0	0	0.0	200	5.5
613	Scup landings	4,685	2.3	4,834	1.0	10,074	3.5	61,243	10.3	36,580	20.5	1,043	3.8	17	0.1	419	9.1	635	5.3	5,671	13.6	147,200	39.9	50,553	40.5
	Loligo landings	34,427	3.8	59,034	2.5	56,951	3.1	45,547	2.7	82,285	7.8	101,087	20.7	154,448	13.4	418,260	34.0	925,371	41.2	2,830,501	48.6	798,356	25.7	532,817	18.5
	Scup discards	0	0.0	0	0.0	0	0.0	132	5.7	862	40.5	10	8.7	0	0.0	0	0.0	2	1.7	135	5.1	2,731	27.0	4,140	83.5
	Loligo discards	0	0.0	225	4.0	10	0.3	860	29.5	1,165	73.3	1,485	91.4	3,289	78.1	3,985	83.6	9,855	90.2	7,087	46.0	2,605	54.5	3,109	84.7
615	Scup landings	28,182	13.7	52,590	11.0	46,707	16.4	12,860	2.2	11,400	6.4	0	0.0	0	0.0	0	0.0	0	0.0	142	0.3	1,104	0.3	442	0.4
	Loligo landings	2,119	0.2	3,940	0.2	15,765	0.8	1,142	0.1	490	0.0	528	0.1	108,610	9.4	53,141	4.3	6,606	0.3	545,864	9.4	334,037	10.7	118,539	4.1
	Scup discards	0	0.0	4,060	39.6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Loligo discards	0	0.0	100	1.8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	320	6.7	0	0.0
616	Scup landings	92,739	45.1	328,241	68.6	189,796	66.6	385,360	64.9	8,397	4.7	0	0.0	0	0.0	0	0.0	0	0.0	20	0.0	10,253	2.8	1,983	1.6
	Loligo landings	491,586	54.4	671,300	28.8	557,910	30.0	770,092	46.4	72,588	6.9	114	0.0	38,703	3.4	3,025	0.2	56,694	2.5	415,538	7.1	795,550	25.6	253,097	8.8
	Scup discards	1,135	89.7	4,835	47.1	2,735	93.7	2,070	88.7	10	0.5	0	0.0	0	0.0	0	0.0	0	0.0	10	0.4	1,375	13.6	280	5.6
	Loligo discards	3,435	87.0	2,135	38.1	1,575	55.0	0	0.0	5	0.3	0	0.0	0	0.0	0	0.0	0	0.0	40	0.3	1,150	24.1	10	0.3

Table 10a(continued). Otter trawl landings of scup and *Loligo* for statistical areas where scup and/or *Loligo* represented greater than 2% of the total landings and/or discards, based on 1997 VTR data.

Area		Jan	%	Feb	%	Mar	%	Apr	%	May	%	Jun	%	Jul	%	Aug	%	Sep	%	Oct	%	Nov	%	Dec	%
621	Scup landings	7,702	3.7	35,544	7.4	16,607	5.8	46,013	7.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	179	0.4	54	0.0	0	0.0
	Loligo landings	307	0.0	3,920	0.2	504	0.0	1,731	0.1	19,362	1.8	65,680	13.4	155,072	13.5	25,752	2.1	239	0.0	195,622	3.4	4,609	0.1	68,354	2.4
	Scup discards	0	0.0	0	0.0	25	0.9	5	0.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	13	0.5	0	0.0	0	0.0
	Loligo discards	0	0.0	0	0.0	10	0.3	10	0.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
622	Scup landings	63,179	30.7	34,215	7.1	3,470	1.2	63,704	10.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	150	0.4	0	0.0	263	0.2
	Loligo landings	171,407	19.0	917,832	39.4	514,840	27.7	172,331	10.4	35,409	3.4	0	0.0	0	0.0	110,630	9.0	312,366	13.9	230,962	4.0	18,740	0.6	731,702	25.4
	Scup discards	100	7.9	1,300	12.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Loligo discards	100	2.5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
626	Scup landings	0	0.0	510	0.1	5,581	2.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Loligo landings	3,775	0.4	433,185	18.6	134,180	7.2	7,861	0.5	4,800	0.5	0	0.0	0	0.0	20,025	1.6	110,000	4.9	1,448	0.0	700	0.0	254,842	8.8
	Scup discards	0	0.0	0	0.0	100	3.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Loligo discards	0	0.0	2,500	44.6	25	0.9	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
632	Scup landings	0	0.0	1,280	0.3	0	0.0	50	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Loligo landings	88	0.0	15,980	0.7	7,850	0.4	800	0.0	100	0.0	0	0.0	0	0.0	0	0.0	500	0.0	257,789	4.4	603,107	19.4	25,000	0.9
	Scup discards	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Loligo discards	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Scup landings	205,673		478,620		285,087		593,860		178,593		27,536		11,432		4,607		12,086		41,826		369,214		124,909	
	Loligo landings	903,052		2,328,016		1,860,820		1,659,621		1,054,091		488,730		1,152,746		1,230,707		2,246,642		5,827,053		3,108,765		2,880,313	
ALL																									
	Scup discards	1,265		10,255		2,920		2,334		2,131		115		243		126		117		2,632		10,106		4,956	
	Loligo discards	3,950		5,610		2,865		2,915		1,590		1,625		4,210		4,765		10,925		15,412		4,780		3,669	

Table 10b. Otter trawl landings of scup and *Loligo* for statistical areas where scup and/or *Loligo* represented greater than 2% of the total landings and/or discards, based on 1998 VTR data.

Area		Jan	%	Feb	%	Mar	%	Apr	%	May	%	Jun	%	Jul	%	Aug	%	Sep	%	Oct	%	Nov	%	Dec	%
148	Scup landings	0	0.0	0	0.0	0	0.0	12	0.0	330	0.3	7,813	43.6	2,244	32.7	881	7.2	611	2.0	126	0.3	61	0.0	5	0.0
	Loligo landings	0	0.0	10	0.0	0	0.0	54	0.0	300	0.1	4,509	1.6	3,468	0.3	2,999	0.6	4,400	0.8	2,945	0.1	277	0.0	4	0.0
	Scup discards	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	235	22.6	225	40.2	175	24.9	1,640	65.3	0	0.0	5	0.0	0	0.0
	Loligo discards	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
525	Scup landings	0	0.0	0	0.0	0	0.0	0	0.0	230	0.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	4,402	1.3	0	0.0
	Loligo landings	13,498	0.4	15,170	0.2	122,230	1.9	2,500	0.1	1,000	0.2	0	0.0	0	0.0	0	0.0	8,000	1.5	48,549	2.0	516,704	16.0	384,569	14.9
	Scup discards	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Loligo discards	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
526	Scup landings	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	3	0.0	305	0.1
	Loligo landings	682,991	20.6	233,965	3.6	529,316	8.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	528,986	16.4	688,216	26.7
	Scup discards	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Loligo discards	0	0.0	800	1.7	20	0.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	9,000	79.5
533	Scup landings	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	10	0.0	0	0.0	0	0.0	0	0.0
	Loligo landings	60,885	1.8	10,110	0.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	14,600	0.6
	Scup discards	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Loligo discards	0	0.0	40,000	82.8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
537	Scup landings	8,542	1.8	263	0.0	373	0.1	97	0.1	8,986	8.1	144	0.8	42	0.6	6,825	55.7	8,237	26.5	15,278	37.9	155,679	46.8	131,357	38.9
	Loligo landings	1,233,43 3	37.2	1,410,24 3	21.6	1,159,21 8	18.4	464,216	23.8	10,653	2.6	1,864	0.7	7,835	0.8	28,655	5.5	259,006	47.0	828,443	34.6	684,648	21.2	848,644	33.0
	Scup discards	1,265	9.5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	6	0.2	350	6.6	5,870	35.3	2,400	56.2
	Loligo discards	585	17.7	1,275	2.6	1,450	23.3	301	14.0	0	0.0	145	7.9	125	5.7	110	4.3	610	28.8	170	4.7	0	0.0	135	1.2
538	Scup landings	600	0.1	0	0.0	0	0.0	1,005	1.2	10,575	9.5	6,350	35.5	2,554	37.2	421	3.4	12,064	38.8	7,192	17.9	276	0.1	900	0.3
	Loligo landings	10,450	0.3	34,100	0.5	36,111	0.6	63,140	3.2	107,854	26.0	6,890	2.4	24	0.0	0	0.0	50	0.0	650	0.0	225	0.0	1,000	0.0
	Scup discards	0	0.0	0	0.0	0	0.0	0	0.0	300	13.4	0	0.0	245	43.8	150	21.3	85	3.4	120	2.3	0	0.0	0	0.0
	Loligo discards	260	7.9	0	0.0	650	10.5	1,150	53.6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
539	Scup landings	3,387	0.7	1	0.0	2	0.0	1,219	1.4	36,637	32.8	3,204	17.9	1,977	28.8	3,527	28.8	7,026	22.6	16,208	40.2	114,620	34.4	38,186	11.3
	Loligo landings	65,241	2.0	91,270	1.4	89,900	1.4	19,845	1.0	45,293	10.9	39,563	13.8	6,568	0.6	25,891	5.0	45,674	8.3	108,999	4.5	78,166	2.4	33,797	1.3
	Scup discards	0	0.0	0	0.0	0	0.0	10	0.0	685	30.6	548	52.8	90	16.1	211	30.0	317	12.6	1,829	34.7	8,287	49.9	72	1.7
	Loligo discards	0	0.0	400	0.8	0	0.0	5	0.2	395	27.0	732	39.9	110	5.0	836	32.9	677	31.9	1,080	30.0	1,390	43.9	275	2.4

Table 10b(continued). Otter trawl landings of scup and *Loligo* for statistical areas where scup and/or *Loligo* represented greater than 2% of the total landings and/or discards, based on 1998 VTR data.

Area		Jan	%	Feb	%	Mar	%	Apr	%	May	%	Jun	%	Jul	%	Aug	%	Sep	%	Oct	%	Nov	%	Dec	%
612	Scup landings	70	0.0	0	0.0	0	0.0	4,229	5.0	6,654	6.0	33	0.2	46	0.7	46	0.4	248	0.8	999	2.5	1,958	0.6	3,986	1.2
	Loligo landings	5,644	0.2	2,660	0.0	2,031	0.0	2,599	0.1	2,184	0.5	81,000	28.3	311,387	30.4	260,302	49.8	3,480	0.6	51,327	2.1	78,232	2.4	111,724	4.3
	Scup discards	0	0.0	0	0.0	0	0.0	13	0.0	2	0.1	0	0.0	0	0.0	135	19.2	1	0.0	2,950	56.0	1,530	9.2	520	12.2
	Loligo discards	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1	210	9.6	100	3.9	0	0.0	0	0.0	1	0.0	0	0.0
613	Scup landings	59,710	12.3	48	0.0	1,347	0.4	3,662	4.3	19,481	17.5	363	2.0	7	0.1	562	4.6	2,936	9.4	469	1.2	54,790	16.5	67,718	20.0
	Loligo landings	206,185	6.2	340,345	5.2	193,937	3.1	55,734	2.9	48,634	11.7	100,353	35.1	274,021	26.7	202,921	38.8	85,120	15.4	525,903	21.9	241,098	7.5	59,320	2.3
	Scup discards	2,450	18.3	0	0.0	0	0.0	280	0.9	1,254	56.0	255	24.6	0	0.0	32	4.6	463	18.4	17	0.3	915	5.5	837	19.6
	Loligo discards	1,601	48.4	300	0.6	240	3.9	385	17.9	1,070	73.0	957	52.2	1,747	79.7	1,495	58.8	834	39.3	2,325	64.7	1,750	55.3	635	5.6
615	Scup landings	48,131	9.9	240	0.0	11,500	3.1	1,065	1.3	900	0.8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	50	0.0	23,020	6.8
	Loligo landings	2,442	0.1	33,095	0.5	53,300	0.8	0	0.0	82	0.0	315	0.1	0	0.0	0	0.0	9,478	1.7	0	0.0	1,937	0.1	3,650	0.1
	Scup discards	440	3.3	10	0.1	0	0.0	100	0.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Loligo discards	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
616	Scup landings	297,993	61.4	58,965	6.5	19,748	5.3	60,053	70.7	26,060	23.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	940	0.3	72,202	21.4
	Loligo landings	695,693	21.0	3,193,014	48.9	2,184,619	34.6	430,558	22.1	8,933	2.2	3,103	1.1	510	0.0	506	0.1	462	0.1	184,182	7.7	353,220	10.9	268,965	10.4
	Scup discards	9,220	68.9	5,500	32.1	619	12.6	30,245	98.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	445	10.4
	Loligo discards	850	25.7	5,495	11.4	1,860	29.9	305	14.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	20	0.6	20	0.6	70	0.6
621	Scup landings	59,213	12.2	149,471	16.6	15,327	4.1	1,506	1.8	802	0.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	21	0.0	175	0.1
	Loligo landings	2,524	0.1	17,306	0.3	75,964	1.2	1,450	0.1	2,936	0.7	48,135	16.8	30,769	3.0	1,019	0.2	125	0.0	292	0.0	14,762	0.5	16,062	0.6
	Scup discards	0	0.0	1,100	6.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Loligo discards	5	0.2	40	0.1	1,200	19.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	5	0.2	1,200	10.6
622	Scup landings	7,684	1.6	512,575	56.9	267,637	71.6	7,503	8.8	941	0.8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	18	0.0	11	0.0
	Loligo landings	311,087	9.4	1,081,830	16.6	1,776,873	28.1	274,443	14.1	184,478	44.5	0	0.0	390,000	38.1	0	0.0	2,348	0.4	31,167	1.3	100,720	3.1	139,316	5.4
	Scup discards	0	0.0	8,020	46.8	4,300	87.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Loligo discards	0	0.0	0	0.0	800	12.9	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
626	Scup landings	0	0.0	178,416	19.8	54,427	14.6	3,331	3.9	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Loligo landings	23,872	0.7	12,501	0.2	85,992	1.4	624,247	32.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	24,100	1.0	183,517	5.7	2,575	0.1
	Scup discards	0	0.0	2,500	14.6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Loligo discards	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

Table 10b(continued). Otter trawl landings of scup and *Loligo* for statistical areas where scup and/or *Loligo* represented greater than 2% of the total landings and/or discards, based on 1998 VTR data.

Area		Jan	%	Feb	%	Mar	%	Apr	%	May	%	Jun	%	Jul	%	Aug	%	Sep	%	Oct	%	Nov	%	Dec	%
632	Scup landings	0	0.0	1,151	0.1	3,175	0.8	1,272	1.5	6	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	50	0.0
	Loligo landings	134	0.0	51,644	0.8	3,315	0.1	9,780	0.5	1,950	0.5	0	0.0	0	0.0	401	0.1	133,185	24.2	590,032	24.6	446,395	13.8	1,392	0.1
	Scup discards	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Loligo discards	10	0.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ALL	Scup landings	485,330	100	901,130	100	373,536	100	84,954	100	111,602	100	17,907	100	6,870	100	12,262	100	31,132	100	40,272	100	332,818	100	337,915	100
	Loligo landings	3,314,079	100	6,527,263	100	6,312,806	100	1,948,566	100	414,297	100	285,732	100	1,024,582	100	522,694	100	551,328	100	2,396,589	100	3,228,887	100	2,573,834	100
	Scup discards	13,375	100	17,130	100	4,919	100	30,648	100	2,241	100	1,038	100	560	100	703	100	2,512	100	5,266	100	16,607	100	4,274	100
	Loligo discards	3,311	100	48,310	100	6,220	100	2,146	100	1,465	100	1,835	100	2,192	100	2,541	100	2,121	100	3,595	100	3,166	100	11,315	100

In addition to the Council's preferred alternative, Council staff analyzed five other regulated mesh area alternatives for this specification document. Staff based their analyses on 1997 and 1998 VTR data and January 1989-April 1999 sea sample data. The fact that discard data for scup are limited and contradictory indicates that there are limitations to these analyses. As indicated in the staff position paper (Attachment 1), annual scup discard estimates can range from less than 2% to over 60% depending on the data set and assumptions used to derive estimates. It is unknown if the NMFS sea sample program accurately describes the catch composition and disposition of scup in the directed scup fishery or small mesh fisheries for other species. Also, sea sample data are limited because many area/quarter strata were not covered by sea sample trips; other area/quarter strata were only represented by a single trip. The use of the entire data set, January 1989 to April 1999, may mask changes in discard patterns resulting from regulatory changes in the scup and *Loligo* fisheries, specifically changes in quotas and mesh regulations. In addition, VTR data may underestimate discards and analyses were also limited because VTR data were not available to determine landings and discards by ten minute area.

Despite these data limitations, analyses were conducted to determine the reduction in the landings and scup discards that would occur for herring, mackerel, scup, black sea bass, *Loligo*, and whiting fisheries based on 1997 and 1998 VTR data and January 1989 to April 1999 sea sample data. Reductions were calculated as the percent of the total landings in the data set for each species and do not include possible displacement of effort, as the result of the proposed regulations, i.e., the reductions do not account for any recoupment of landings. The percentages were determined as relative comparisons to total otter trawl landings in each data set. The total landings in 1997 and 1998, by bottom otter trawl, as indicated by the VTR and sea sample data for these small mesh fisheries are presented in Table 12.

NMFS does not propose to adopt the Council's preferred alternative. The recommended areas and times identified in the Council alternative were extremely small and short in duration. Given the nature of the VTR and sea sampling data used to help determine these areas, it would be very unlikely that the small, two-week restricted gear areas identified in that alternative would have coincided with the seasonal migration of scup. Further, the small areas presented a considerable enforcement burden and limited conservation benefits because of the likelihood that harvesters would shift fishing operations to nearby areas where discards are still likely to occur. Consequently, NMFS has published an alternative that would establish larger gear areas that would remain closed to small mesh fisheries for longer periods of time (i.e., Alternative 6, as described in the RIR/IRFA). Additionally, the management objectives of the FMP (see the Introduction to the EA) include the promotion of uniform and effective enforcement of regulations, and the minimization of regulations to achieve the management objectives. The small, biweekly restrictions of Alternative 1 are particularly burdensome for enforcement, and in NMFS's view do not meet the stated objectives.

Table 11a. Scup discards (pounds) by ten minute square for statical area 537, based on sea sampling data, Nov-Dec 1989-1999 combined.

Label	10 min square	Discards (lbs)	% of scup discarded in 10 min square	% of total scup discarded in 537	Cumm % of total scup discarded in 537	Number of tows
A	**407142**	**7,051**	**56**	**33.80**	**33.80**	**16**
B	**407151**	**4,256**	**52**	**20.40**	**54.20**	**25**
C	**407135**	**2,400**	**53**	**11.50**	**65.70**	**3**
D	**407161**	**2,073**	**29**	**9.94**	**75.64**	**9**
E	**407152**	**1,035**	**18**	**4.96**	**80.60**	**14**
F	**407133**	**1,005**	**59**	**4.82**	**85.42**	**2**
G	**407145**	**610**	**55**	**2.92**	**88.34**	**1**
H	**407055**	**598**	**54**	**2.87**	**91.21**	**1**
	407021	510	7	2.44	93.65	7
	407035	245	40	1.17	94.82	2
	417035	243	50	1.16	95.98	11
	407045	206	58	0.99	96.97	1
	407136	199	17	0.95	97.92	5
	407011	170	6	0.81	98.73	4
	397131	70	38	0.34	99.07	2
	407012	60	2	0.29	99.36	3
	417045	36	32	0.17	99.53	2
	407146	25	41	0.12	99.65	2
	407132	22	12	0.11	99.76	4
	417156	22	15	0.11	99.87	1
	407162	20	1	0.10	99.97	3
	407144	4	100	0.02	99.99	1
	407165	4	57	0.02	100.01	2
	407134	0	0	0.00	100.01	1
	407156	0	0	0.00	100.01	2
	417036	0	0	0.00	100.01	1
Total	26	20,864		100		125

Table 11b. Scup discards (pounds) by ten minute square for statical area 539, based on sea sampling data, Nov-Dec 1989-1999 combined.

Label	10 min square	Discards (lbs)	% of scup discarded in 10 min square	% of total scup discarded in 539	Cumm % of total scup discarded in 539	Number of tows
A	**407141**	**911**	**19**	**43.90**	**43.90**	**39**
B	**417146**	**824**	**69**	**39.71**	**83.61**	**9**
C	**407131**	**270**	**16**	**13.01**	**96.63**	**9**
	417145	38	10	1.83	98.46	5
	417136	28	10	1.35	99.81	4
	417144	3	60	0.14	99.95	1
	417135	1	100	0.05	100.00	1
Total	7	2,075		100		68

Table 11c. Scup discards (pounds) by ten minute square for statical area 613, based on sea sampling data, Nov-Dec 1989-1999 combined.

Label	10 min square	Discards (lbs)	% of scup 10 min square	% of total discarded in 613	Cumm % of total discarded in 613	Number of tows
A	**407113**	**17,864**	**47**	**24.31**	**24.31**	**17**
B	**407256**	**6,987**	**60**	**9.51**	**33.81**	**11**
C	**407123**	**6,601**	**66**	**8.98**	**42.79**	**5**
D	**407246**	**6,075**	**71**	**8.27**	**51.06**	**11**
E	**407114**	**5,529**	**52**	**7.52**	**58.58**	**10**
F	**407254**	**5,171**	**77**	**7.04**	**65.62**	**6**
G	**407255**	**4,584**	**57**	**6.24**	**71.86**	**12**
H	**407264**	**4,402**	**36**	**5.99**	**77.85**	**21**
I	**407115**	**3,240**	**74**	**4.41**	**82.25**	**9**
J	**407116**	**2,862**	**76**	**3.89**	**86.15**	**6**
K	**407236**	**2,632**	**76**	**3.58**	**89.73**	**12**
L	**407125**	**2,494**	**56**	**3.39**	**93.12**	**3**
M	**407265**	**1,294**	**60**	**1.76**	**94.88**	**17**
N	**407266**	**1,195**	**53**	**1.63**	**96.51**	**14**
O	**407245**	**938**	**68**	**1.28**	**97.79**	**7**
P	**407263**	**500**	**28**	**0.68**	**98.47**	**3**
	407126	470	61	0.64	99.11	6
	407124	217	26	0.30	99.40	3
	407241	140	39	0.19	99.59	3
	407226	121	56	0.16	99.76	4
	407122	120	53	0.16	99.92	2
	407251	36	29	0.05	99.97	2
	407112	20	100	0.03	100.00	1
	407261	2	17	0.00	100.00	1
	417126	1	100	0.00	100.00	1
Total	26	73,495		100		187

Table 11d. Scup discards (pounds) by ten minute square for statical area 616, based on sea sampling data, January - April 1989-1999 combined.

Label	10 min square	Discards (lbs)	% of scup 10 min square	% of total discarded in 613	Cumm % of total discarded in 613	Number of tows
A	**397226**	**9,402**	**68**	**25.84**	**25.84**	**26**
B	**397111**	**5,280**	**93**	**14.51**	**40.35**	**16**
C	**397216**	**4,020**	**66**	**11.05**	**51.40**	**5**
D	**397121**	**3,684**	**40**	**10.12**	**61.52**	**20**
E	**397225**	**3,070**	**26**	**8.44**	**69.96**	**22**
F	**397262**	**1,966**	**26**	**5.40**	**75.36**	**21**
G	**397243**	**1,913**	**14**	**5.26**	**80.62**	**28**
H	**397253**	**1,553**	**41**	**4.27**	**84.89**	**6**
I	**397252**	**1,315**	**19**	**3.61**	**88.50**	**28**
J	**397244**	**1,266**	**68**	**3.48**	**91.98**	**10**
K	**397251**	**907**	**16**	**2.49**	**94.47**	**14**
L	**397242**	**867**	**11**	**2.38**	**96.85**	**15**
	397261	363	73	1.00	97.85	15
	397234	350	8	0.96	98.81	10
	397235	269	3	0.74	99.55	12
	397254	115	95	0.32	99.87	3
	397224	18	56	0.05	99.92	15
	397215	11	44	0.03	99.95	2
	397245	10	100	0.03	99.98	1
	397263	6	55	0.02	99.99	3
	397211	2	12	0.01	100.00	2
	397112	1	17	0.00	100.00	2
	397232	0	0	0.00	100.00	1
	397233	0	0	0.00	100.00	4
Total	26	36,388		100		281

Table 11e. Scup discards (pounds) by ten minute square for statical area 622, based on sea sampling data, January - April 1989-1999 combined.

Label	10 min square	Discards (lbs)	% of scup 10 min square	% of total discarded in 613	Cumm % of total discarded in 613	Number of tows
A	**387334**	**7,333**	**79**	**44.49**	**44.49**	**10**
B	**387362**	**3,581**	**76**	**21.73**	**66.22**	**5**
C	**387335**	**2,917**	**74**	**17.70**	**83.92**	**6**
D	**387314**	**873**	**98**	**5.30**	**89.21**	**6**
E	**387313**	**594**	**100**	**3.60**	**92.82**	**2**
F	**387344**	**548**	**100**	**3.32**	**96.14**	**1**
	387333	318	77	1.93	98.07	1
	387325	307	67	1.86	99.93	3
	387343	5	63	0.03	99.96	2
	387351	4	50	0.02	99.99	2
	387352	1	100	0.01	99.99	1
	387361	1	100	0.01	100.00	1
Total	26	16,482		100		40

Table 12. Total otter trawl landings and scup discards for fisheries potentially affected by regulated mesh areas (Sea Sample and VTR data).

Species	Sea Sample Data	VTR Data	
	1989-1999 Landings/ Discards (Pounds)	**1997 Landings/ Discards (Pounds)**	**1998 Landings/ Discards (Pounds)**
Herring	379,230	1,961,212	3,478,813
Mackerel	2,693,368	16,704,316	18,440,351
Black Sea Bass	65,508	685,083	814,532
Whiting	4,538,726	36,321,444	33,700,784
Loligo	2,720,858	27,112,741	32,537,370
Scup Discards	**539,497**	**39,863**	**102,808**

Figure 1.

The alternatives considered in this document include:

Alternative 1 (preferred): sub-areas B1 and B2 from November 1 - November 15, sub-area B3 from November 16 to November 30, sub-area B4 from December 1 to December 15, sub-areas B5 and B5A from December 16 through December 31, sub-areas B6 and B6A from January 1 to January 15, sub-areas B7 from January 16 to January 31, sub-areas B8 and B8A from February 1 to April 30 (Figure 2).

Alternative 2: sub-areas B1-B6 of statistical areas 537, 539, and 613 from November 1 to December 31, and sub-areas B6A-B8A of statistical areas 616 and 622 from January 1 to April 30. These are the times recommended by Scup Monitoring Committee with areas recommended by Scup Working Group (Figure 2).

Alternative 3: statistical areas 537, 539, and 613 from November 1 to December 31 and statistical areas 616 and 622 from January 1 through April 30. This was the Scup Monitoring Committee's recommendation (Figure 3).

Alternative 4: statistical area 537 from November 1 to November 30, area 539 from November 16 to November 30, area 613 from December 1 to January 15, area 616 from January 16 through April 30, area 622 from February 1 to April 30. These are the areas recommended by Scup Monitoring Committee and time periods recommended by the Scup Working Group (Figure 3).

Alternative 5: sub-areas A-B-C of statistical areas 537 and 539 and sub-area A of statistical area 613 from November 1 to December 31, and sub-areas A-B-C-D in statistical area 616, and sub-areas A-B-C of statistical area 622 from January 1 to April 30 (Figure 4). These sub-areas correspond to the ten minute squares of highest scup discards (areas with discards greater than 10% of the total scup discards for the area) for each statistical area and time periods recommended by the Scup Monitoring Committee.

Alternative 6: an area that intersects statistical areas 537, 539, and 613 from November 1 to December 31, and an area that intersects statistic areas 616 and 622 from January 1 to April 30 (Figure 5). These areas include the ten minute squares identified by Council staff as having high scup discards, using January 1989 - April 1999 sea sample data.

Each alternative details the time and areas as to when and where codend mesh less than 4.5 inches would be prohibited. The prohibitions would apply to all otter trawl gear unless it was being used in an exempted fishery. Exempted fisheries are those fisheries which do not exceed 10% scup discards for directed trips (a directed trip is defined as trips landing 1000 pounds or more of the target species). In addition, vessels with experimental exempted fishing permits would also be allowed to conduct small mesh experiments in regulated areas.

The Council is working with industry members to identify gear modifications that would reduce catch of scup in small mesh fisheries for squid. Once this work is completed and an effective gear design is identified, fishermen would have the option of using this gear in the regulated mesh areas.

Figure 2

Figure 3

Figure 4

Figure 5

6.3.4.1 Alternative 1

Alternative 1 would regulate the use of otter trawls with codend mesh of less than 4.5 inches in the time and areas recommended by Scup Working Group (Figure 2). These sub-areas and time periods were identified by the Scup Working Group based on information provided by industry representatives on areas and times most likely to have coincident concentrations of squid and scup. Industry representatives indicated that scup are located from 50 to 70 fathoms in statistical areas 616 and 622 from January through April and from 30 to 50 fathoms in statistical areas 537, 539, and 613 in November and December. The Working Group also considered data provided by Council staff which detailed discards by ten minute square (Tables 11a-e; Figure 1).

The proposed regulated areas would have reduced scup discards by 34% based on sea sample data from January 1989 through April 1999. In addition, landings of small mesh species would have been reduced as follows: herring - 2%, mackerel - 11%, black sea bass - 15%, whiting - 1%, and *Loligo* - 5% (Table 13). These percentages are reductions associated with the total otter trawl landings of each species in the sea sample data.

Table 13. The percent of landings and scup discards that would be reduced by proposed regulated mesh area alternatives. The reductions are based on sea sample data from January 1989 - May 1999, for bottom otter trawls with mesh less than 4.5 inches.

	Reduction in Landings/Discards[a]					
	Alternative					
Species	**1**	**2**	**3**	**4**	**5**	**6**
Herring	2%	2%	24%	23%	1%	6%
Mackerel	11%	19%	34%	33%	6%	35%
Black Sea Bass	15%	23%	27%	24%	6%	29%
Whiting	1%	4%	14%	13%	3%	17%
Loligo	5%	12%	34%	26%	6%	36%
Scup Discards	**34%**	**49%**	**28%**	**14%**	**13%**	**58%**

[a] Percentage reductions in landings/discards apply to landings/discards under the sea sampling data column in Table 12.

Potential lost revenue for each species was estimated by applying estimated reduction in landings based on sea sample data and 1998 prices in NMFS General Canvass Data to total otter trawl landings in the 1998 VTR data (Table 14). It was necessary to use average prices from NMFS general canvass data when estimating changes in revenues because VTR data do not contain dollar values. This alternative has the lowest cost associate with it ($2.0 million), the third highest percent reduction associated with it (34%) and the lowest ratio of cost per percent reduction (Table 14a). However, sea sample data indicate that the herring fishery would be exempted from the January through April regulations, only, under this alternative (Table 15), so the impacts may be overstated. This fishery, in this area and time period, has associated scup discards that are less than 10%. This exemption would allow the herring

fishery to operate without the constraint of a regulated area. Excluding herring for both periods, the reduced landings of the other small mesh species could reduce revenues by $1.95 million.

Table 14. Potential reduction in value of 1998 VTR otter trawl landings based on estimated reductions in landings for regulated mesh area alternatives (sea sample data) and 1998 prices(NMFS General Canvass Data).

	Reduction in Revenue (thousand dollars)					
	Alternative					
Species	**1**	**2**	**3**	**4**	**5**	**6**
Herring	4	4	50	48	2	13
Mackerel	346	598	1,070	1,039	189	1,102
Black Sea Bass	204	313	367	326	82	394
Whiting	147	587	2,053	1,906	440	2,493
Loligo	1,256	3,015	8,541	6,531	1,507	9,044

Table 14a. Comparison of percent reduction and dollar cost for all alternatives.

	Alterna tive					
	1	**2**	**3**	**4**	**5**	**6**
% Discard Reduction	34	49	28	14	13	58
Total Cost of Alternative (thousand dollars) All Species	1,957	4,517	12,081	9,850	2,220	13,046
% Reduction per Thousand Dollars	0.017	0.011	0.002	0.001	0.006	0.004
Total Cost per % Reduction	57.6	92.2	431.5	703.6	170.8	224.9
Ranking	1	2	5	6	3	4

Table 15. The percent of scup discards for small mesh fisheries based on directed trips. A directed trip is defined as trips landing 1000 pounds or more of the target species caught.

		Alternative					
		1	**2**	**3**	**4**	**5**	**6**
Time Period	**Fishery**						

		% Scup Discards	% Scup Discards	% Scup Discards	% Scup Discards
Nov - Dec	Herring	ND[1]	0% (2 trips)	0% (1 trip)	0% (2 trips)
	Mackerel	ND[1]	ND[1]	ND[1]	ND[1]
	Black Sea Bass	30% (1 trip)	30% (1 trip)	47% (1 trip)	30% (1 trip)
	Whiting	53% (19)	53% (29 trips)	45% (18 trips)	53% (23 trips)
	Loligo	51% (27 trips)	48% (52 trips)	46% (8 trips)	48% (32 trips)
Jan - Apr	Herring	0% (1 trip)	0% (1 trip)	ND[1]	0% (1 trip)
	Mackerel	75% (11 trips)	75% (17 trips)	44% (5 trips)	76% (19 trips)
	Black Sea Bass	72% (3 trips)	72% (3 trips)	ND[1]	76% (5 trips)
	Whiting	86% (19 trips)	36% (52 trips)	56% (22 trips)	76% (55 trips)
	Loligo	88% (17 trips)	40% (50 trips)	73% (21 trips)	78% (52 trips)

[1] No Data.

However, as noted by Council staff in previous analyses and Kennelly (1999), closing an areas for a specific time “will not simply remove trawling effort from the region but merely redirect it to other areas that may yield lower scup discards.” As such, reductions of discards and landings inside the closed areas “will be tempered by increased landings and discards outside the closure by the redirected vessels.” As such, the effect of the regulated areas would be reduced as fishermen recoup their landings in areas outside the regulated areas.

The Scup Working Group indicated that closing larger areas for longer periods would have a severe impact on fisheries that do not discard scup. They indicated that scup and squid only occur together in relatively small areas within the larger statistical areas. Therefore limiting small mesh fisheries in larger areas would only achieve marginal reductions in scup discards, which would not justify impacts to these other fisheries.

In addition, the Scup Working Group was very concerned about the data limitations and questioned the extent of the discard problem. They indicated that the discard problem with scup was associated with the fisheries of the late 1980s and early 1990s. These fisheries have since been affected by a number of regulations including summer flounder mesh sizes, groundfish mesh sizes, and scup mesh sizes with associated thresholds and trip limits that would have reduced scup discards. In addition, since then, there have been significant improvements in electronics that allow fishermen to avoid areas where small scup are concentrated and, as such, allow for significant

reductions in scup discards. Still, the 1998 assessment (SAW-27) had indicated that F should be reduced "substantially and immediately" and "that reducing discards (especially in small mesh fisheries) would have the most impact in that regard." Also, NMFS notes that although the data with respect to identifying primary discard sources sufficient to implement management measures are limited, the precautionary approach to developing measures to reduce discards requires that action be taken on this sorely depleted stock.

Finally, the Working Group indicated that the reduction in *Loligo* quota proposed for 2000 would reduce scup discards and therefore the need for more restrictive regulated areas. Specifically, a reduction in the *Loligo* quota could also result in a reduction in scup discards. Assuming effort was reduced in direct proportion to the reduction in landings, and a uniform ratio of discards to landings over the year, a 28% reduction in *Loligo* quota could result in a 28% reduction in the scup discards associated with this small mesh fishery.

In general, short time periods and small areas make it more likely that the effectiveness of a regulated area will be reduced. Enforcement of regulated areas becomes more problematic as the size of the area decreases. Also, scup migration is also dependent on water temperature and can vary from one year to the next. Therefore, it is possible that the proposed 2 week periods may have little or no effect on scup discards if scup are not present during the regulated time periods.

Sea sample data suggests that this alternative would reduce scup discards with minimal effects on landings of other commercially important species. As such, this alternative offers the best balance between the economic effects on the industry and a reduction in scup discards. Because this alternative was derived with significant industry input, it is more likely that these regulated areas will have industry-wide support resulting in greater compliance and greater reductions in scup discards. Reduced scup discards will benefit both the scup stock and the fishing industry. As more scup are allowed to reach maturity and spawn, spawning stock biomass and yields will increase.

6.3.4.2 Alternative 2

Alternative 2 would regulate the use of bottom otter trawls with codend mesh less than 4.5 inches in sub-areas 1-6 (sub-areas of statistical areas 537, 539, and 613) from November 1 to December 31 and sub-areas 6A-8A (sub-areas of statistical areas 616 and 622) from January 1 to April 30 (Figure 2). These are the time periods recommended by Scup Monitoring Committee with areas recommended by Scup Working Group.

The proposed regulated areas would have reduced scup discards by 49% based on sea sample data from 1989 through April 1999. In addition, landings of small mesh species would have been reduced as follows: herring - 2%, mackerel - 19%, black sea bass - 23%, whiting - 4%, and *Loligo* - 12% (Table 13). These percentages are reductions associated with the total otter trawl landings of each species in the sea sample data.

Potential lost revenue for each species was estimated by applying estimated reduction in landings based on sea sample data and 1998 prices in NMFS General Canvass Data to total otter trawl landings in the 1998 VTR data (Table 14). This alternative has the fourth highest cost associate with it ($4.5 million), the second highest percent reduction in discard (49%), and the second lowest

ratio of cost per percent reduction (Table 14a). However, sea sample data indicate that the herring fishery would be exempted from the January through April regulations, only, under this alternative (Table 15), so the impacts may be overstated. This fishery, in this area and time period, has associated scup discards that are less than 10 percent. This exemption would allow the herring fishery to operate without the constraint of a regulated area.

As noted by Council staff several times in previous analyses and Kennelly (1999), closing areas for a specific time "will not simply remove trawling effort from the region but merely redirect it to other areas that may yield lower scup discards." As such, reductions of discards and landings inside the closed areas "will be tempered by increased landings and discards outside the closure by the redirected vessels." As such, the effect of the regulated areas would be reduced as fishermen recoup their landings in areas outside the regulated areas.

In general, shorter time periods and smaller areas make it more likely that the effectiveness of a regulated area will be reduced. Enforcement of regulated areas becomes more problematic as the size of the area decreases. Also, scup migration is dependent on water temperature and can vary from one year to the next. Because this alternative regulates areas for longer periods of time than Alternative 1, it is more likely that areas would be closed to small mesh during the period when small scup would be vulnerable to the gear. Reduced scup discards will benefit both the scup stock and the fishing industry. As more scup are allowed to reach maturity and spawn, spawning stock biomass and yields will increase.

Sea sample data indicate that this alternative would allow for a larger reduction in scup discards than Alternative 1 and a smaller reduction than Alternative 6. Compared to Alternative 1, the greater discard reduction comes at the expense of a greater decrease in landings (and revenue) of other commercially important species. Decreased revenues could be as much as 131% higher under this alternative compared to the Council's preferred alternative and 35 percent of the decreases estimated for the preferred alternative. As such, the benefits associated with a larger reduction in scup discards may be outweighed by the effect on other fisheries. Based on industry input, the two-month and four-month closures could close areas to small mesh gear when scup were not present resulting in an impact on other fisheries that would not discard scup.

6.3.4.3 Alternative 3

Alternative 3 would regulate the use of bottom otter trawls with codend mesh less than 4.5 inches in statistical areas 537, 539, and 613 from November 1 to December 31 and statistical areas 616 and 622 from January 1 to April 30 (Figure 3). This is the alternative recommended by the Scup Monitoring Committee.

The proposed regulated areas would have reduced scup discards by 28% based on sea sample data from 1989 through April 1999. In addition, landings of small mesh species would have been reduced as follows: herring - 24%, mackerel - 34%, black sea bass - 27%, whiting - 14%, and *Loligo* - 34% (Table 13). These percentages are reductions associated with the total otter trawl landings of each species in the sea sample data.

Because VTR data are available by statistical area, additional analyses could be conducted with VTR data for this alternative. Analysis of VTR data from

1997 and 1998 indicates that this alternative would have reduced scup discards by 50% and 70% in 1997 and 1998, respectively. In 1997, bottom otter trawl landings would have been reduced as follows: herring - 11%, mackerel - 36%, black sea bass - 22%, whiting - 14%, and *Loligo* - 23% (Table 16a). In 1998, bottom otter trawl landings would have been reduced as follows: herring - 2%, mackerel - 4%, black sea bass - 21%, whiting - 16%, and *Loligo* - 33% (Table 16b).

Table 16a. The percent of landings and scup discards that would be reduced by proposed regulated mesh area alternatives. The reductions are based on 1997 VTR data, for bottom otter trawls with mesh less than 4.5 inches.

Species	**Reduction in Landings/Discards[a]**					
	Alternative					
	1	**2**	**3**	**4**	**5**	**6**
Herring	ND[1]	ND[1]	11%	8%	ND[1]	ND[1]
Mackerel	ND[1]	ND[1]	36%	36%	ND[1]	ND[1]
Black Sea Bass	ND[1]	ND[1]	22%	16%	ND[1]	ND[1]
Whiting	ND[1]	ND[1]	14%	11%	ND[1]	ND[1]
Loligo	ND[1]	ND[1]	23%	17%	ND[1]	ND[1]
Scup Discards	**ND[1]**	**ND[1]**	**50%**	**33%**	**ND[1]**	**ND[1]**

[1] No data.
[a] Percentage reductions in landings/discards apply to landings/discards under the 1997 VTR data column in Table 12.

Table 16b. The percent of landings and scup discards that would be reduced by proposed regulated mesh area alternatives. The reductions are based on 1998 VTR data, for bottom otter trawls with mesh less than 4.5 inches.

Species	**Reduction in Landings/Discards[a]**					
	Alternative					
	1	**2**	**3**	**4**	**5**	**6**
Herring	ND[1]	ND[1]	2%	1%	ND[1]	ND[1]
Mackerel	ND[1]	ND[1]	4%	4%	ND[1]	ND[1]
Black Sea Bass	ND[1]	ND[1]	21%	17%	ND[1]	ND[1]
Whiting	ND[1]	ND[1]	16%	14%	ND[1]	ND[1]
Loligo	ND[1]	ND[1]	33%	29%	ND[1]	ND[1]
Scup Discards	**ND[1]**	**ND[1]**	**70%**	**64%**	**ND[1]**	**ND[1]**

[1] No data.
[a] Percentage reductions in landings/discards apply to landings/discards under the 1998 VTR data column in Table 12.

Potential lost revenue for each species was estimated by applying estimated reduction in landings based on sea sample data and 1998 prices in NMFS General Canvass Data to total otter trawl landings in the 1998 VTR data (Table 14). This alternative has the second highest cost associate with it ($12.1 million), the fourth greatest reduction in scup discards (28%), and the second highest ratio of cost per percent reduction (Table 14a). However, sea sample data indicate that the herring fishery, under both the November and December and January through April regulations, qualifies as exempted under this alternative (Table 15). This fishery, in these areas and time periods, has associated scup discards that are less than 10%. This exemption would allow this fishery to operate without the constraint of a regulated area.

As noted by Council staff in previous analyses and Kennelly (1999), closing areas for a specific time "will not simply remove trawling effort from the region but merely redirect it to other areas that may yield lower scup discards." As such, reductions of discards and landings inside the closed areas "will be tempered by increased landings and discards outside the closure by the redirected vessels." As such, the effect of the regulated areas would be reduced as fishermen recoup their landings in areas outside the regulated areas.

These analyses indicate a 28% reduction of total scup discards based on sea sample data and a 50%-70% reduction of total scup discards based on VTR data could be achieved by closing these five statistical areas at various times during the year. In general, longer regulated time periods and larger areas make it more likely that a regulated area will be effective in reducing discards. Enforcement of regulated areas becomes more problematic as the size of the area decreases. Also, scup migration is dependent on water temperature and can vary from one year to the next. Because this alternative regulates larger areas for a longer period of time than Alternative 1, it is more likely that areas would be closed to small mesh during the period when small scup would be vulnerable to the gear. In addition, the larger area encompasses the 30 to 70 fathom depth contours which were identified by fishermen as the location of scup in the winter. As such, a closure to small mesh in these larger areas could have a higher probability of achieving reductions in scup discards. Reduced scup discards will benefit both the scup stock and the fishing industry. As more scup are allowed to reach maturity and spawn, spawning stock biomass and yields will increase.

Sea sample data indicate that this alternative would allow for a smaller reduction in scup discards than either Alternative 1 or 6. The costs associated with this reduction result in decreased revenues as much as 516% higher under this alternative compared to the Alternative 1, and 7.5% lower than the preferred alternative. As such, the benefits associated with this reduction in scup discards do not necessarily outweigh the effect on other fisheries in terms of lost revenue. Based on industry input, the two-month and four-month closures could close areas to small mesh gear when scup were not present resulting in an impact on other fisheries that do not discard scup.

6.3.4.4 Alternative 4

Alternative 4 would regulate otter trawl gear with codend mesh less than 4.5 inches in statistical area 537 from November 1 to November 31, area 539 from November 16 to November 31, area 613 from December 1 to January 15, area 616

from January 16 through April 30, area 622 from February 1 to April 30 (Figure 4). These are the areas recommended by Scup Monitoring Committee and time periods recommended by the Scup Working Group.

The proposed regulated areas would have reduced scup discards by 14% based on sea sample data from 1989 through April 1999. In addition, landings of small mesh species would have been reduced as follows: herring - 23%, mackerel - 33%, black sea bass - 24%, whiting - 13%, and *Loligo* - 26% (Table 13). These percentages are reductions associated with the total otter trawl landings of each species in the sea sample data.

Because VTR data are available by statistical area, additional analyses could be conducted with VTR data. Analysis of VTR data from 1997 and 1998 indicates that this alternative would have reduced scup discards by 33% and 64% in 1997 and 1998, respectively. In 1997, bottom otter trawl landings would have been reduced as follows: herring - 8%, mackerel - 36%, black sea bass - 16%, whiting - 11%, and *Loligo* - 17% (Table 16a). In 1998, bottom otter trawl landings would have been reduced as follows: herring - 1%, mackerel - 4%, black sea bass - 17%, whiting - 14%, and *Loligo* - 29% (Table 16b).

Potential lost revenue for each species was estimated by applying estimated reduction in landings based on sea sample data and 1998 prices in NMFS General Canvass Data to total otter trawl landings in the 1998 VTR data (Table 14). This alternative would have the second lowest percent reduction in scup discards (14%), the third highest cost ($9.8 million), and the largest cost per percent reduction (Table 14a). Sea sample data indicate that the herring fishery, under both the November and December and January through April regulations, would qualify as exempted under this alternative (Table 15). This fishery, in these areas and time periods, has associated scup discards that are less than 10%. This exemption would allow this fishery to operate without the constraint of a regulated area.

As noted by Council staff in previous analyses and Kennelly (1999), closing areas for a specific time “will not simply remove trawling effort from the region but merely redirect it to other areas that may yield lower scup discards.” As such, reductions of discards and landings inside the closed areas “will be tempered by increased landings and discards outside the closure by the redirected vessels.” As such, the effect of the regulated areas would be reduced as fishermen recoup their landings in areas outside the regulated areas.

These analyses indicate a 14% reduction of total scup discards based on sea sample data and a 33%-64% reduction of total scup discards based on VTR data could be achieved by closing these five statistical areas at various times during the year. In general, larger areas make it more likely that a regulated area will be effective in reducing discards. Reduced scup discards will benefit both the scup stock and the fishing industry. As more scup are allowed to reach maturity and spawn, the spawning stock biomass as well as yields will increase.

Sea sample data indicate that this alternative would allow for a smaller reduction in scup discards than Alternative 1 at the expense of a greater decrease in landings of other commercially important species. Decreased revenues could be as much as 402% higher under this alternative and 24.6% lower than the preferred alternative. As such, the benefits associated with this reduction in scup discards may be outweighed by the effect on other fisheries. Based on industry input, the larger area closures could close

areas to small mesh gear when scup were not present resulting in an impact on other fisheries that do not discard scup.

6.3.4.5 Alternative 5

Alternative 5 would regulate the use of otter trawls with codend mesh less than 4.5 inches in sub-areas A-B-C of statistical areas 537 and 539, sub-area A of statistical area 613 during November 1 and December 31, sub-areas A-B-C-D in statistical area 616, and sub-areas A-B-C of statistical area 622 from January 1 through April 30. These sub-areas correspond to the ten minute squares of highest scup discards (areas with discards greater than 10% based on sea sample data; Figure 5) for each statistical area with the time periods recommended by the Scup Monitoring Committee.

The proposed regulated areas would have reduced scup discards by 13% based on sea sample data from January 1989 through April 1999. In addition, landings of small mesh species would have been reduced as follows: herring - 1%, mackerel - 6%, black sea bass - 6%, whiting - 3%, and *Loligo* - 6 % (Table 13). These percentages are reductions associated with the total landings of each species in the sea sample data.

Potential lost revenue for each species was estimated by applying estimated reduction in landings based on sea sample data and 1998 prices in NMFS General Canvass Data to total otter trawl landings in the 1998 VTR data (Table 14). This alternative contains the lowest percent reduction in scup discards (13%), the second lowest cost associated with it ($2.2 million), and the highest total cost per percent reduction (Table 14a). Sea sample data that the herring fishery would be exempted from the January through April regulations, only, under this alternative (Table 15). This fishery, in this area and time period, has associated scup discards that are less than 10%. This exemption would allow the herring fishery to operate without the constraint of a regulated area.

However, as noted by Council in previous analyses and Kennelly (1999), closing areas for a specific time “will not simply remove trawling effort from the region but merely redirect it to other areas that may yield lower scup discards.” As such, reductions of discards and landings inside the closed areas “will be tempered by increased landings and discards outside the closure by the redirected vessels.” As such, the effect of the regulated areas would be reduced as fishermen recoup their landings in areas outside the regulated areas.

In general, shorter time periods and smaller areas make it more likely that the effectiveness of a regulated area will be reduced. Enforcement of regulated areas becomes more problematic as the size of the area decreases. The small non-contiguous areas associated with this alternative make it unlikely that it could be enforced. Also, scup migration is dependent on water temperature and can vary from one year to the next. Because this alternative regulates even smaller areas than Alternative 1, it is less likely to be effective at reducing scup discards. Reduced scup discards will benefit both the scup stock and the fishing industry. As more scup are allowed to reach maturity and spawn, spawning stock biomass and yields will increase.

6.3.4.6 Alternative 6 (Preferred)

Alternative 6 would regulate the use of otter trawls with codend mesh less than 4.5 inches in two areas, an area that intersects statistical areas 537,

539, and 613 from November 1 to December 31, and an area that intersects statistical areas 616 and 622 from January 1 to April 30 (Figure 6). These areas include both the ten minute squares identified by Council staff as having high scup discards using sea sample data from 1989 - April 1999 and the areas identified by the Scup Working Group for Alternative 1.

The proposed regulated areas would have reduced scup discards by 58% based on sea sample data from 1989 through April 1999. In addition, landings of small mesh species would have been reduced as follows: herring - 6%, mackerel - 35%, black sea bass - 29%, whiting - 17%, and *Loligo* -36 % (Table 13). These percentages are reductions associated with the total otter trawl landings of each species in the sea sample data.

Potential lost revenue for each species was estimated by applying estimated reduction in landings based on sea sample data and 1998 prices in NMFS General Canvass Data to total otter trawl landings in the 1998 VTR data (Table 14). This alternative has the highest cost associate with it ($13.0 million), the greatest reduction in scup discards (58%), and the fourth highest ratio of cost per percent reduction (Table 14a). Sea sample data indicate that the herring fishery qualifies as exempted, under both the November and December and January through April regulations, under this alternative (Table 15). This fishery, in this area and time period, has associated scup discards that are less than 10 percent. This exemption would allow this fishery to operate without the constraint of a regulated area.

However, as noted by Council staff in previous analyses and Kennelly (1999), closing areas for a specific time “will not simply remove trawling effort from the region but merely redirect it to other areas that may yield lower scup discards.” As such, reductions of discards and landings inside the closed areas “will be tempered by increased landings and discards outside the closure by the redirected vessels.” As such, the effect of the regulated areas would be reduced as fishermen recoup their landings in areas outside the regulated areas.

These analyses indicate a 58% reduction of total scup discards based on sea sample data by closing these two areas at various times during the year. In general, these longer time periods and larger areas make it more likely that a regulated area will be effective in reducing discards. Enforcement of regulated areas becomes more problematic as the size of the area decreases. Also, scup migration is dependent on water temperature and can vary from one year to the next. Because this alternative regulates areas for a longer period of time than Alternative 1, it is more likely that areas would be closed to small mesh during the period when small scup would be vulnerable to the gear. In addition, the larger area encompasses the 30 to 70 fathom depth contours which were identified by the Scup Working Group as the location of scup in the winter. As such, a closure to small mesh in these larger areas could have a higher probability of achieving reductions in scup discards. Reduced scup discards will benefit both the scup stock and the fishing industry. As more scup are allowed to reach maturity and spawn, spawning stock biomass and yields will increase.

Sea sample data indicate that this alternative would allow for a larger reduction in scup discards than Alternative 1 at the expense of a greater decrease in landings of other commercially important species. While decreased revenues could be as much as 567% higher under the preferred alternative compared to alternative 1, the decrease in scup discards exceeds the latter alternative by 70 percent. Industry representatives had indicated that two-

month and four-month closures, combined with larger areas that close areas to small mesh gear when scup were not present, would impact other fisheries that do not discard scup. However, this alternative incorporates the areas proposed by the scup Working Group and adopted as alternative 1. In addition, this area expands those areas to encompass other areas noted for high scup discards, and expanded areas and times to enhance enforceability.

6.4 Impact of Scenario 2 on the Environment

6.4.1 Impact of Scenario 2 Summer Flounder Measures upon the Environment

This alternative would set the 2000 summer flounder TAL at 16.815 million lb (7.63 million kg), a decrease of 9 percent from the 1999 TAL. Based on this limit 60 percent would be allocated to the commercial fishery, or 10.089 million lb (4.58 million kg). The recreational fishery would be allocated 40 percent or 6.726 million lb (3.05 million kg) in 2000. Based on stochastic projections, a total coastwide harvest limit of 16.815 million lb (7.63 million kg) would have a 50 percent probability of achieving the target F of 0.26 in 2000.

These flounder measures would not result in any negative impacts on other fisheries. The commercial fishery for summer flounder is primarily prosecuted with otter trawls and often harvests a mixed fishery, including summer flounder, scup, black sea bass, squid, Atlantic mackerel and silver hake. Given the mixed fishery nature of the summer flounder fishery, incidental catch of other species does occur. Because these measures would result in a reduction of effort in the summer flounder fishery, the incidental catch rates of other species should also decrease.

A recreational harvest limit of 6.726 million lb (3.05 million kg) in 2000 would be about 0.684 million lb (0.31 million kg) below the recreational harvest limit for 1997, 1998, and 1999. In addition, this harvest limit for 2000 could result in a decrease in recreational landings of 5.802 million lb (2.63 million kg) from estimated recreational landings for 1998. At the present time there are neither behavioral or demand data available to estimate how sensitive party/charter boat anglers might be to proposed fishing regulations. It may be possible that, given the popularity of summer flounder among anglers as the most frequently sought species in the Mid-Atlantic, and third the North Atlantic in 1998 (MRFSS), a drastic decrease in recreational harvest limit could adversely affect the demand for party/charter boat trips. However, overall party/charter demand for all species is stable, so overall economic impacts are anticipated to be slight.

6.4.2 Impact of Scenario 2 Scup Measures upon the Environment

This alternative would set the coastwide commercial quota at 2.497 million lb (1.13 million kg). The recreational harvest limit would be 0.869 million lb (0.39 million kg). The commercial quota of 2.497 million lb (1.13 million kg) is derived from the commercial TAC of 3.243 million lb (1.47 million kg) and a discard level of 0.746 million lb (0.338 million kg). The recreational harvest limit is based on a recreational TAC of 0.915 million lb (0.41 million kg) and a discard level of 0.045 million lb (0.02 million kg).

This alternative is based on the Monitoring Committee recommendation that the TAC for 2000 be 4.158 million lb (1.886 million kg). The Committee recommended that the 1999 TAC (5.922 million lb) be reduced in proportion to the

reduction in the target exploitation rates, i.e., 47% to 33% or a 33% reduction, to derive the TAC for 2000.

The Monitoring Committee recommended area/season closures that if implemented in 1997 would have reduced discards by as much as 68%. This reduction was applied to the estimate of discards for 1997 to derive a discard to catch ratio of 23%. This ratio was applied to the proposed TAC to derive a discard estimate of 0.746 million lb (0.338 million kg). The estimate of recreational discards was derived using the same proportion of recreational discards to recreational catch as 1997.

The scup measures should not result in any negative impacts on other fisheries. The commercial fishery for scup is primarily prosecuted with otter trawls and pots/traps and often harvests mixed species, including summer flounder, scup, black sea bass, squid, Atlantic mackerel and silver hake. Given the mixed species nature of the scup fishery, incidental catch of other species does occur. Because these measures will result in a reduction of effort in the scup flounder fishery, the incidental catch rates of other species should also decrease.

The preferred alternative would implement a recreational harvest limit of 0.869 million lb (0.39 million kg). In 1998, scup recreational landings were estimated at 0.87 million lb (0.39 million kg). Because the recreational harvest limit is almost identical to the 1998 landings this harvest limit should have minimal impacts in 2000.

6.4.3 Impact of Scenario 2 Black Sea Bass Measures upon the Environment

This alternative under Scenario 2 is the same as the black sea bass alternative discussed under Scenario 1 (section 6.1.3 of the EA).

6.5 Impact of Scenario 3 on the Environment

6.5.1 Impact of Scenario 3 Summer Flounder Measures upon the Environment

This alternative would set the coastwide limit at 22.046 million lb (10.0 million kg). Based on this limit, 13.228 million lb (6.00 million kg) would be allocated to the commercial fishery and 8.818 million lb (4.0 million kg) to the recreational fishery in 2000. Based on stochastic projection results, a TAL of 22.046 million lb (10.0 million kg) has a 1% probability of achieving the target F of 0.26 in 2000.

This summer flounder TAL may result in negative impacts on other fisheries. The commercial fishery for summer flounder is primarily prosecuted with otter trawls and often harvests a mixed fishery, including summer flounder, scup, black sea bass, squid, Atlantic mackerel and silver hake. Given the mixed fishery nature of the summer flounder fishery, incidental catch of other species does occur. Because these measures would result in an increase in effort for the summer flounder fishery, the incidental catch rates of other species would also increase.

This alternative, a coastwide landing limit of 22.046 million lb (10.0 million kg) would be approximately 3.528 million lb (1.6 million kg) higher than the 1999 TAL. In addition, the recreational harvest limit associated with the preferred alternative is approximately 1.408 million lb (0.639 million kg) higher than the harvest limit established in 1999.

This alternative has an unacceptably low probability of achieving the target F. The probability of achieving the target F (0.26) is 1 percent and the probability of achieving an F of 0.36 is only 50 percent. This alternative would increase short-term benefits to the commercial and recreational fisheries due to the increase in landings. However, given this low level probability of achieving the target and the fact that the past harvest levels have yet to achieve the annual target F, this recommendation is unacceptably risk-prone for the summer flounder stock.

6.5.2 Impact of Scenario 3 Scup Measures upon the Environment

This alternative would set the coastwide commercial quota at 3.51 million lb (1.59 million kg). The recreational harvest limit would be 1.238 million lb (0.56 million kg).

The commercial quota of 3.51 million lb (1.59 million kg) is derived from the commercial TAC of 4.61 million lb (2.57 million kg) and a discard level of 1.10 million lb (0.49 million kg). As such, this alternative would use the same discard level in 2000 as used in the 1998 quota calculation.

These scup measures may result in negative impacts to other fisheries. The commercial fishery for scup is primarily prosecuted with otter trawls and pots/traps and often harvests a mixed fishery, including summer flounder, scup, black sea bass, squid, Atlantic mackerel and silver hake. Given the mixed fishery nature of the scup fishery, incidental catch of other species does occur. Because these measures will result in an increase of effort in the scup flounder fishery, the incidental catch rates of other species may also increase.

Under this scenario, this commercial quota would represent an increase of 38% relative to the 1999 quota. As such, the scup commercial quota for 2000 would increase short-term benefits to commercial fishermen due to an increase in landings. The scup recreational harvest limit for 2000 would be 1.23 million lb (0.56 million kg). This is a 2.5 percent increase over the 1997 recreational landings, and a 0.32 million lb (0.15 million kg) decrease from the 1998 recreational harvest limit. Given that this is an increase over the 1997 landings and that the recreational fishery has shown a decreasing trend in recent years, it is not expected that this recreational harvest limit would have any significant impact on the recreational fishery.

However, the higher TAL will result in an exploitation rate that exceeds the target for 2000. If the target is exceeded, stock rebuilding will be slowed and the long-term benefits to the fishery and the stock will be reduced. In addition, because this TAL has no probability of achieving the target in 2000, this limit would violate the provisions of Amendment 8. As such, this harvest limit could not be implemented.

6.5.3 Impact of Scenario 3 Black Sea Bass Measures upon the Environment

This 2000 TAL would be equivalent to the total landings for 1996. Based on this TAL, the commercial quota would be 4.52 million lb (2.05 million kg) and the recreational harvest limit would be 4.71 million lb (2.13 million kg) for 2000.

Recreational landings would be increased by over 3 times relative to the 1998 landings if this alternative were implemented. As such, it is not expected

that this alternative would have an adverse affect on the recreational fishery for black sea bass.

These black sea bass measures may result in negative impacts to other fisheries. The commercial fishery for black sea bass is primarily prosecuted with otter trawls and pots/traps and often harvests a mixed fishery, including summer flounder, scup, black sea bass, squid, Atlantic mackerel and silver hake. Given the mixed fishery nature of the black sea bass fishery, incidental catch of other species does occur. Because these measures will result in an increase in effort for the black sea bass fishery, the incidental catch rates of other species may increase.

This higher TAL will result in an exploitation rate that would likely exceed the target for 2000. If the target is exceeded, stock rebuilding will be slowed and the long-term benefits to the fishery and the stock will be reduced. In addition, because this TAL has no probability of achieving the target in 2000, this limit would violate the provisions of Amendment 9. As such, this harvest limit could not be implemented.

6.6 Impact of Scenario 4 on the Environment

6.6.1 Impact of Scenario 4 Summer Flounder Measures upon the Environment

This alternative would set the 1999 summer flounder TAL at 14.33 million lb (6.50 million kg), a decrease of 23 percent from the 1999 TAL. Based on this limit 60 percent would be allocated to the commercial fishery, or 8.60 million lb (3.9 million kg). The recreational fishery would be allocated 40 percent or 5.73 million lb (2.59 million kg) in 2000. Based on stochastic projections, a total coastwide harvest limit of 14.33 million lb (6.5 million kg) would have greater than a 75 percent probability of achieving the target F of 0.26 in 2000. In fact, this TAL has a 50% probability of achieving an F of 0.22 in 2000.

This TAL would not result in any negative impacts on other fisheries. The commercial fishery for summer flounder is primarily prosecuted with otter trawls and often harvests a mixed fishery, including summer flounder, scup, black sea bass, squid, Atlantic mackerel and silver hake. Given the mixed fishery nature of the summer flounder fishery, incidental catch of other species does occur. Because these measures would result in a reduction of effort in the summer flounder fishery, the incidental catch rates of other species should also decrease.

A recreational harvest limit of 5.73 million lb (2.59 million kg) in 2000 would be 1.68 million lb (0.76 million kg) below the recreational harvest limit for 1999. The harvest limit for 2000 could result in a decrease in recreational landings of 6.798 million lb (3.083 million kg) relative to the estimate of landings for 1999. At the present time there are neither behavioral or demand data available to estimate how sensitive party/charter boat anglers might be to proposed fishing regulations. It may be possible that, given the popularity of summer flounder among anglers as the most frequently sought species in the Mid-Atlantic, and third in the North Atlantic in 1998 (MRFSS), a drastic decrease in recreational harvest limit could adversely affect the demand for party/charter boat trips. However, overall party/charter demand for all species is stable, so overall economic impacts may be slight.

6.6.2 Impact of Scenario 4 Scup Measures upon the Environment

This alternative would set the coastwide commercial quota at 0.324 million lb (0.15 million kg). The recreational harvest limit would be 1.238 million lb (0.56 million kg).

The commercial quota of 0.324 million lb (0.15 million kg) is derived from the commercial TAC of 3.243 million lb (1.47 million kg) and a discard level of 2.919 million lb (1.32 million kg). This discard amount is based on a 90% ratio of discards to total catch and was projected for 2000 by the Monitoring Committee based on the assumption that season and area closures would not be implemented for scup in 2000.

This discard ratio is double that estimated for the 1997 fishery. However, the amount of scup that can be landed in 2000 based on the preferred alternative is reduced relative to 1997 landings. As such, the amount of fishing effort and related discards should also be reduced. In addition, the Council and Commission voted to implement season and area closures. These closures should reduce the bycatch of scup in small mesh fisheries and as such allow for a reduction in scup discards.

These scup measures should not result in any negative impacts on other fisheries. The commercial fishery for scup is primarily prosecuted with otter trawls and pots/traps and often harvests a mixed fishery, including summer flounder, scup, black sea bass, squid, Atlantic mackerel and silver hake. Given the mixed fishery nature of the scup fishery, incidental catch of other species does occur. Because these measures would result in a reduction of effort in the scup flounder fishery, the incidental catch rates of other species should also decrease.

Under this scenario, the scup recreational harvest limit for 1999 would be 1.238 million lb (0.56 million kg). This is a 42 percent increase over the 1998 recreational landings, and is equivalent to the 1999 recreational harvest limit. Given that this is an increase over the 1998 landings and that the recreational fishery has show a decreasing trend in recent years, it is not expected that this recreational harvest limit would have any significant impact on the recreational fishery.

6.6.3 Impact of Scenario 4 Black Sea Bass Measures upon the Environment

This 2000 TAL was derived by reducing the 1997 landings by 50 percent. Based on this TAL, the commercial quota would be 1.40 million lb (0.63 million kg) (49 percent) and the recreational harvest limit would be 1.46 million lb (0.66 million kg) (51 percent) for 2000.

This reduction in TAL would result in an exploitation rate that would accelerate stock rebuilding. However, it is probable that the current estimate of fishing mortality is less than or equal to the target exploitation rate for 2000 (F=0.73). As such, a reduction of this degree would be significant impacts on the commercial fishery while not being necessary to meet the FMP requirements.

These black sea bass measures should not result in any negative impacts on other fisheries. The commercial fishery for black sea bass is primarily prosecuted with otter trawls and pots/traps and often harvests a mixed fishery, including summer flounder, scup, black sea bass, squid, Atlantic mackerel and silver hake. Given the mixed fishery nature of the black sea bass fishery, incidental catch of other species does occur. Because these

measures would result in no increase in effort for the black sea bass fishery, the incidental catch rates of other species should not increase.

Recreational landings would be reduced by 54 percent relative to the 1998 landings if this alternative were implemented. At the present time there are neither behavioral or demand data available to estimate how sensitive party/charter boat anglers might be to proposed fishing regulations. The reduction in landings could have short-term negative consequences to the recreational fishing industry. It is probable that given this reduced recreational harvest limit more restrictive limits (i.e., lower possession limits, greater minimum size limits, and/or shorter seasons) would be required to prevent anglers from exceeding the recreational harvest limit in 2000.

6.7 Social Impacts

New quotas alone have relatively limited social impacts. The changes in social structure and cultural fabric that may have occurred under implementation of limited access are already largely in place. The major impact of quota reductions is to 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. With regard to commercial fishermen, the landings and revenue per vessel for the species whose quotas are being lowered in Scenario 1 (the preferred alternative) are such a small portion of overall landings and revenues for the majority of those vessels that impacts are expected to be small (Regulatory Impact Review, section 5.0).

The specifications are not expected to affect in a negative way the overall demand for recreational fishing trips in the North and Mid-Atlantic regions (Regulatory Impact Review, section 5.0). As such, there should not be significant adverse impacts to ports and communities.

Finlayson and McCay (1994) report that black sea bass pot specialization is found from Cape May, NJ 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.

Further north, Rhode Island pot fishermen and fish trap/pound net fishers are heavily dependent on scup. These fishermen are scattered through communities the length of the Rhode Island coast, however. So the impacts to individuals are unlikely to translate into large community effects.

It is important to mention that the proposed quotas for summer flounder, scup, and black sea bass for year 2000 are identical to the quotas specified for those species in 1999. However, due to projected overages in 1999, the final adjusted commercial quotas for 2000 will be lower than those in 1999 (section 3.1 and 4.0, IRFA). While some individual fishermen and their families may find the final adjusted 2000 quotas to have significant impacts, the larger communities and towns in which they live will not.

The management measure regarding regulated mesh areas will likely have minimal effect on ports and communities as fishermen will likely recoup losses in revenues by redirecting their effort into other areas that are open the closed areas when they reopen (sections 6.3.4 of the EA and 5.1.3 of the IRFA).

Vessel affected under the 2000 recommended harvest levels (Scenario 1)

Under Scenario 1, a total of 115 vessels are impacted (revenue reductions greater than 5 percent). Of these, 75 vessels hold some combination of summer flounder, scup or black sea bass commercial permits. The remaining 40 vessels have shown landings of either of those three species in 1998, but do not hold any of the requisite Federal permits in 1999. These vessels may be fishing exclusively in state waters fisheries for those species, 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.

The various permit combinations held by the 75 vessels are described in Table 17. It is most common for vessels to hold both scup an black sea bass permits, followed by black sea bass permits only, and a combination of all three permits. Vessels holding multiple permits would be able to maintain diverse fishing opportunities.

Table 17. Combinations of 1999 FLK, BSB, and SCP permits held, by commercial vessels impacted under Scenario 1.

	All 3	FLK only	BSB only	SCP only	SCP/ BSB	SCP/ FLK	BSB/ FLK	None*
Commercial	15	1	25	1	32	1	0	40

* "None" indicates no summer flounder, scup, or black sea bass permit held, and not necessarily no commercial permits held.

Many of these vessels hold permits in other fisheries (Table 18)— especially multispecies and squid-mackerel-butterfish, though the degree to which they can compensate for reductions in summer flounder, scup, and black sea bass due to reductions in 2000 versus 1999 quotas (due to overages in 1999) through increases in these species is questionable. The 75 vessels with Federal permits for summer flounder, scup, and/or black sea bass are h-ported (home port) principally in New York, Massachusetts, and Virginia (Table 19). It is important to mention that the proposed quotas for FLK, SCP, and BSB for year 2000 are identical to the quotas specified for those species in 1999. However, due to projected overages in 1999 the final 2000 quotas are lower than the quotas specified in 1999 (sections 3.1 and 4.0 of the RIR). However, aggregate summer flounder reductions (compared to 1999 quotas) under this scenario are only marginal (Table 28).

Table 18. Other 1999 permits held by the 75 vessels holding FLK, SCP, and BSB commercial permits impacted under Scenario 1.

	Northeast Region Permit Status	Number of Vessels	Percent of Permitted Vessels
Commercial	Multispecies	58	77
	Surfclam	9	12
	Lobster	32	43

	Squid/Mackerel/ Butterfish	51	68
	Quahog	9	12
Recreational	FLK, SCP, and/or BSB	8	11

Under Scenario 1, New York is the most heavily impacted state with regard to commercial vessels (section 5.0, IRFA). The impacted vessels in New York appear to be primarily smaller vessels (Table 19). Smaller vessels generally have few options for changing their fishing locations or ports of landing. This latter point is emphasized by the indication of a high level of coincidence between h-port and p-port (principal port) of landing.

Table 19. Impacted commercial vessels based on 1999 descriptive data from NMFS permit files - No vessel characteristics data are reported for states with fewer than 3 permits.

	DE	MA	MD	NJ	NY	PA	RI	VA	Other
# Permits by H-port state	3	13	5	5	22	5	4	13	5
# Permits by P-port state	2	12	7	8	23	0	5	15	3
# Permits by Mailing Address state	5	12	5	9	21	0	5	13	5
Avg. Length in Feet by P-port	39	36	48	36	30		32	34	
Avg. GRT by P-port	16	15	31	15	8		14	12	
% of vessels where h-port state = p-port state	40	100	100	66	100	0	80	100	

Impacted vessels are concentrated in New York, Massachusetts, and Virginia. New York is the most heavily impacted state, with Suffolk County and the port of Montauk being the most heavily impacted (Table 20).

Table 20. Distribution of all impacted vessels (holding permits for FLK, SCP, and BSB) by state, county and h-port, from 1999 NMFS permit files - h-ports with fewer than four vessels are not reported - only county-level data supplied; counties with fewer than three vessels are not reported.

State	County	Home port	No. Vessels
Massachusetts	Suffolk	Boston	6
	Bristol		3
Maryland	Worcester	Ocean City	4
		Other	1
New Jersey	Atlantic	Atlantic City	3
		Other	1
New York	Suffolk	Montauk/Montauk Point	16
		New York	3

		Other	2
Pennsylvania	Philadelphia	Philadelphia	5
Rhode Island	Washington		3
Virginia	Norfolk City	Norfolk	4
	Virginia Beach City	Virginia Beach	8

Effects of the regulated mesh areas

Section 6.3.4 of the EA describes and analyzes in detail the alternatives in this specification document to reduce scup discards. Additional analyses are presented in section 5.1.3 of the IRFA. A summary of the effects on exvessel revenues associated with the various alternatives evaluated is presented below.

As indicated in sections 6.3.4 of the EA and 5.1.3 of the IRFA, all of the regulated mesh area alternatives would reduce landings of herring, mackerel, black sea bass, whiting, and *Loligo*. The reductions in landings would decrease exvessel revenue of participating entities in amounts ranging from $1.96 million for Alternative 1, to $13.05 million for Alternative 6. This figure was derived by applying estimated reduction in landings based on sea sampling data (January 1989 thru April 1999, combined) and 1998 landings in NMFS General Canvass data to total otter trawl landings in 1998 VTR data for all areas combined. It was necessary to use average prices from NMFS general canvass data when estimating changes in revenues because VTR data do not contain dollar values. Assuming that reductions in discards from sea sampling data are representative of reductions in discards in the VTR data, then the estimated loss in revenue associated with the alternatives represent an upper limit estimate. That is, to the extent to which discard reduction estimates are not representative, then, too, are the estimated losses in revenues. Since the analyses here assume no displacement by industry into open areas - or rather, the quantitative analyses do not account for displacement - the estimates do not account for a recoupment of losses through displaced effort. Therefore, it is likely that the revenue reductions are overestimated.

As revenue reductions may be overestimated, so too, may scup discard reduction estimates be overestimated (see Section 6.3.4 of the EA). However, since Alternative 1 allows for displacement of effort into other “hot spots” (i.e., areas of high scup/Loligo interaction, as identified in Figure 1), there is no conservation benefit (reduced scup discards) made for allowing displacement and recoupment of lost landings and revenue. However, with Alternative 6, the “hot spots” are contained within the gear restriction areas to a greater extent (compared with other alternatives), so displacement of effort may result in continued landings by the impacted fisheries, while still maintaining a high conservation benefit. However, the estimates of this recoupment and conservation benefits are uncertain at this time for the reasons noted above.

Sections 6.3.4 of the EA and 5.1.3 of the IRFA both indicate that vessels that participate in these fisheries will likely redirect their effort onto other areas that are open or closed areas when they reopen. By recouping any loss in revenues associated with the implementation a gear restriction area, it is expected that social impacts are likely to be limited. However, impacts to

profitability are possible if costs due to vessel operation increase (see below).

A general description of the participating entities was made for this assessment of impacts. According to VTR data for the 1998 calender year, it is estimated that 172 vessels would be affected by the proposed regulated mesh areas alternatives (see section 5.1.3 of the IRFA for details). As indicated in section 5.1.3 of the IRFA, this estimate of affected entities is likely to represent an upper limit of affected vessels. The affected entities can be categorized as follows: 12% of the vessels (20 vessels) are between 5 and 50 GRTs, 66% of the vessels (113 vessels) are between 51 and 150 GRTs, and 23% of the vessels (39) are larger than 151 GRTs. It is important to note that of the 20 vessels in the 5 to 50 GRTs range, only one vessel is between 11 and 15 GRTs, 7 vessels are between 23 and 33 GRTs, and the remaining 12 vessels are between 34 and 50 GRTs. Larger vessel often have more options than smaller vessels, due to increased range and more deck space for alternative gear configurations. This fact can help them to respond to mesh regulated areas more efficiently. Finally, it was estimated that approximately 97% (166 vessels) of the vessels affected by regulated mesh areas are part of the universe of vessels that were identified as being participants of the summer flounder, scup, and/or black sea bass fisheries evaluated under the quota scenarios. In addition, it was also estimated that only one of the 172 vessels affected by the proposed regulated mesh area alternatives will also be impacted by revenue losses of 5 percent or greater due to the proposed 2000 summer flounder, scup, and black sea bass quotas detailed in Scenario 1.

Vessel affected under the most restrictive scenario (Scenario 4)

The social impact analysis first examined the anticipated impacts under that which was recommended by the Council and Board, and then further examined Scenario 4 - the most restrictive scenario. It is presumed that impacts of other scenarios will be less than impacts under this scenario. Under Scenario 4, 510 vessels would be affected with revenue reductions greater than 5 percent (section 5.5, IRFA). Of these, 405 are readily identified as holders of Federal summer flounder, scup or black sea bass permits. The remaining 105 are vessels that conducted landings in 1998, but did not hold a Federal permit for either of these species in 1999. These vessels are presumed to be fishing exclusively in state waters for the quota species or do not hold a Federal permit to participate in these fisheries any longer. The 405 vessels holding various combinations of FLK, BSB, and SCP permits are described in Table 21. It is most common for vessels to hold all three permits, which would allow a vessel to maintain diverse fishing opportunities. Other common combinations include scup/black sea bass, and black sea bass only.

Table 21. Combinations of 1999 FLK, BSB, and SCP permits held, by commercial vessels impacted under Scenario 4.

	All 3	FLK only	BSB only	SCP only	SCP/ BSB	SCP/ FLK	BSB/ FLK	None*
Commercial	238	22	38	7	59	29	12	105

* “None” indicates no summer flounder, scup, or black sea bass permit held, and not necessarily no commercial permits held.

As was demonstrated in the previous analysis, many of these impacted vessels hold permits in other fisheries (Table 22). In particular, most vessels have

multispecies, squid-mackerel-butterfish, and lobster permits. They do, thus, have access to some alternative fisheries, though at least multispecies and scallop are already under heavy regulation and likely to have increasingly stringent catch limits for the near future.

Table 22. Other 1999 permits held by the 405 vessels holding summer flounder, scup and black sea bass permits impacted under the most restrictive scenario (Scenario 4).

	Northeast Region Permit Status	Number of Vessels	Percent of Permitted Vessels
Commercial	Multispecies	349	87
	Surfclam	152	38
	Scallop	57	14
	Lobster	260	65
	Squid/Mackerel/ Butterfish	348	87
	Quahog	144	36
Recreational	FLK, SCP, and/or BSB	20	5

The 405 vessels with Federal permits for summer flounder, scup and/or black sea bass are h-ported principally in New York, Massachusetts, North Carolina, and Rhode Island. By p-port of landing, impacted vessels are mainly located in New York, Rhode Island, North Carolina, and New Jersey (Table 23).

While the summer flounder quota is allocated to the individual states, vessels are not necessarily constrained to land in their home state. It is 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. Thus, of the four states h-porting the highest number of impacted vessels (New York and Massachusetts), vessels in those states are highly likely to land in their h-port state (98 percent). Conversely, vessels h-ported in North Carolina and Rhode Island land in their state 70 and 68 percent, respectively. This information is important because impacts will occur both in the community of residence and in the community where the vessel’s catch is landed and sold.

The largest vessels are found in North Carolina, Connecticut, and New Jersey, followed by Rhode Island, Maryland, and Virginia (Table 23). Larger vessels often have more options than smaller vessels, due to increased range and more deck space for alternative gear configurations. This can help them to respond to cuts in quota in particular states. They also, however, need larger volumes to remain profitable.

Table 23. Impacted commercial vessels based on 1999 descriptive data from NMFS permit files - No vessel characteristics data are reported for states with fewer than 3 permits.

	CT	DE	MA	MD	NC	NJ	NY	PA	RI	VA	WV	Other
# Permits by H-port state	3	5	61	10	60	47	102	12	50	47	3	5
# Permits by P-port state	5	4	47	15	66	63	97	0	67	40	0	1

# Permits by Mailing Address state	4	8	43	13	73	65	94	0	68	35	0	2
Avg. Length in Feet by P-port	62	40	47	53	68	61	46		57	51		
Avg. GRT by P-port	79	17	40	39	97	79	41		64	59		
% of vessels where h-port state = p-port state	67	38	98	77	70	71	98	0	68	83	0	

Impacted vessels are concentrated in New York, Massachusetts, North Carolina, Rhode Island, New Jersey, and Virginia (Table 24). Within these states, the most impacted counties are: Massachusetts — Suffolk; North Carolina - Pamlico and Carteret; New Jersey — Cape May; New York — Suffolk; Rhode Island — Washington; and Virginia - Norfolk City. Within these counties, some individual ports have concentrations of vessels; in other cases only one or two vessels may be found per port but the overall number in the county is large. Some individual ports with large numbers of impacted vessels are: Boston, Massachusetts, Atlantic, Beaufort/Morehead, and Wanchese, North Carolina; Cape May, New Jersey; Montauk and New York, New York; Philadelphia, Pennsylvania; Point Judith, Rhode Island; and Norfolk, Virginia. The communities having larger numbers of impacted vessels also have larger total numbers of vessels. The proportion that may be impacted thus may be lower. This effect may mitigate the impacts on the community as a whole.

Table 24. Distribution of all impacted vessels (holding permits for FLK, SCP, and BSB) by state, county and h-port, from 1999 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
Connecticut	New London		3
Delaware	Sussex		4
Massachusetts	Barnstable		11
	Bristol	New Bedford	7
		Fairhaven	3
		Other	1
	Plymouth		3
	Suffolk	Boston	35
Maryland	Worcester	Ocean City/ West Ocean City	10
North Carolina	Carteret	Atlantic	6
		Beaufort/Morehead	8
		Other	3

	Craven	New Bern	3
	Dare	Wanchese	10
		Other	3
	Hyde	Swanquarter	3
		Other	1
	Pamlico	Bayboro	4
		Lowland	6
		Oriental	3
		Vandamere	3
		Other	2
New Jersey	Atlantic	Atlantic City	3
		Other	1
	Cape May	Cape May	21
		Other	2
	Monmouth	Belford	7
		Other	1
	Ocean	Point Pleasant	9
New York	Kings		4
	Nassau	New York	9
		Other	1
	Suffolk	Montauk	32
		New York	41
		Shinnecock/Hampton Bays	7
		Other	5
Pennsylvania	Philadelphia	Philadelphia	12
Rhode Island	Newport		3
	Providence	Providence	5
	Washington	Narragansett	3
		Point Judith	29
		Wakefield	8
		Other	5

Virginia	New Port News City	New Port News	3
	Norfolk City	Norfolk	29
	Virginia Beach City	Virginia Beach	10
West Virginia	Berkeley	Falling Waters	3

7.0 ESSENTIAL FISH HABITAT ASSESSMENT

Summer flounder, scup and black sea bass have Essential Fish Habitat (EFH) designated in many of the same bottom habitats that have been designated as EFH for most of the MAFMC managed species of surfclams/ocean quahogs, squid/mackerel/butterfish, bluefish, and dogfish, as well as the NEFMC species of groundfish within the Northeast Multispecies FMP, including: Atlantic cod, haddock, monkfish, ocean pout, American plaice, pollock, redfish, white hake, windowpane flounder, winter flounder, witch flounder, yellowtail flounder, Atlantic halibut and Atlantic sea scallops. Numerous species within the NMFS Highly Migratory Species Division and the SAFMC have EFH identified in areas also identified as EFH for summer flounder, scup and black sea bass. Broadly, EFH is designated as the pelagic and demersal waters along the continental shelf from off southern New England through the south Atlantic to Cape Canaveral, Florida. Specifically, the definitions as approved in Amendment 12 (MAFMC 1999) are:

Identification and Description

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. 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. 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. 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 ELMR database, 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. 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. 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 for the "mixing" and "seawater" salinity zones. 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 ^{o}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. 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 for the "mixing" and "seawater" salinity zones. 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 for the "mixing" and "seawater" salinity zones. In general scup eggs are found from May through August in southern New England to coastal Virginia, in waters between 55 and 73 ^{o}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 for the "mixing" and "seawater" salinity zones. In general scup larvae are most abundant nearshore from May through September, in waters between 55 and 73 ^{o}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. 2) Inshore, EFH is the estuaries where scup are identified as being common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. 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. 2) Inshore, EFH is the estuaries where scup were identified as being common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. 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 for the "mixing" and "seawater" salinity zones. 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. 2) EFH also is estuaries where black sea bass were identified as common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. 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. 2) Inshore, EFH is the estuaries where black sea bass are identified as being common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. Juveniles are found in the estuaries in the summer and spring. 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. 2) Inshore, EFH is the estuaries where adult black sea bass were identified as being common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones. 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 ^{o}F seem to be the minimum requirements. Structured habitats (natural and man-made), sand and shell are usually the substrate preference.

Fishing impacts to summer flounder, scup, and black sea bass EFH

Auster and Langton (1998) state that, "One of the most difficult aspects of estimating the extent of fishing impacts on habitat is the lack of high resolution data on the distribution of fishing effort." Currently, there is no way to fully gauge the present intensity and severity of mobile gear in contact with the bottom (bottom otter trawl, clam dredge, scallop dredge, and dredge-other), therefore these gears are characterized as having a "potential adverse impact" on summer flounder, scup, and black sea bass EFH (MAFMC 1999). The types of habitat in which these gears are fishing and with what kind of intensity is unquantified in the Mid-Atlantic. Auster and Langton (1998) cite studies that indicate that mobile clam dredges, traps and pots being drug and dropped, and bottom otter trawls coming into contact with the bottom have impacted structural habitat, community structure, and ecosystem process. They also cite several conceptual models to determine the impacts of gears on different types of habitat. However, without high resolution data on fishing effort and the habitat complexity that is being fished, it is currently difficult to predict impact of these gears.

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 and are important to these species are as follows:

Summer Flounder: pelagic waters, demersal waters, saltmarsh creeks, sea grass beds, mudflats, open bay areas

Scup: demersal waters, sands, mud, mussel and eelgrass beds

Black Sea Bass: pelagic waters, structured habitat (e.g. sponge beds), rough bottom shellfish, sand and shell

Both mobile and stationary gear are characterized as having a potential impact on summer flounder, scup, and black sea bass EFH. Auster and Langton (1998) cited studies that indicate impacts mobile gear on the structural components and community structure in both long- and short- terms, of these habitat types. Stationary gears such as pots, traps, and gill nets can continue to fish once they are lost, i.e., ghost gear. The impact of ghost gear is also poorly quantified, therefore these gears are also characterized as having a "potential adverse impact" on summer flounder, scup, and black sea bass EFH (MAFMC 1999).

Options for Managing Adverse Effects from Fishing

According to section 600.815 (a)(3) 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.

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.

The Council designated both mobile bottom gear and stationary gear as having a potential adverse impact (MAFMC 1999) on summer flounder, scup, and black sea bass EFH. The Council has implemented many regulations in the past that have indirectly acted to reduce impacts to habitat. Since numerous regulations are already in place, the Council is not presently planning on implementing any additional management measures associated with these proposed quotas. The Council will implement new management measure to reduce habitat impacts, if data become available that indicate that current measures are inadequate to reduce impact to habitat. The Council can propose management measures through the framework procedures described in Section 3.1.1.7 (MAFMC 1999) at any time and must review all of their EFH at least every 5 years.

Currently, there are 32 stocks managed by NEFMC, MAFMC, and SAFMC in the Atlantic Ocean that are designated as overfished (NMFS 1998). All of NMFS's HMS species with the exception of the group "pelagic sharks" are overfished. These designations result in a general reduction of fishing effort from Maine through Florida in order to rebuild these stocks. This reduction of effort translates into less of an impact on habitat throughout the western Atlantic coast.

In addition to a general reduction of fishing effort there are other mechanisms in place to reduce the impact of bottom otter trawls and other types of bottom mobile gear on habitat. The summer flounder, scup, and black sea bass FMP includes a mechanism to implement Special Management Zones (SMZ) which allows the restriction of certain types of fishing gear that are not compatible with artificial reefs or fish attraction devices permitted by the Army Corps of Engineers. In addition, the Council is proposing regulated mesh areas for scup in the year 2000 to reduce scup discards. The tilefish FMP proposes to close an area to trawling that intersects with EFH for summer flounder, scup, and black sea bass beyond 300 feet. The preferred alternative would prohibit directed tilefish fishing with bottom tending mobile gear in statistical areas 616 and 537 between 300 and 850 feet. In addition, any other gear in those areas must be modified to reduce bottom habitat impacts.

Dredges accounted for 79% of the MAFMC landings from Maine through North Carolina in 1997. The surfclam and ocean quahog fisheries are managed under an Individual Transferable Quota (ITQ) system. 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 surfclamming vessels, by 1995 that number had fallen to 37. The number of ocean quahog vessels decreased from 59 in 1979 to 36 in 1995. Many vessels fish for both surfclams and ocean quahogs and in fact the total number of clam dredge vessels that fished in 1998 was only 47.

Some discussions of various gear impacts on bottom in the Mid-Atlantic region has been presented to the Council over the past several years. It is because of this anecdotal information that the Council is considering that all mobile gear coming into contact with the seafloor within summer flounder, scup, and black sea bass EFH is characterized as having a potential impact on their EFH

(MAFMC 1999). However, the effort of these bottom tending gears is largely unquantified from data that are presently collected by the NEFSC as summarized by Auster and Langton (1998). Dr. Joe DeAlteris (University of Rhode Island) is presently attempting to synthesize the historical (1983 to 1993) fishing effort data by area and hopes to have this project complete in the next two years. When specific gear-effort data by area are available the Council will review them and consider whether additional specific management measures will be useful.

The requirement concerning gear impact management is to the extent practicable given the evidence that the fishing practice is having an identifiable adverse effect. The Council feels strongly that very little evidence was provided in the synthesis document of Auster and Langton (1998) relative to identifiable adverse effects to EFH in FMPs managed by this Council at this time. Fishing gear impacts along with the description and identification of EFH are frameworked management measures which can easily and readily be changed as more information becomes available (MAFMC 1999). The Council feels it would be premature, given the lack of identifiable adverse effects of gear impacts to these managed species EFH, to propose gear management measures at this time. The Council will consider implementing management measures to protect EFH if and when adverse gear impacts are identified.

In summary, the proposed quotas for summer flounder, scup, and black sea bass, for 2000, are identical to those for 1999 and therefore should cause no change in any habitat impacts. The proposed regulated mesh areas for scup include areas of EFH for summer flounder, scup, and black sea bass. These regulations would benefit summer flounder, scup, and black sea bass EFH by reducing fishing effort in these habitats. Therefore, the MAFMC has determined that these actions will have no more than minimal adverse impact upon the listed EFH.

8.0 List of agencies and persons consulted in formulating the action

The summer flounder, scup and black sea bass specifications were submitted to the National Marine Fisheries Service (NMFS) by the Mid-Atlantic Fishery Management Council and the Atlantic States Marine Fisheries Commission.

9.0 List of preparers of the environmental assessment

This environmental assessment was prepared by the Mid-Atlantic Council and the Northeast Regional Office of NMFS, and is based, in part, on information provided by the Northeast Fisheries Science Center (Center).

10.0 Finding of no significant environmental impact

Having reviewed the environmental assessment and the available information relating to the action, I have determined that there will be no significant adverse environmental impact resulting from the action and that preparation of an environmental impact statement on the action is not required by Section 102(2)(c) of the National Environmental Policy Act or its implementing regulations.

_____ _____

Assistant Administrator for Fisheries, NOAA

Date

OTHER APPLICABLE LAWS

1.0 PAPERWORK 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.

The Council is not proposing measures under this regulatory action that require review under PRA. There are no changes to existing reporting requirements previously approved under OMB Control Nos. 0648-0202 (Vessel permits), 0648-0229 (Dealer reporting) and 0648-0212 (Vessel logbooks). However, the request for an experimental fishing exemption has been approved by OMB under control number 0648-0309. Public reporting burden for this collection of information is estimated to average 1 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

Currently, all summer flounder, scup and/or 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 summer flounder, scup, 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. The owner of any party or charter boat issued a summer flounder or scup permit other than a moratorium permit and carrying passengers for hire shall maintain on board the vessel, and submit, an accurate daily fishing log report for each charter or party fishing trip that lands summer flounder or scup, unless such a vessel is also issued another permit that requires regular reporting, in which case a fishing log report is required for each trip regardless of species retained. These reporting requirements are critical for monitoring the harvest level of these fisheries.

2.0 RELEVANT FEDERAL RULES

This action will not duplicate, overlap or conflict with any other Federal rules.

REGULATORY IMPACT REVIEW, AND INITIAL REGULATORY FLEXIBILITY ANALYSIS

1.0 INTRODUCTION

The National Marine Fisheries Service (NMFS) requires the preparation of a Regulatory Impact Review (RIR) for all regulatory actions that either implement a new Fishery Management Plan (FMP) or significantly amend an existing plan. 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 (E.O.) 12866.

Also included is an Initial Regulatory Flexibility Analysis (IRFA). This analysis is being undertaken in support of a complete analysis for the 2000 specifications for fishing for summer flounder, scup and black sea bass. A complete description of the need for, and objectives of, this rule can be found in the Introduction of the EA. The legal basis of this rule can be found in section 1.0 of the EA.

2.0 EVALUATION OF E.O. 12866 SIGNIFICANCE

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 is developed and interim actions (framework adjustments or quota specifications) 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 was largely qualitative in nature. Given the fact that the black sea bass quota was implemented for the first time in 1998 it is too early to determine whether or not the black sea bass objectives are being met. Nevertheless, assessment of the black sea bass quota indicates that in 1988 landings were within the quota specifications. In addition, preliminary assessment of the 1999 fishing season indicate that 1999 landings will be within the overall quota specifications (assuming that overages do not occur in the fourth quarter; See section 3.1 below) so there is a reasonable expectation that the management objectives will be met and the expected economic benefits will not be compromised.

The economic effects of the scup effort reductions were evaluated at the time scup was added to the FMP through Amendment 8. The expected economic benefits and costs for the scup effort reduction were also described in qualitative terms. Similar to black sea bass, the coastwide scup quota has only been implemented for 1997, 1998, and 1999. Preliminary assessment of the 1999 fishing season indicate that 1999 landings will be approximately 17 percent over the quota specification. Thus, it is too early to determine whether or

not the management objectives for scup are being met. At this time, the plan objectives appear to be met so there is a reasonable expectation that the expected economic benefits of managing scup will not be compromised. However, overages must be brought in control in order to meet the benefits of the proposed management objectives. Attainment of the management objectives may require more rigorous actions to reduce effort than what has been adopted to date.

The economic benefits of the summer flounder effort reduction were last formally analyzed in 1995 for Amendment 7 to the Summer Flounder FMP. Amendment 7 revised the effort reduction schedule established in Amendment 2 to the Summer Flounder FMP. The economic analysis was limited to an estimate of gross revenues from the sale of summer flounder projected over a six-year period (1995-2000) at the selected effort reduction schedule. The estimated present value of gross revenues were $77 million at a discount rate of 7 percent. This estimate was predicated on known stock conditions at the time and an effort reduction schedule that would reduce fishing mortality to the target rate of F=0.24 by 1996 and continuing through 2000.

Summer flounder fishing mortality rate declined from 0.89 in 1995 to 0.52 in 1998 but is still in excess of the target and threshold F of 0.26. Note that the latter rate is approximately equal to the effort reduction targets established under Amendment 7. Given these estimates of fishing mortality rates, the 2000 quota specifications are below that projected in Amendment 7 and if the fishing mortality rates continue to remain above the target rate, quota specifications will have to continue to lie below projected quotas in Amendment 7. This means that current and future benefit streams from summer flounder may differ from earlier assessments upon which the present effort reduction schedule was based. The essence of the management plan remains in place and the conservation targets have not changed so the opportunity to achieve the intended conservation and economic objectives remain intact. In addition to this, preliminary assessment of the 1999 fishing season indicate that 1999 landings will be approximately 0.5 percent above the 1999 quota.

In addition to the potential deviation from projected benefits, the state-by-state quota system has introduced a number of unanticipated costs associated with constraining the derby effects of the quota system. These costs are largely comprised of a variety of transactions costs associated with administering, monitoring and enforcing openings and closings, trip limits and other measures that have been implemented in an attempt to spread out available quota throughout the year.

The proposed action does not constitute a significant regulatory action under E.O. 12866 for the following reasons. First, it will not have an annual effect on the economy of more than $100 million. Based on unpublished NMFS weighout data (Maine-North Carolina) the total commercial value in 1998 was estimated at $18.7 million for summer flounder, $6.1 million for scup, and $4.4 million for black sea bass. Assuming 1998 exvessel prices, the proposed quotas for 2000 (after overages have been applied) would decrease summer flounder, scup, and black sea bass revenues by $0.11 million, $0.38 million, and $0.38 million, respectively, relative to 1999 quotas. As such, the overall net change in exvessel revenue from the proposed quotas is projected to decrease by about $1.8 million. The proposed regulated mesh area alternative is projected to reduce exvessel revenue in the herring, mackerel, black sea bass, whiting, and *Loligo* fisheries by $0.004 million, $0.35 million, $0.02 million, $0.15 million, and $1.26 million, respectively. Based on unpublished NMFS weighout data (Maine-North Carolina) the total commercial

value in 1998 for herring, mackerel, whiting, and *Loligo* were $10.8 million, $4.7 million, $17.9 million, and $32.2 million, respectively. However, as it was indicated in section 6.7 of the EA, the decrease in landings associated with these species as a consequence of the proposed regulated mesh area measure is expected to be minimal as vessels can redirect effort into other areas. As such, it is likely that most of these revenues will be recouped as vessels redirect effort into these other areas. The measures considered in this quota paper will not affect total revenues generated by the commercial sector to the extent that a $100 million annual economic impact will occur in any of these fisheries. The actions are necessary to advance the recovery of these stocks, and to establish the harvest of these species at sustainable levels. 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 summer flounder, scup or black sea bass fisheries 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 E.O. 12866.

3.0 INITIAL REGULATORY FLEXIBILITY ANALYSIS

3.1 INTRODUCTION AND METHODS

The Regulatory Flexibility Act (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 2000 quotas could affect any vessel holding an active Federal permit for summer flounder, scup, or black sea bass as well as vessels that fish for any one of these species in state waters. Data from the Northeast permit application database shows that as of September 10, 1999 there were 1,899 vessels that were permitted to take part in the summer flounder, scup, and/or black sea bass fisheries (both commercial and charter/party sectors). These permitted vessels may be further categorized depending upon which permits or combinations of permits that were held. Table 2 reports the number of vessels for all possible combinations of permits. The proposed measure regarding the regulated mesh areas could affect any vessel fishing in the proposed regulated mesh areas. It was estimated that approximately 172 vessels (1998 VTR data) would be affected by the proposed regulated mesh areas (section 5.1.3 of the IRFA for details). 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 1,056 commercial vessels that are actively participating in these fisheries (Table 25). An active participant was defined as being any vessel that reported having landed one or more pounds of any one of the three species in the Northeast dealer data during calendar year 1998. 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 summer flounder, scup, or black sea bass permit; a vessel that holds a valid Federal permit but no summer flounder, scup or black bass permit; a vessel that holds a Federal permit other than summer flounder, scup, or black sea bass and fishes for those 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 vessels reported in Table 25, 264 commercial vessels did not hold a valid Federal permit for scup, black sea bass, or summer flounder during calendar year 1999. Note that in a manner similar to that of Table 2 these active vessels are also reported by all possible combinations of reported landings.

In the present IRFA the primary unit of observation for purposes of performing a threshold analysis is vessels that participated in any one or more of the three fisheries (summer flounder, scup, and black sea bass) during calendar year 1998 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 four ways to represent four potential quota “scenarios.” The first analysis (scenario) examined the measures recommended by the Council for each of the three species. The second scenario considered the measures proposed by the Monitoring Committee for the respective fisheries. Since the Council’s summer flounder and scup recommendations differ from that of the Monitoring Committee, the analysis considers the same black sea bass harvest levels as Scenario 1. The third and fourth alternatives looked at the highest quotas (least restrictive) and the lowest quotas (most restrictive) considered, respectively. Cumulative impacts were examined because many of the vessels active in these fisheries participate in one or even all three of these fisheries (section 4.2 of the EA). Actions in one fishery, e.g. a decrease in quota, could have an impact on levels of participation in other fisheries. A full description of these scenarios is given in sections 4 and 5, below.

Procedurally, the economic effects of the quota scenarios 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 summer flounder, scup, or black sea bass in calendar year 1998. The fact that individual owners' business organization may differ from one another is reflected in the different combinations of species landed by these vessels. Thus, for purposes of the threshold analysis, active vessels were grouped into seven classes or tiers (Table 25) based on combinations of summer flounder, scup and black sea bass landings. In this manner, the original universe of vessels is treated as seven distinct "sub-universes" with a separate threshold analysis conducted for each. 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 1998. This estimate provides the base from which subsequent quota changes and their associated effects on vessel revenues were compared. Since 1998 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 1999 were not used in this analysis because the year is not complete. As such, 1998 data were used as a proxy for 1999.

The third step was to deduct or add, as appropriate, the expected change in vessel revenues depending upon which of the four quota scenarios were evaluated. This was accomplished by estimating proportional reductions or increases in the four quota scenarios versus the base quota year 1998 (1999 proxy). Notice that the proposed quotas under Scenario 1 are identical to that of the 1999 quotas. If there were no overages during the 1999 calender year then fishermen would have the same fishing opportunities in 2000 as in 1999. However, landings to date, indicate that there will be overages in the summer flounder, scup, and black sea bass commercial fisheries. The estimated overages were used to adjust the final 2000 quotas to reflect the expected fishing opportunities. NMFS quota summary reports at the time this analysis was conducted (November 1, 1999) indicate that in the scup fishery an overage of 61,347 lbs (5.4%) and 298,074 lbs (30.2%) occurred during Winter 1 and Summer periods, respectively; in the black sea bass fishery an overage of 172,525 lbs (19.5%) and 54,415 lbs (19%) occurred during Quarters 2 and 3, respectively; and in the summer flounder fishery an overage of 38,362 lbs (5.1%) occurred in Massachusetts. In addition to Massachusetts, Maine has also minor summer flounder overages (about 1,400 lbs). The overage from Maine was not included in the analysis. However, since this overage is small it is not expected that it will have significant effects regarding the results presented in this IRFA. Vessel landings and revenues of summer flounder, scup, and black sea bass were prorated by state (summer flounder) or period (scup and black sea bass) according to the proportional change in quota in each state (summer flounder) or periods (scup and black sea bass) (section 4.0 below). In addition to this, for the purpose of estimating the 2000 quotas and revenue changes, the following assumptions were made: a) that the states with overages at the time of the analysis will harvest no additional summer flounder, and that the industry will fully harvest, and not exceed, the remaining 1999 state allocations; b) that the scup overages that occurred in

the Winter 1 and Summer periods will remain and that the industry will fully harvest, and not exceed, the remaining 1999 allocation; and c) that the black sea bass underages in Quarter 1 and overages in Quarters 2 and 3 will remain, and that the industry will fully harvest, and not exceed, the remaining 1999 allocation.

The fourth step was to divide the estimated 2000 revenues from all species by the 1998 base revenues for every vessel in each of the classes. 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. For each quota scenario a summary table was constructed that report the results of the threshold analysis by class. 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. Each profile was based on impacts under quota Scenario 4 - the most restrictive possible alternative. Scenario 4 was chosen to identify impacted counties because it would identify the maximum number possible and thus include the broadest possible range of counties in the analysis. Counties included in the profile had to meet the following criteria: the number of impacted vessels (vessels with revenue loss exceeding 5 percent) per county was either greater than 4, or all impacted vessels in a given state were from the same home county.

Based on these criteria, a total of 26 counties-make changes were identified: New London County, CT; Sussex County, DE; Barnstable, Bristol, Dukes, and Plymouth Counties, MA; Worcester County, MD; Beaufort, Carteret, Craven, Dare, Hyde, and Pamlico Counties, NC; Atlantic, Cape May, Monmouth, and Ocean Counties, NJ; Nassau and Suffolk Counties, NY; Newport and Washington Counties, RI; and Accomack, Hampton City, Isle of Wight, Norfolk and Virginia Beach Counties, VA. Counties not included in this analysis (e.g. in CT, ME, and NH) did not have enough impacted vessels to meet the criteria specified, i.e., there were less than 4 impacted vessels per county, or all impacted vessels in a state 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 EA) 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 1999 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, the zip code from the permit application file was matched against a National zip code data base to assign a home county.

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 include

summaries of landings, Federal permits, demographic statistics, and employment, wages, and number of establishments for each county.

Table 25. Numbers of vessels landing scup, black sea bass or summer flounder in 1998.

Landings Class	Landings Combinations	Commercial Vessels (#)
1	Scup Only	11
2	Black Sea Bass Only	150
3	Fluke Only	251
4	Scup/Black Sea Bass	87
5	Scup/Fluke	39
6	Black Sea Bass/Fluke	119
7	Scup/Black Sea Bass/Fluke	399
	Total	1056
Data from Northeast Region dealer data.		

4.0 DESCRIPTION OF QUOTA ALTERNATIVES OR SCENARIOS

All quota scenarios considered in this IRFA are based on three harvest levels for each of the species (a high, medium, and low level of harvest). These recommendations, and their impact relative to the 1998 landings, are shown in Table 26. As it was discussed in section 3.1 of the RIR, the proposed quotas under Scenario 1 are identical to that of the 1999 quotas. As such, if there were no overages during the 1999 calender year then fishermen would have the same fishing opportunities in 2000 an in 1999. Table 27 shows the proposed quota specifications as a proportion of the 1999 quotas. Estimated overages for 1999 were used to adjust the final 2000 quotas which reflect expected fishing opportunities. Table 28 shows the percentage change of the 2000 allowable commercial landings relative to 1999 quotas. The analysis for comparison in this IRFA was conducted employing adjusted final 2000 quotas.

Table 26. 2000 quota recommendations for each alternative versus the 1998 landings.

	Commercial Quota Recommendations	1998 Weighout Landings	2000 Quota as a Percent of 1998 Landings
Summer Flounder			
Preferred Alternative	11,111,298	11,208,758	99.13
Technical Recommendation	10,089,000	11,208,758	90.00
Non-Selected Alternative 1	8,898,027	11,208,758	76.71
Non-Selected Alternative 2	13,227,736	11,208,758	118.01
Scup			

Preferred Alternative	2,534,160	4,171,844	60.74
Technical Recommendation	2,497,000	4,171,844	59.85
Non-Selected Alternative 1	324,000	4,171,844	7.77
Non-Selected Alternative 2	3,510,000	4,171,844	84.14
Black Sea Bass			
Preferred Alternative	3,024,742	2,559,788	118.16
Technical Recommendation	3,024,742	2,559,788	118.16
Non-Selected Alternative 1	1,400,000	2,559,788	54.69
Non-Selected Alternative 2	4,527,600	2,559,788	176.87

Table 27. Comparison of the scenarios of quota combinations reviewed. “FLK” is summer flounder.

	Commercial Quota	**Quota Specification as a Proportion of the 1999 Quotas**	**Percent Change**
Quota Scenario 1			
FLK Preferred Alternative	11,111,298	1	0
Scup Preferred Alternative	2,534,160	1	0
Black Sea Bass Preferred Alternative	3,024,742	1	0
Quota Scenario 2			
FLK Technical Recommendation	10,089,000	0.91	-9.20
Scup Technical Recommendation	2,497,000	0.96	-1.47
Black Sea Bass Preferred Alternative	3,024,742	1	0
Quota Scenario 3 (Least restrictive)			
FLK Non-Selected Alternative 2	13,227,736	1.19	19.05
Scup Non-Selected Alternative 2	3,510,000	1.39	38.51
Black Sea Bass Non-Selected Alternative 2	4,527,600	1.50	49.69
Quota Scenario 4 (Most restrictive)			
FLK Non-Selected Alternative 1	8,598,027	0.774	-22.62
Scup Non-Selected Alternative 1	324,000	0.123	-87.21
Black Sea Bass Non-Selected Alternative 1	1,400,000	0.463	-53.72

Table 28. Percentage changes associated with allowable commercial landings for various scenarios in 2000 relative to 1999 quotas*.

	Overages	Total Reductions Including Overages		
Geographic Area or Time Period	**Quota Scenario 1**	**Quota Scenario 2**	**Quota Scenario 3 (Least restrictive)**	**Quota Scenario 4 (Most restrictive)**
Summer Flounder				
States other than MA	0%	-9.20%	19.05%	-22.62%
MA	-5.10%	-14.30%	13.95%	-27.72%
Aggregate Change	-0.35%	-9.55%	18.70%	-22.96%
Scup				
Winter 1	-5.40%	-6.87%	33.11%	-92.61%
Summer	-30.20%	-31.67%	8.31%	-100%
Winter 2	0%	-1.47%	38.51%	-87.21%
Aggregate Change	-14.18%	-15.64%	24.32%	-100%
Black Sea Bass				
Quarter 1	0%	0%	49.69%	-53.7%
Quarter 2	-19.50%	-19.50%	30.19%	-73.22%
Quarter 3	-19.00%	-19.00%	30.69%	-72.71%
Quarter 4	0%	0%	49.69%	-53.72%
Aggregate Change	-8.02%	-8.02%	41.66%	-61.74%

4.1 QUOTA SCENARIO 1

Scenario 1 analyzes the cumulative impacts of the harvest limits recommended by the Council and Board for summer flounder, scup, and black sea bass on vessels that are permitted to catch any of these three species. Harvest limits were recommended to best achieve the target fishing mortality or exploitation rates specified in each fisheries respective rebuilding schedule.

Specifically, this scenario examines the impacts on industry that would result from a TAL 18.52 million lb for summer flounder (11.07 million lb commercial; 7.41 million lb recreational); a TAL 3.77 million lb for scup (2.27 million lb commercial; 1.24 million lb recreational), and a TAL 6.17 million lb for black sea bass (2.79 million lb commercial; 3.15 million lb recreational). Notice that the commercial allowable landings presented here and in the next 3 scenarios have been adjusted to account for overages in 1999.

Regulated mesh area - Alternative 1

As indicated in the analysis presented in section 6.3.4 of the EA, the preferred alternative would reduce landings of herring, mackerel, black sea bass, whiting, and *Loligo* by 0.07 million lb (0.32 million kg), 2.03 million lb (0.92 million kg), 0.12 million lb (0.05 million kg), 0.34 million lb (0.15 million kg), and 1.63 million lbs 0.74 million kg), respectively.

4.2 QUOTA SCENARIO 2

Scenario 2 differs from Scenario 1 in that its analysis of cumulative impacts includes the summer flounder and scup harvest limits recommended by the Monitoring Committee. The Monitoring Committee recommendation includes the same black sea bass harvest levels as in Quota Scenario 1. Therefore, Scenario 2 includes the Monitoring Committee's recommendation for summer flounder of a 16.82 million lb TAL (10.05 million lb commercial, 6.73 million lb recreational), a TAL of 3.90 million lb for scup (2.50 million lb commercial; 1.24 million lb recreational), and a TAL of 6.17 million lb for black sea bass (2.79 million lb commercial; 3.15 million lb recreational).

4.3 QUOTA SCENARIO 3 (Least restrictive)

Scenario 3 analyzes the cumulative impacts of the least restrictive possible harvest levels - those that would result in the least reductions (or greatest increases) in landings (relative to 1999) for all species. These limits resulted in the highest possible landings for 2000, regardless of their probability of achieving the biological targets. Thus, this scenario includes non-selected alternatives for all three species. Specifically, this scenario considers a TAL of 22.05 million lb for summer flounder (13.19 million lb commercial; 8.82 million lb recreational), a 3.51 million lb commercial quota for scup (0.98 million lb recreational), and a 9.24 million lb TAL for black sea bass (4.30 million lb commercial; 4.71 million lb recreational) in 2000.

4.4 QUOTA SCENARIO 4 (Most restrictive)

Scenario 4 analyzes the cumulative impacts of the most restrictive possible harvest levels - those that would result in the greatest in landings (relative to 1999) for all species. This scenario includes non-selected alternatives for all three species. Specifically, this scenario considers a TAL of 14.33 million lb for summer flounder (8.56 million lb commercial; 5.73 million lb recreational), a 0.06 million lb commercial quota for scup (1.24 million lb recreational), and a 2.86 million lb TAL for black sea bass (1.17 million lb commercial; 1.46 million lb recreational) in 2000.

5.0 ANALYSES OF IMPACTS OF ALTERNATIVES

For the purpose of analysis under the following scenarios, several assumptions must be made. First, average revenue changes noted in this analysis are made using 1998 dealer data and participation. In addition to this, 1999 permit files were used to describe permit holders in these fisheries. It is importance to mention, that, revenue changes for 2000 are dependent upon landings in 1999. This dependence occurs because the commercial quotas for all three species require that overages in the quota from the prior year to be deducted from the allocation in the current year. Hence, overages in 1999 will decrease the 2000 allocations. As such, for the purpose of analyzing the 2000 revenue changes, the assumptions made in section 3.1 of the IRFA regarding 1999 landings apply.

For the analyses themselves, reductions are estimated by examining the total revenue earned by an individual vessel in 1998, and comparing it to its potential revenue in 2000, given the 2000 harvest levels. Generally, the percent of revenue reduction for impacted 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.

The assumptions employed to analyzed the regulated mesh area alternatives are fully described in section 6.3.4 of the EA. Changes in landings associated with this alternative were estimated by applying projected reduction in landings based on sea sampling data (January 1989 thru April, combined) to total otter trawl landings in 1998 VTR data for all areas combined. Assuming that reductions in discards from sea sampling data are representative of reductions in discards in the VTR data, then, the estimated loss in revenue associated with this alternative represents an upper limit estimate. Given the data limitation identified in section 6.3.4 of the EA, it is not possible' to provide a description of the entities participating in these fisheries at the season/area level proposed in the alternative.

5.1 QUOTA SCENARIO 1

This scenario examines the impacts on industry that would result from total harvest limits for summer flounder, scup and black sea bass. To analyze the economic effects of this scenario, the total harvest limits specified in section 4.0 of the IRFA were employed.

The summer flounder specifications would result in an aggregate 0.4 percent decrease in allowable commercial landings relative to the 1999 quota and a 40.9 percent reduction in recreational harvest relative to 1998 landings (Tables 28 and 31). The scup specifications would result in an aggregate 14.2 percent decrease in allowable commercial landings and a 42.5 percent increase in recreational harvest relative to 1998 landings (Tables 28 and 32). The black sea bass specifications would result in an aggregate 8.0 percent increase in allowable commercial landings and a 178.8 percent increase in the recreational harvest relative to 1998 landings (Tables 28 and 33).

5.1.1 COMMERCIAL IMPACTS

5.1.1.1 Threshold Analysis for Participating Vessels

The results of the threshold analysis are reported in Table 29. Across all vessel classes a total of 115 vessels were projected to be impacted by revenue losses of 5 percent or greater. The economic impacts range from expected revenue losses on the order of 30 to 39 percent for a total of 2 vessels to no change in revenues (relative to 1999) for 264 of the 1056 vessels. The revenue losses occur in spite of the fact the proposed quotas under Scenario 1 are identical to that of the 1999 quotas. The reduction in revenues is attributed to the overages that are projected to occur in 1999. This is due to the decrease in fishing opportunities in 2000 versus 1999 associated with the overages. It is important to notice that even though overages were deducted in each of the three fisheries analyzed, not all vessel that

participated in these fisheries may be equally affected. This is because overages were deducted from specific time periods (scup and black sea bass) or area (summer flounder). For example, if a vessel only targets and landed black sea bass in Quarter 1, then this vessel would not be affected by the projected overage reductions in Quarters 2 or 3.

Table 29. Threshold analysis of revenue impacts for participating vessels, "FLK" is summer flounder, "BSB" is black sea bass, and "SCP" is scup.

Quota Scenario 1 Preferred Alternative				Increased Revenue (number)	No Change in Revenue (number)	Number of Impacted Vessels by Reduction Percentile (%)						
Class	Landings Combination	Total Vessels	Number of Vessels Impacted by ≥ 5 Reduction			<5	5-9	10-19	20-29	30-39	40-49	≥50
1	SCP Only	11	2	0	0	9	0	0	0	2	0	0
2	BSB Only	150	35	0	54	61	14	21	0	0	0	0
3	FLK Only	251	5	0	134	112	5	0	0	0	0	0
4	SCP/BSB	87	34	0	8	45	6	13	15	0	0	0
5	SCP/FLK	39	4	0	2	33	3	0	1	0	0	0
6	BSB/FLK	119	6	0	57	56	3	3	0	0	0	0
7	SCP/BSB /FLK	399	29	0	9	361	15	10	4	0	0	0
	Totals	1056	115	0	264	677	46	47	20	2	0	0

Impacts of the quotas provisions were examined relative to a vessel's home state as reported on the vessel's permit application (Table 30). "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 impacted vessels (revenue reduction >5%) by home state ranged from none in Florida to a high of 22 in New York. The larger number of impacted vessels in New York may be due to a relatively higher dependence on scup.

Table 30. Review of revenue impacts under quota Scenario 1, by home state.

State	Participating Vessels	Number of Vessels Impacted ≥5 percent	Increased Revenue (number)	No Change in Revenue (number)	Number of Impacted Vessels by Reduction Percentile (percent)						
					<5	5-9	10-19	20-29	30-39	40-49	≥50
CT	4	2	0	1	1	2	0	0	0	0	0
DE	6	3	0	2	1	1	2	0	0	0	0
FL	5	0	0	3	2	0	0	0	0	0	0

MA	212	13	0	17	182	6	4	3	0	0	0
MD	12	5	0	0	7	3	2	0	0	0	0
NC	82	2	0	37	43	1	1	0	0	0	0
NJ	98	5	0	30	63	3	2	0	0	0	0
NY	161	22	0	21	118	6	8	7	1	0	0
PA	24	5	0	8	11	3	2	0	0	0	0
RI	88	4	0	13	71	2	2	0	0	0	0
VA	90	13	0	49	28	2	11	0	0	0	0
OTHER[a]	9	1	0	3	5	0	1	0	0	0	0
NOT KNOWN[b]	265	NK	NK	NK	NK	NK	NK	NK	NK	NK	NK
Total	1056	85	0	184	532	29	35	10	1	0	0

[a]States with fewer than 4 vessels were aggregated.
[b]Vessels have shown landings of either of those three species in 1998, but do not hold any of the requisite Federal permits in 1999. These vessels may be fishing exclusively in state waters fisheries for those species, 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.

By virtue of holding a valid Federal permit for summer flounder, scup, or 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 specification whether or not they actually choose to engage in any one of the three (summer flounder, scup, or black sea bass) fisheries. 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.

5.1.2 RECREATIONAL IMPACTS

Landing statistics from the last several years show that recreational summer flounder landings have generally exceeded the recreational harvest limits (Table 31). In 1998, the recreational landings were 12.53 million lb. Under this scenario, the summer flounder 2000 recreational harvest limit would be 7.41 million lb. Thus, the harvest limit in 2000 would be a decrease of about 40.9 percent from 1998 recreational landings.

Table 31. Number of summer flounder recreational fishing trips, recreational harvest limit, and recreational landings from 1991 to 2000.

Year	Number of Fishing Trips[a]	Recreational Harvest Limit (million lb)	Recreational Landings of Summer Flounder (million lb)[b]
1991	4,645,993	None	7.96
1992	3,751,815	None	7.15
1993	4,829,252	8.38	8.83
1997	5,761,918	10.67	9.33

1995	4,742,194	7.76	5.50
1996	5,086,347	7.41	10.38
1997	5,620,055	7.41	11.86
1998	5,296,982	7.41	12.53
1999	N/A	7.41	N/A
2000	-	7.41	-

[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.
[b] From Maine to North Carolina. Source: MRFSS.
N/A = Data not available.

Scup recreational landings have declined over 89 percent for the period 1991 to 1999 (Table 32). The number of fishing trips has also declined over 86 percent for the same time period. This decrease in the recreational fishery has occurred both with and without any recreational harvest limits, and it is perhaps a result from the stock's being over-exploited and at a low biomass level. In addition, party/charter boats may be targeting other species that are relatively more abundant than scup (e.g., striped bass), thus accounting for the decrease in the number of fishing trips in this fishery. In 1998, recreational landings were 0.87 million lb. Under this scenario, the scup recreational harvest limit for 2000 would be 1.24 million lb. This is a 42.5 percent increase over the 1998 recreational landings. The proposed recreational harvest limit for 2000 is equal to the recreational harvest limit implemented in 1999.

Table 32. Number of scup recreational fishing trips, recreational harvest limit, and recreational landings from 1991 to 2000.

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	1.31
1996	145,814	None	2.24
1997	118,266	1.95	1.20
1998	105,283	1.55	0.87
1999	N/A	1.24	N/A
2000	-	1.24	-

[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. Estimates are not expanded. Source: MRFSS.
[b] From Maine to North Carolina. Source: MRFSS.
N/A = Data not available.

Black sea bass recreational landings and number of trips have increased slightly from the early 1990's to the present (Table 33). In 1998, recreational landings were 1.13 million lb. In 1998, the first recreational harvest limit was implemented at 3.15 million lb. Under this scenario, the black sea bass recreational harvest limit for 2000 would be 3.15 million lb. This recreational harvest limit is equal to the recreational limit implemented in 1998 and 1999. The 2000 recreational harvest limit represents an increase of 178.8 percent from the 1998 recreational landings.

Table 33. Number of black sea bass recreational fishing trips, recreational harvest limit, and recreational landings from 1991 to 2000.

Year	Number of Fishing Trips[a]	Recreational Harvest Limit (million lb)	Recreational Landings of BSB (million lb)[b]
1991	N/A	None	4.16
1992	218,700	None	2.64
1993	296,370	None	4.48
1994	265,402	None	2.98
1995	315,165	None	5.71
1996	282,972	None	6.04
1997	313,052	None	4.28
1998	N/A	3.15	1.13
1999	N/A	3.15	N/A
2000	-	3.15	-

[a] Number of fishing trips as reported by anglers in the intercept survey indicating that the primary species group sought was black sea bass, North Atlantic, Mid-Atlantic, and South Atlantic regions combined. Estimates are not expanded. Source: MRFSS.
[b] From Maine to Cape Hatteras, North Carolina. Source: MRFSS.
N/A = Data not available.

At the present time, there is neither behavioral nor demand data available to estimate how sensitive party/charter boat anglers might be to proposed fishing regulations. For example, in the summer flounder fishery, there is no mechanism to deduct overages directly from the recreational harvest limit. Any overages must be addressed by way of adjustments to the management measures. While it is likely that proposed management measures may restrict the recreational fishery for 2000, and these measures may cause some decrease in recreational satisfaction (i.e., low bag limit, larger fish size or closed

season), there is no indication that any of these measures would lead to a decline in the demand for party/charter boat trips. Currently, the market demand for this sector is relatively stable. It is unlikely measures will result in any substantive decreases in the demand for party/charter boat trips. It is most likely that party/charter anglers will target other species when faced with potential reductions in the amount of summer flounder that they are allowed to catch. As such, it is probable that the decrease in the summer flounder harvest limit, relative to the 1998 landings, will not have a substantial impact on the number of party/charter fishing trips.

5.1.3 EFFECTS OF REGULATED MESH AREAS

As indicated in sections 6.3.4 of the EA, the regulated mesh area alternatives would reduce landings of herring, mackerel, black sea bass, whiting, and *Loligo*. Estimates are derived by applying estimated reduction in landings based on sea sampling data (January 1989 thru April 1999, combined) and 1998 prices in NMFS General Canvass Data to total otter trawl landings in 1998 VTR data for all areas combined. It was necessary to use average prices from NMFS general canvass data when estimating changes in revenues because VTR data do not contain dollar values. Assuming that reductions in discards from sea sampling data are representative of reductions in discards in the VTR data, then the estimated losses in revenue associated with the alternatives represent upper limit estimates. The reductions in landings associated with the alternatives vary from $1.96 for Alternative 1, to $13.05 million for Alternative 6. Alternatives 2 through 5 would decrease exvessel revenue of participating entities in the amount of $4.52 million, $12.08 million, $9.85 million, and $2.22 million, respectively (Table 34).

For this analysis “affected entities” are identified as those vessels that fished with otter trawl gear with codend mesh less than 4.5 inches in regulated mesh areas, specifically, those specified under Alternatives 3 and 4 since those areas incorporate full statistical areas. According to 1998 VTR data, it is estimated that 171 and 172 vessels fished with that configuration in those areas. Since VTR data are not specified at the 10 minute square level nor does it include complete longitude and latitude information, it is not possible to identify the number of vessels that fished under the remaining alternatives. However, Alternatives 3 and 4 represent the most restrictive temporal-spatial limitations of all the alternatives evaluated. Thus, it is possible that these alternatives represent the upper limit of affected vessels under any specific alternative.

The affected entities can be categorized as follows: 12% of the vessels (20 vessels) are between 5 and 50 GRTs, 66% of the vessels (113 vessels) are between 51 and 150 GRTs, and 23% of the vessels (39) are larger than 151 GRTs. It is important to note that of the 20 vessels in the 5 to 50 GRTs range, only one vessel is between 11 and 15 GRTs, 7 vessels are between 23 and 33 GRTs, and the remaining 12 vessels are between 34 and 50 GRTs. Larger vessel often have more options than smaller vessels, due to increased range and more deck space for alternative gear configurations. This fact can help them to respond to mesh regulated areas more efficiently. It was estimated that approximately 97% (166 vessels) of the vessels by the regulated mesh areas are part of the universe of vessels that were identified as being participants of the summer flounder, scup, and/or black sea bass fisheries and were evaluated under the quota scenarios. In addition, it was also estimated that only one of the 172 vessels affected by the proposed regulated mesh area alternatives will also be impacted by revenue losses of 5 percent or greater due to the proposed 2000 summer flounder, scup, and black sea bass quotas detailed in quota scenario 1.

On average, each vessel would lose $11,372 under Alternative 1 ($1.96 million divided by 172 vessels). By the same factor, each vessel would lose $75,850 under Alternative 6. However, vessels that participate in these fisheries will likely redirect their effort into other areas that are open or the closed areas when they reopen and recouping any loss in revenues associated with the implementation of this alternative. As such, the number of vessels expected to be impacted by revenue losses of 5 percent or greater is likely to be minimal. However, impacts to profitability are possible if costs due to vessel operation increase.

As indicated in section 6.3.4 of the EA, there are various levels of revenue reductions and various levels of reductions in scup discards associated with each of the regulated mesh area alternatives. The Council and Commission preferred regulated mesh area Alternative 1 because it provides the largest reduction in scup discard while minimizing the loss in revenues due to regulated mesh area closures. Table 34 shows the Relative Performance Index associated with the proposed regulated mesh area alternatives. This relative index is estimated by dividing the percentage in scup discards associated with a specific alternative by the associated reduction in revenues. As such, the index provides a relative comparison among the various proposed alternatives. The higher the Relative Performance Index, the higher the percentage scup reduction relative to the reduction in revenues. According to this Relative Performance Index, the preferred regulated mesh area alternative (Alternative 1) would provide the largest reduction in scup discards while providing the lowest reduction in revenues followed by Alternatives 2, 5, 6, 3, and 4.

However, the Relative Performance Index of Table 34 (and similarly, the ratios shown in Table 14a) do no account for enforceability of an alternative. The recommended areas and times identified in Alternative 1 are extremely small and short in duration. Given the nature of the VTR and sea sampling data used to help determine these areas, it would be very unlikely that the small, two-week restricted gear areas identified in that alternative would have coincided with the seasonal migration of scup. Further, the small areas presented a considerable enforcement burden and limited conservation benefits because of the likelihood that harvesters would shift fishing operations to nearby areas where discards are still likely to occur. Alternative would establish larger gear areas that would remain closed to small mesh fisheries for longer periods of time. The areas provide for some shift of fishing operations, but into areas that have not been identified as areas where discards are still likely to occur.

Table 34. Relative Performance Index associated with the proposed regulated mesh area alternatives.

Alternatives	Reduction in Revenues[a] ($ million)	Reduction in Scup Discards[b] (%)	Relative Performance Index[c]
Alternative 1	1.957	34	17.37
Alternative 2	4.517	49	10.85
Alternative 3	12.081	28	2.32
Alternative 4	9.850	14	1.42
Alternative 5	2.220	13	5.86

Alternative 6	13.046	58	4.45

[a]Reductions in revenues taken from Table 14.
[b]Percentage reductions in scup discards taken from Table 13.
[c]Relative Performance Index is estimated by dividing the percentage reduction in scup discards by the associated reduction in revenues.

5.1.4 SUMMARY OF IMPACTS

In sum, the proposed quotas under Scenario 1 are identical to that of the 1999 quotas. However, due to projected overages in 1999, the final commercial quotas in 2000 will be lower than 1999 due adjustments in overages. Since overages were only deducted in Massachusetts for summer flounder, in Winter and Summer periods for scup, and in Quarters 2 and 3 for black sea bass, vessel that participated in those fisheries during any other time/area are not projected to be affected by revenue losses. In 2000, recreational landings would decrease in the case of summer flounder and increase in the case of scup and black sea bass (versus 1998 recreational landings).

Recreational landings for all three fisheries have fluctuated over the past several years. However, there are numerous alternative target species for the recreational sector. The number of trips targeting a given species in any given year is quite variable. In the aggregate, total number of recreational trips in the Mid-Atlantic region have remained stable, with a slight upward trend, since the early 1990s.

Under this scenario a total of 115 of the 1056 commercial vessels were projected to incur revenue losses of 5 percent or greater. Among affected entities, vessels that landed scup and black sea bass combined, black sea bass only, or scup only were proportionally more affected by revenue losses in excess of 5 percent when compared to vessels that landed summer flounder only, a combination of scup and summer flounder, a combination of black sea bass and summer flounder, or a combination of scup, black sea bass and summer flounder.

It is important to stress that these changes represent merely the potential, i.e., based on available data. Actual changes in revenue will likely vary. This variation would occur for several reasons, including impacts undetermined for unidentifiable vessels, revenues earned or lost due to trip limits and seasons set by a state to manage sub-allocations of quota, and unanticipated reductions in 2000 for quota overages in 1999 that were not accounted for here. These measures are specified in order to eliminate overfishing and to attain the rebuilding objectives specified in the FMP for summer flounder, scup and black sea bass.

Overall reductions in exvessel revenue associated with the proposed mesh area closures are projected to range from $1.96 million for the preferred alternative (Alternative 1) to $13.05 million for Alterative 6. A Relative Performance Index was developed to compare the potential reduction in scup discards associated with the various regulated mesh areas alternatives to the decrease in landings associated with them (see section 5.1.3 above). According to this Relative Performance Index, the preferred regulated mesh area alternative (Alternative 1) would provide the largest reduction in scup discards while providing the lowest reduction in revenues followed by Alternatives 2, 5, 6, 3, and 4. It is important to note that the associated decrease in landings can be recouped as vessel redirect effort will likely redirect their effort onto other areas that are open or closed areas when they

reopen, recouping any loss in revenues associated with the implementation of this alternative. However, impacts to profitability are possible if costs due to vessel operation increase.

5.2 QUOTA SCENARIO 2

This scenario examines the impacts on industry that would result from total harvest limits for summer flounder, scup and black sea bass. To analyze the economic effects of this scenario, the total harvest limits specified in section 4.0 of the IRFA were employed.

Under this scenario, the summer flounder specifications would result in an aggregate 9.6 percent decrease in allowable commercial landings relative to the 1999 quota and a 46.3 percent reduction in recreational harvest relative to 1998 landings (Tables 28 and 31). The scup specifications would result in an aggregate 15.6 percent decrease in allowable commercial landings relative to the 1999 quota and a 42.5 percent increase in recreational harvest relative to 1998 landings (Tables 28 and 32). The black sea bass specifications would result in an aggregate 8.0 percent reduction in allowable commercial landings relative to the 1999 quota and a 178.8 percent increase in the recreational harvest relative to 1998 landings (Tables 28 and 33). The black sea bass TAL is equivalent to the Council's proposed specifications for 2000. Again, this scenario makes the same assumptions about landings as are made in the previous analysis.

5.2.1 COMMERCIAL IMPACTS

5.2.1.1 Threshold Analysis for Participating Vessels

The results of the threshold analysis are reported in Table 35. Across all vessel classes a total of 231 vessels were projected to be impacted by revenue losses of 5 percent or greater. The economic impacts range from expected revenue losses on the order of 30 to 39 percent for 2 vessels that were predominantly engaged in scup fisheries to no change in revenues (relative to 1999) for 54 of the 1056 vessels. The majority of the revenue losses are attributed to quota reductions and overages associated with summer flounder and scup.

Table 35. Threshold analysis of revenue impacts for participating vessels, "FLK" is summer flounder, "BSB" is black sea bass, and "SCP" is scup.

Quota Scenario 2				Increased Revenue (number)	No Change in Revenue (number)	Number of Impacted Vessels by Reduction Percentile (%)						
Class	Landings Combination	Total Vessels	Number of Vessels Impacted by ≥ 5 Reduction			<5	5-9	10-19	20-29	30-39	40-49	≥50
1	SCP Only	11	2	0	0	9	0	0	0	2	0	0

2	BSB Only	150	35	0	54	61	14	21	0	0	0	0
3	FLK Only	251	38	0	0	213	29	9	0	0	0	0
4	SCP/BSB	87	34	0	0	53	5	14	15	0	0	0
5	SCP/FLK	39	11	0	0	28	5	5	1	0	0	0
6	BSB/FLK	119	18	0	0	101	14	4	0	0	0	0
7	SCP/BSB /FLK	399	93	0	0	306	69	18	6	0	0	0
	Totals	1056	231	0	54	771	136	71	22	2	0	0

Impacts of the quotas provisions were examined relative to a vessel's home state as reported on the vessel's permit application (Table 36). "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 impacted vessels (revenue reduction >5%) by home state ranged from none in Florida to a high of 35 in New York. The larger number of impacted vessels in New York may be due to a relatively higher dependence on scup.

Table 36. Review of revenue impacts under quota Scenario 2, by home state.
[a]States with fewer than 4 vessels were aggregated.

State	Participating Vessels	Number of Vessels Impacted ≥5 percent	Increased Revenue (number)	No Change in Revenue (number)	Number of Impacted Vessels by Reduction Percentile (percent)						
					<5	5-9	10-19	20-29	30-39	40-49	≥50
CT	4	3	0	0	1	3	0	0	0	0	0
DE	6	3	0	1	2	1	2	0	0	0	0
FL	5	0	0	0	5	0	0	0	0	0	0
MA	212	31	0	4	177	13	14	4	0	0	0
MD	12	8	0	0	4	6	2	0	0	0	0
NC	82	18	0	2	62	16	2	0	0	0	0
NJ	98	6	0	2	90	4	2	0	0	0	0
NY	161	35	0	5	121	17	10	7	1	0	0
PA	24	5	0	1	18	3	2	0	0	0	0
RI	88	17	0	3	68	15	1	1	0	0	0
VA	90	28	0	2	60	17	11	0	0	0	0
OTHER[a]	9	2	0	0	7	1	1	0	0	0	0
NOT KNOWN[b]	265	NK	NK	NK	NK	NK	NK	NK	NK	NK	NK
Total	1056	156	0	20	615	96	47	12	1	0	0

[a]States with fewer than 4 vessels were aggregated.
[b]Vessels have shown landings of either of those three species in 1998, but do not hold any of the requisite Federal permits in 1999. These vessels may be fishing exclusively in state waters fisheries for those species, 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.

By virtue of holding a valid Federal permit for summer flounder, scup, or 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 specification whether or not they actually choose to engage in any one of the three (summer flounder, scup, or black sea bass) fisheries. 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.

5.2.2 RECREATIONAL IMPACTS

Under this scenario, the summer flounder 2000 recreational harvest limit would be 6.73 million lb. This limit is a 46.3 percent decrease from 1998 recreational landings, and a 0.68 million lb decrease over the 1999 recreational harvest limit (Table 31). The scup recreational harvest limit for 2000 would be set equal to 1.24 million lb. This is a 42.5 percent increase over the 1998 recreational landings, and no change from the 1999 recreational harvest limit (Table 32). Finally, this scenario would set the black sea bass recreational harvest limit for 2000 at 3.15 million lb. This level represents a 178.8 percent increase from the 1998 recreational landings, and no change from the 1999 recreational harvest limit (Table 33).

In the summer flounder fishery, there is no mechanism to deduct overages directly from the recreational harvest limit, so any overages must be addressed by way of adjustments to the management measures. It is likely that management measures under this scenario would be required to restrict the recreational fishery for 2000 (compared to 1998 landings) and may cause some decrease in recreational satisfaction (i.e., low bag limit, larger fish size or closed season). However, there is no indication that any of these measures would lead to a decline in the demand for party/charter boat trips. Currently, the market demand for these sectors is relatively stable. It is unlikely these measures will result in any substantive decreases in the demand for party/charter boat trips.

At the present time, there is neither behavioral nor demand data available to estimate how sensitive party/charter boat anglers might be to proposed fishing regulations. It is most likely that party/charter anglers will target other species when faced with potential reductions in the amount of summer flounder and scup that they are allowed to catch. As such, it is not probable that the decrease in the summer flounder harvest limits, relative to the 1998 landings will have a substantial impact on the number of party/charter fishing trips.

5.2.3 SUMMARY OF IMPACTS

In sum, the proposed quotas under Scenario 2 for black sea bass is identical to that of the 1999 quotas. Proposed quotas for summer flounder and scup are 9.2 percent and 1.5 percent lower than the 1999 quotas, respectively. However, due to projected overages in 1999, the final commercial quotas in 2000 will be further lowered due to adjustments in overages. In 2000, recreational landings would decrease in the case of summer flounder and

increase in the case of scup and black sea bass (versus 1998 recreational landings).

Recreational landings for all three fisheries have fluctuated over the past several years. The number of trips targeting a given species in any given year is quite variable. In the aggregate, total number of recreational trips in the Mid-Atlantic region have remained stable, with a slight upward trend, since the early 1990s.

Under this scenario, a total of 231 of the 1056 commercial vessels were projected to incur revenue losses of 5 percent or greater. Among affected vessels that landed a combination of scup and black sea bass, or scup and summer flounder, or black sea bass only or a combination of scup, black sea bass and summer flounder were proportionally more affected in excess of 5 percent when compared to vessels that landed scup only, fluke only, or a combination of black sea bass and summer flounder.

The total harvest limits for summer flounder and scup analyzed under this scenario are more conservative than those presented in Scenario 1. More specifically, the commercial summer flounder harvest limit under this scenario is approximately 1 million lb lower than the limit specified under Scenario 1, and the scup commercial harvest limit is almost identical to that presented under Scenario 1. While these measures may present an improved probability of attaining the rebuilding objectives specified in the FMP, the negative economic impacts upon small entities would be higher than under Scenario 1.

The overall impacts associated with some vessels with certain landing combinations (scup only, black sea bass only, or a combination of the two) do not differ much from those in Scenario 1. However, negative economic impacts for vessels that harvested summer flounder alone or in combination with any of the other species were more severe under this scenario. This is due to the 1 million pound decrease in summer flounder quota. Therefore, since the impacts are greater, the benefits to the stocks do not appear to outweigh the impacts on small entities. To minimize the impacts on small entities, the Council chose not to propose this scenario.

It is important to stress that these changes represent merely the potential, i.e., based on available data. Actual changes in revenue will likely vary. This variation would occur for several reasons, including impacts undetermined for unidentifiable vessels, revenues earned or lost due to trip limits and seasons set by a state to manage sub-allocations of quota, and unanticipated reductions in 2000 for quota overages in 1999 that were not accounted for here.

5.3 QUOTA SCENARIO 3

This scenario examines the impacts on industry that would result from total harvest limits for summer flounder, scup and black sea bass. To analyze the economic effects of this scenario, the total harvest limits specified in section 4.0 of the IRFA were employed.

Scenario 3 represents the “least restrictive” alternative - those harvest levels considered that would allow the maximum to be harvested. The summer flounder specifications under this scenario would result in an aggregate 18.7 percent increase in allowable commercial landings relative to the 1999 quota and a 29.6 percent reduction in recreational harvest relative to 1998 landings (Tables 28 and 31). The scup specifications would result in an aggregate 24.3 percent increase in allowable commercial landings relative to the 1999

commercial quota and a 42.5 percent increase in recreational harvest relative to 1998 landings (Tables 28 and 32). The black sea bass specifications would result in an aggregate 41.6 percent increase in allowable commercial landings relative to the 1999 commercial quota and a 316.8 percent increase in the recreational harvest relative to 1998 landings (Tables 28 and 33). Again, this scenario makes the same assumptions about landings as are made in the previous analyses.

5.3.1 COMMERCIAL IMPACTS

5.3.1.1 Threshold Analysis for Participating Vessels

An analysis of these harvest limits indicates that no vessels would suffer revenue losses, in fact, all vessels will experience an increase in revenue (relative to 1999) regarding of the species landed (Table 37).

Table 37. Threshold analysis of revenue impacts for participating vessels, “FLK” is summer flounder, “BSB” is black sea bass, and “SCP” is scup.

Quota Scenario 3				Increased Revenue (number)	No Change in Revenue (number)	Number of Impacted Vessels by Reduction Percentile (%)						
Class	Landings Combination	Total Vessels	Number of Vessels Impacted by ≥ 5 Reduction			<5	5-9	10-19	20-29	30-39	40-49	≥50
1	SCP Only	11	0	11	0	0	0	0	0	0	0	0
2	BSB Only	150	0	150	0	0	0	0	0	0	0	0
3	FLK Only	251	0	251	0	0	0	0	0	0	0	0
4	SCP/BSB	87	0	87	0	0	0	0	0	0	0	0
5	SCP/FLK	39	0	39	0	0	0	0	0	0	0	0
6	BSB/FLK	119	0	119	0	0	0	0	0	0	0	0
7	SCP/BSB /FLK	399	0	399	0	0	0	0	0	0	0	0
	Totals	1056	0	1056	0	0	0	0	0	0	0	0

Impacts of the quotas provisions were examined relative to a vessel’s home state as reported on the vessel’s permit application (Table 38). “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 range of vessels projected to experience an increase in revenue is presented in Table 38.

Table 38. Review of revenue impacts under quota Scenario 3, by home state.

State	Participating Vessels	Number of Vessels Impacted ≥5 percent	Increased Revenue (number)	No Change in Revenue (number)	Number of Impacted Vessels by Reduction Percentile (percent)						
					<5	5-9	10-19	20-29	30-39	40-49	≥50
CT	4	0	4	0	0	0	0	0	0	0	0
DE	6	0	6	0	0	0	0	0	0	0	0
FL	5	0	5	0	0	0	0	0	0	0	0
MA	212	0	212	0	0	0	0	0	0	0	0
MD	12	0	12	0	0	0	0	0	0	0	0
NC	82	0	82	0	0	0	0	0	0	0	0
NJ	98	0	98	0	0	0	0	0	0	0	0
NY	161	0	161	0	0	0	0	0	0	0	0
PA	24	0	24	0	0	0	0	0	0	0	0
RI	88	0	88	0	0	0	0	0	0	0	0
VA	90	0	90	0	0	0	0	0	0	0	0
OTHER[a]	9	0	9	0	0	0	0	0	0	0	0
NOT KNOWN[b]	265	0	265	0	0	0	0	0	0	0	0
Total	1056	0	1056	0	0	0	0	0	0	0	0

[a]States with fewer than 4 vessels were aggregated.
[b]Vessels have shown landings of either of those three species in 1998, but do not hold any of the requisite Federal permits in 1999. These vessels may be fishing exclusively in state waters fisheries for those species, 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.

By virtue of holding a valid Federal permit for summer flounder, scup, or 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 specification whether or not they actually choose to engage in any one of the three (summer flounder, scup, or black sea bass) fisheries. 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 allow.

5.3.2 RECREATIONAL IMPACTS

Under this “least restrictive” scenario, the summer flounder 1999 recreational harvest limit would be 8.82 million lb. This level is a 29.6 percent decrease from 1998 recreational landings, and a 1.41 million lb increase over the 1999 recreational harvest limit. Under this scenario, the scup recreational harvest limit for 2000 would be 1.24 million lb. This is a 42.5 percent increase over the 1998 landings, and no change from the 1999 harvest limit. For black sea bass, the recreational harvest limit for 2000 would be 4.71 million lb, a 316.8 percent increase over the 1998 recreational landings, and 1.46 million lb over the 1999 recreational harvest limit.

It is likely that management measures proposed to restrict the recreational summer flounder fishery for 2000 (compared to 1998 landings) may cause some decrease in recreational satisfaction (i.e., low bag limit, larger fish size

or closed season). Given that the scup and black sea bass levels are projected to increase, it is not anticipated that restrictive measures would be required under this scenario. There is no indication that any of these measures would lead to a decline in the demand for party/charter boat trips. Given the relatively stable market demand that these sectors are experiencing, it is unlikely these measures will result in any substantive decreases in the demand for party/charter boat trips.

At the present time, there is neither behavioral nor demand data available to estimate how sensitive party/charter boat anglers might be to proposed fishing regulations. It is most likely that party/charter anglers will target other species when faced with potential reductions in the amount of summer flounder that they are allowed to catch. It is not probable that the decrease in the summer flounder harvest limits, relative to the 1998 landings, will have a substantial impact on the number of party/charter fishing trips, as the increased scup and black sea bass harvest limits will allow for greater recreational opportunities in those fisheries.

5.3.3 SUMMARY OF IMPACTS

Scenario 3 allow fishermen to land more summer flounder and black sea bass in 2000 versus 1999, 1998, and 1997. It would also allow fishermen to land more scup in 2000 versus 1999. Recreational landings would increase for scup and black sea bass (relative to 1998 landings) and decrease for summer flounder.

Recreational landings for all three fisheries have fluctuated over the past several years. The number of trips targeting a given species in any given year is quite variable. In the aggregate, total number of recreational trips in the Mid-Atlantic region have remained stable, with a slight upward trend, since the early 1990s.

The threshold analysis indicates that all 1056 commercial vessels were projected to incur revenue gain. This due to the fact that the quotas under this alternative are substantially higher than those established in 1999. The substantial increase in these quotas overcompensate for the reductions in landings due to overages in 1999.

These measures would allow for significant increases in the harvest of summer flounder and black sea bass. Neither limit for these species has a high probability of achieving the rebuilding goals of the FMP. Therefore, while this scenario may mitigate the impacts on small entities, it does not comport with the FMP. Therefore, this scenario was not proposed by the Council and Board.

It is important to stress that these changes represent merely the potential, i.e., based on available data. Actual changes in revenue will likely vary. This variation would occur for several reasons, including impacts undetermined for unidentifiable vessels, revenues earned or lost due to trip limits and seasons set by a state to manage sub-allocations of quota, and unanticipated reductions in 2000 for quota overages in 1999 that were not accounted for here. These measures are specified in order to eliminate overfishing and to attain the rebuilding objectives specified in the FMP for summer flounder, scup and black sea bass.

5.4 QUOTA SCENARIO 4

This scenario examines the impacts on industry that would result from total harvest limits for summer flounder, scup and black sea bass. To analyze the economic effects of this scenario, the total harvest limits specified in section 4.0 of the IRFA were employed.

Scenario 4 represents the “Most restrictive” alternative - those harvest levels considered that would allow the minimum to be harvested. The summer flounder specifications under this scenario would result in an aggregate 23.0 percent decease in allowable commercial landings relative to the 1999 quota and a 54.3 percent reduction in recreational harvest relative to 1998 landings (Tables 28 and 31). The scup specifications would result in an aggregate 100 percent decrease in allowable commercial landings relative to the 1999 commercial quota and a 42.5 percent increase in recreational harvest relative to 1998 landings (Tables 28 and 32). The black sea bass specifications would result in an aggregate 61.8 percent decrease in allowable commercial landings relative to the 1999 commercial quota and a 29.2 percent increase in the recreational harvest relative to 1998 landings (Tables 28 and 33). Again, this scenario makes the same assumptions about landings as are made in the previous analyses.

5.4.1 COMMERCIAL IMPACTS

5.4.1.1 Threshold Analysis for Participating vessels

An analysis of these harvest limits indicates that these most restrictive levels will result in greater than a five percent revenue loss for 510 of the commercial vessels subject to this rule (Table 39). Since commercial harvest limits for all three species will result in decrease landings in 2000 (relative to 1999 quotas), no landings combinations mitigate the potential impacts on participants as it occurred in all other scenarios. While all three species would face a reduction in quota under this scenario, the impacts may serve to illustrate the relative importance of those species to an individual vessel’s overall revenue. Revenue is not projected to increase for any vessels subject to this rule.

Table 39. Threshold analysis of revenue impacts for participating vessels, “FLK” is summer flounder, “BSB” is black sea bass, and “SCP” is scup.

Quota Scenario 4				Increased Revenue (number)	No Change in Revenue (number)	Number of Impacted Vessels by Reduction Percentile (%)						
Class	Landings Combination	Total Vessels	Number of Vessels Impacted by ≥ 5 Reduction			<5	5-9	10-19	20-29	30-39	40-49	≥50
1	SCP Only	11	3	0	0	8	0	1	0	0	0	2
2	BSB Only	150	56	0	0	94	5	5	6	2	2	36
3	FLK Only	251	52	0	0	199	10	19	23	0	0	0
4	SCP/BSB	87	53	0	0	34	2	8	0	7	3	33
5	SCP/FLK	39	16	0	0	23	5	2	7	1	0	1

6	BSB/FLK	119	52	0	0	67	23	12	11	0	2	4
7	SCP/BSB /FLK	399	278	0	0	121	94	120	36	9	7	12
	Totals	1056	510	0	0	546	139	167	83	19	14	88

Impacts of the quotas provisions were examined relative to a vessel's home state as reported on the vessel's permit application (Table 40). "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. Under this scenario all states have vessels facing reduction in revenue greater than 5 percent, ranging from 2 vessels in Florida to 102 vessels in New York.

Table 40. Review of revenue impacts under quota Scenario 4, by home state.

State	Participating Vessels	Number of Vessels Impacted ≥5 percent	Increased Revenue (number)	No Change in Revenue (number)	Number of Impacted Vessels by Reduction Percentile (percent)						
					<5	5-9	10-19	20-29	30-39	40-49	≥50
CT	4	3	0	0	1	0	1	1	0	0	1
DE	6	5	0	0	1	0	0	0	0	0	5
FL	5	2	0	0	3	1	1	0	0	0	0
MA	212	61	0	0	151	22	18	11	1	2	7
MD	12	10	0	0	2	0	5	3	0	0	2
NC	82	60	0	0	22	26	20	8	1	1	4
NJ	98	47	0	0	51	7	25	6	4	1	4
NY	161	102	0	0	59	40	34	5	5	4	14
PA	24	12	0	0	12	2	5	1	1	0	3
RI	88	50	0	0	38	19	19	7	2	0	3
VA	90	37	0	0	43	8	16	6	0	1	6
OTHER[a]	9	3	0	0	3	0	0	1	0	1	1
NOT KNOWN[b]	265	NK	0	0	NK	NK	NK	NK	NK	NK	NK
Total	1056	392	0	0	386	125	144	49	14	10	50

[a]States with fewer than 4 vessels were aggregated.
[b]Vessels have shown landings of either of those three species in 1998, but do not hold any of the requisite Federal permits in 1999. These vessels may be fishing exclusively in state waters fisheries for those species, 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.

By virtue of holding a valid Federal permit for summer flounder, scup, or 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 specification whether or not they actually choose to engage in any one of the three (summer flounder, scup, or black sea bass) fisheries. 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 allow.

5.4.2 RECREATIONAL IMPACTS

Under this scenario, the summer flounder 2000 recreational harvest limit would be 5.73 million lb. This level is a 54.3 percent decrease from 1998 recreational landings, and 1.68 million lb less than the 1999 harvest limit. Under this scenario, the scup recreational harvest limit for 2000 would be 1.24 million lb. This is a 42.5 percent increase over the 1998 recreational landings, and no change from the 1999 harvest limit. Black sea bass under this scenario, would have a 2000 harvest limit of 1.46 million lb. This level is a 29.2 percent increase from the 1998 landings, and a 1.69 million lb decrease from the 1999 recreational harvest limit.

Since in the summer flounder fishery, there is no mechanism to deduct overages directly from the recreational harvest limit, any overages must be addressed by way of adjustments to the management measures. In fact, for all the fisheries, harvest limits are achieved through a combination of such. It is likely that management measures will be required to restrict the recreational fishery for 2000 and that may cause some decrease in recreational satisfaction (i.e., low bag limit, larger fish size or closed season). However, there is no indication that any of these measures would lead to a decline in the demand for party/charter boat trips. Given the relatively stable market demand that these sectors are experiencing, it is unlikely these measures will result in any substantive decreases in the demand for party/charter boat trips.

At the present time, there is neither behavioral nor demand data available to estimate how sensitive party/charter boat anglers might be to proposed fishing regulations. It is most likely that party/charter anglers will target other species when faced with potential reductions in the amount of summer flounder, scup and black sea bass that they are allowed to catch. As such, it is possible that the decrease in the summer flounder relative to the 1998 landings may not have a substantial impact on the number of party/charter fishing trips.

5.4.3 SUMMARY OF IMPACTS

In sum, Scenario 4 would result in a decrease in the commercial quotas for summer flounder, scup, and black sea bass for 2000 relative to the 1999 base year. While the scup and black sea bass recreational harvest limits would increase compared to 1998 landings, summer flounder would be decreased.

Recreational landings for all three fisheries have fluctuated over the past several years. The number of trips targeting a given species in any given year is quite variable. In the aggregate, total number of recreational trips in the Mid-Atlantic region have remained stable, with a slight upward trend, since the early 1990s.

The estimated commercial impacts indicate that a total of 510 of the 1056 participating commercial vessels were projected to incur revenue losses of 5 percent or greater. Among the alternatives evaluated herein this scenario would have greatest negative impact across all classes of participating vessels.

While these measures have an improved probability of attaining the rebuilding objectives specified in the FMP, the negative economic impacts upon small entities would be substantial. Since the objective of the FMP can be met using a scenario that has a less profound impact on small entities, this scenario was not proposed by the Council. The Council recommended reducing the number of small entities impacted by this rule by offering Scenario 1 as an alternative that also meets the conservation goals of the FMP.

It is important to stress that these changes represent merely the potential, i.e., based on available data. Actual changes in revenue will likely vary. This variation would occur for several reasons, including impacts undetermined for unidentifiable vessels, revenues earned or lost due to trip limits and seasons set by a state to manage sub-allocations of quota, and unanticipated reductions in 2000 for quota overages in 1999 that were not accounted for here. These measures are specified in order to eliminate overfishing and to attain the rebuilding objectives specified in the FMP for summer flounder, scup and black sea bass.

6.0 OTHER IMPACTS

6.1 COUNTY IMPACTS

For the reasons specified in section 3.1 of this IRFA, 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 quota Scenario 4 - the most restrictive possible alternative. Counties included in the profile had to meet the following criteria:
- the number of impacted vessels (vessels with revenue loss exceeding 5 percent) per county was either greater than 4, or
- all impacted vessels in a given state were from the same home county.

The results of these analyses are summarized below. Since the counties have been identified based on impacts under quota Scenario 4, the analyses represent the most profound impacts possible for those counties. Consequently, other quota scenarios would result in fewer impacts.

Based on the above criteria, a total of 26 counties were identified: New London County, CT; Sussex County, DE; Barnstable, Bristol, Dukes, and Plymouth Counties, MA; Worcester County, MD; Beaufort, Carteret, Craven, Dare, Hyde, and Pamlico Counties, NC; Atlantic, Cape May, Monmouth, and Ocean Counties, NJ; Nassau and Suffolk Counties, NY; Newport and Washington Counties, RI; and Accomack, Hampton City, isle of Wight, Norfolk and Virginia Beach Counties, VA. Counties not included in this analysis (e.g. in CT, ME, and NH) did not have enough impacted vessels to meet the criteria specified, i.e., there were less than 4 impacted vessels per county, or all impacted vessels in a state were not home ported within the same county. For example, Scenario 4 indicates that 3 vessels in the State of Connecticut would be impacted with revenue losses exceeding 5 percent. Even though those three vessels are located in one county (New London), this individual county does not meet the criteria stated above.

Table 41 details the contribution of commercial fishing sales to total county output and the relative contribution of the three quota species to total commercial fishing sales in each county. Data for the total value of goods and services sold in each county was obtained from data bases supplied by the Minnesota IMPLAN Group for the calendar year 1995. All commercial fishing data were obtained from NMFS dealer data for the 1998 calendar year for

identifiable vessels. Note that commercial fishing data from the state of Delaware does not identify individual vessels. Consequently, the commercial fishing sales reported in Table 41 for Sussex County, DE do not adequately capture the economic importance of the commercial fishing industry to the county. Similarly, the magnitude of the impacts in other counties may be understated if landings made by state licensed vessels selling to state licensed dealers (as such unidentified vessel) are substantial.

Of the 26 counties commercial fishing sales exceed or approach 1 percent of the total value of goods and services sold only in Dare, Hyde, and Pamlico Counties, NC; Cape May County, NJ; and Washington County, RI. These data indicate that each of the identified counties are not substantially dependent upon sales of commercial fishing products to sustain the county economies.

As a percentage of commercial fishing sales, scup comprises less than 5 percent of revenues in all counties except in Dukes County, MA (10.65 percent) and Cape May County, NJ (5.03 percent). The black sea bass share of commercial fishing sales is less than 5 percent in all counties except Dukes (13.39 percent), MA; Worcester (7.05 percent), MD; and Virginia Beach (15.61 percent), VA. By contrast, the summer flounder share of commercial fishing sales exceeds 5 percent in 11 out of 26 counties and represents as much as 5.04 and 100 percent of commercial fishing sales in New London, CT and Craven, NC, respectively.

Table 42 summarizes permit data for each of the identified home counties (column 1). The second column in Table 42 reports the total number of vessels that only held a valid 1999 Federal permit for scup, black sea bass and/or summer flounder. The third column reports the number of vessels (that only had a valid 1999 Federal permit for scup, black sea bass, and/or summer flounder) that actually reported having landed one pound or more of any one of the three species. In approximately 40 percent of cases at least half of the permit holders actually landed at least some quantity of scup, black sea bass or summer flounder. Column four reports the total number of vessels in each county that held at least one valid Federal permit in 1999, and also hold a valid Federal scup, black sea bass and/or summer flounder permit but landed at least one or more pounds of at least one of the three species. Column five reports the total number of vessels that held at least one Federal permit in addition to a scup, black sea bass or summer flounder permit and landed at least one pound of species other than scup, black sea bass or summer flounder. Columns six and seven report average vessel length for all vessels whose h-port is within the identified home county.

Table 43 summarizes population and demographic data for each of the identified home counties. Of the 26 counties, total population in Dukes County, MA; Worcester County, MD; Catered, Craven, Dave, Hyde, and Pamlico Counties, NC; Cape May County, NJ; Newport County, RI; and Accomack, Hampton Bay and Isle of Wight Counties, VA was less than 100,000 in 1998. Of the remaining counties total population exceeds one million in only Nassau, NY and Suffolk, NY while total population all other counties falls between 100,000 and 600,000. The proportion of the population that falls below the poverty line were highest in Hyde County, NC (25.7 percent) and Norfolk County, VA (24.2 percent), and was at least 10 percent or greater in the counties of Sussex, DE; Bristol, MA; Worcester, MD; Beaufort, Carteret, Craven, and Pamlico, NC; Atlantic, NJ; and Accomack, Hampton City, and Isle of Wight, VA. Across each of the home counties, median annual income follows the same general pattern as poverty estimates provided in column three.

Table 44 provides estimates of total county employment, payroll and number of entities for all industries and for fishing related industries (processing, wholesale, and retail). All data were obtained from Bureau of the Census for the calendar year 1996. Note that 1997 estimates were nearing completion but were not available at the time this analysis was prepared. Due to non-disclosure requirements estimates of employment and payroll at the four-digit SIC level must be aggregated to the next highest industrial classification. The non-disclosure problem is particularly evident for processors and to a lesser extent for wholesale seafood trade.

Table 41. Summary of total county sales, commercial fishing sales, and sales of scup, black sea bass and summer flounder by county.

County, State	1995 Total Value of All Goods and Services Sold ($ million)	1998 Total Value of All Commercial Fishing sales ($)	Commercial Fishing as a Percent of Total County Output (%)	1998 Total Value of Commercial Fishing Scup Sales ($)	Scup as a Percent of Total Commercial Fishing Sales (%)	1998 Total Value of Commercial Fishing Black Sea Bass Sales ($)	Black Sea Bass as a Percent of Commercial Fishing Sales (%)	1998 Total Value of Commercial Fishing Sales of Summer Flounder ($)	Summer Flounder as a Percent of Commercial Fishing Sales (%)
New London, CT	13,589	11,570,905	0.09	142,012	1.23	17,167	0.15	583,011	5.04
Sussex, DE	8,177	1,145,340	0.01	0	0.00	56,910	4.97	0	0.00
Barnstable, MA	7,638	18,558,393	0.24	125,457	0.68	88,975	0.48	425,635	2.29
Bristol, MA	19,817	95,255,121	0.48	724,875	0.76	64,753	0.07	642,765	0.67
Dukes, MA	665	1,525,431	0.23	162,473	10.65	204,181	13.39	281,547	18.46
Plymouth, MA	15,286	4,222,335	0.03	42,668	1.01	7,794	0.18	251	0.01
Worcester, MD	1,974	6,356,802	0.32	9,051	0.14	448,214	7.05	317,262	4.99
Beaufort, NC	2,083	142,962	0.01	0	0.00	0	0.00	0	0.00
Carteret, NC	1,496	7,869,153	0.53	613	0.01	35,407	0.45	1,357,867	17.26
Craven, NC	3,550	2,718	0.00	0	0.00	0	0.00	2,718	100.00
Dare, NC	1,097	11,231,428	1.02	21,966	0.20	283,481	2.52	1,291,510	11.50
Hyde, NC	149	2,662,993	1.79	77	0.00	91,373	3.43	461,677	17.34
Pamlico, NC	233	3,764,617	1.62	55	0.00	4,780	0.13	1,179,778	31.34
Atlantic, NJ	13,418	20,159,483	0.15	11	0.00	33,668	0.17	1,651	0.01
Cape May, NJ	3,234	31,740,940	0.98	1,595,139	5.03	771,650	2.43	1,162,748	3.66
Monmouth, NJ	25,026	3,796,686	0.02	15,343	0.40	7,510	0.20	573,680	15.11
Ocean, NJ	12,543	28,072,246	0.22	303,920	1.08	33,590	0.12	969,668	3.45
Nassau, NY	70,388	5,503,065	0.01	133,021	2.42	31,166	0.57	120,301	2.19
Suffolk, NY	59,592	48,815,260	0.08	945,022	1.94	285,838	0.59	1,848,895	3.79
New Port, RI	3,125	12,373,463	0.40	120,704	0.98	41,491	0.34	793,700	6.41
Accomack, VA	1,672	8,485,039	0.51	22	0.00	143,703	1.69	321,477	3.79
Washington, RI	3,542	52,546,991	1.48	1,035,141	1.97	214,579	0.41	2,987,325	5.69
Hampton City, VA	6,335	8,218,162	0.13	7,282	0.09	350,738	4.27	1,229,348	14.96
Norfolk City, VA	15,857	405,861	0.00	0	0.00	8,736	2.15	8,563	2.11

Virginia Beach City, VA	5,397	4,272,786	0.08	3	0.00	667,126	15.61	12,394	0.29
Isle of Wight, VA	397	521,934	0.13	0	0.00	0	0.00	11	0.00

Table 42. County-level permit table from NMFS permit and commercial landings database.

County, State	Vessels with FLK, BSB and/or SCP Permit	No. Vessels with FLK, SCP, and/or BSB Permit that Landed FLK, SCP, and/or BSB	No. Vessels with FLK, SCP, or BSB Permit and One or More Other Northeast Region Permits	No. Vessels with FLK, SCP, and/or BSB Permits that Landed Species other than FLK, SCP, or BSB	Avg. Vessel Length for vessels with FLK, SCP, and/or BSB Permits	Avg. Vessel Length for all FLK, SCP, and/or BSB Permit Holders that Landed FLK, SCP, and/or BSB
New London, CT	26	C	25	9	55	N/A
Sussex, DE	19	C	19	8	48	N/A
Barnstable, MA	80	26	80	64	42	42
Bristol, MA	187	42	185	167	72	64
Dukes, MA	16	7	16	10	39	45
Plymouth, MA	51	9	50	30	43	48
Worcester, MD	20	10	19	17	53	53
Beaufort, NC	12	3	10	8	66	68
Carteret, NC	25	14	23	23	70	72
Craven, NC	7	5	7	6	70	75
Dare, NC	33	12	15	26	46	59
Hyde, NC	21	7	13	17	54	71
Pamlico, NC	34	21	33	32	71	73
Atlantic, NJ	7	3	7	5	34	36
Cape May, NJ	65	39	65	61	68	74
Monmouth, NJ	48	17	48	34	46	52
Ocean, NJ	56	24	55	53	56	57
Nassau, NY	36	13	35	17	42	52
Suffolk, NY	164	106	162	136	45	49
New Port, RI	29	19	29	21	48	51
Washington, RI	133	88	132	109	58	64
Accomack, VA	14	C	12	5	45	N/A
Hampton City, VA	24	14	24	21	78	76

Norfolk City, VA	8	C	4	6	37	N/A
Virginia Beach City, VA	27	5	20	17	49	66
Isle of Wight, VA	6	3	6	6	85	87

C Denotes fewer than 3 vessels.

Table 43. County-level demographic information.

County, State	Total Population (1997 est.)	Per Capita Personal Income (1997 est.)	Total Full and Part time Employment (1997 est.)	Number of Non-Farm Proprietors (1997 est.)	Percent of Total Population Below Poverty Line (1995 est.)	No. of Fishing Vessel Captains (1990 Occupation Census Data)	No. of Male Fishing Vessel Crew (1990 Occupation Census Data)	No. of Female Fishing Vessel Crew (1990 Occupation Census Data)
New London, CT	248,838	28,466	159,109	20,695	7.3	19	67	18
Sussex, DE	133,661	21,961	75,002	12,445	11.9	7	100	5
Barnstable, MA	204,978	30,199	118,981	32,778	8.1	84	571	45
Bristol, MA	514,944	24,188	263,593	40,758	10.5	121	922	0
Dukes, MA	13,588	29,945	10,635	3,718	5.5	6	53	13
Plymouth, MA	461,569	27,402	217,341	45,401	7.8	48	437	5
Worcester, MD	42,135	24,427	29,666	5,525	11.7	33	79	8
Beaufort, NC	442,714	19,319	24,490	3,917	19.2	2	137	8
Carteret, NC	59,560	20,798	30,257	7,115	12.7	86	560	31
Craven, NC	87,752	20,747	55,707	7,158	14.6	13	58	12
Dare, NC	27,935	21,624	22,239	5,892	8.2	30	391	49
Hyde, NC	5,626	18,364	3,309	872	25.7	0	234	8
Pamlico, NC	12,143	18,493	4,383	1,228	17.3	36	251	3
Atlantic, NJ	236,331	30,187	166,336	17,062	10.9	8	57	10
Cape May, NJ	97,961	26,419	51,696	11,100	9.8	82	274	1
Monmouth, NJ	596,987	33,952	298,649	55,403	6.3	41	142	0
Ocean, NJ	482,421	25,725	173,217	38,323	7.3	36	267	1
Nassau, NY	1,299,485	39,691	735,880	122,375	5.1	14	57	5
Suffolk, NY	1,361,138	30,330	672,001	111,420	7.4	101	654	8
New Port, RI	82,962	27,558	48,588	7,700	8.3	27	333	0
Washington, RI	119,243	27,198	59,973	13,402	6.7	131	566	46
Accomack, VA	32,062	18,240	17,020	2,784	21.1	25	360	12
Hampton City, VA	13,859	19,973	80,005	7,226	13.8	0	122	0
Norfolk City, VA	230,018	20,221	234,424	10,710	24.2	0	32	0

Virginia Beach City, VA	431,179	24,425	215,127	32,110	8.8	26	62	0
Isle of Wight, VA	28,596	21,826	14,884	1,851	10.4	0	40	0

Source population, Per Capita Income, Employment, and Non-Farm Proprietors
fisher.lib.virginia.edu/reis/county.html
Source Percent Poverty: www.census.gov./hhes/www/saipe/estimate/cty/cty37095.htm
Source Occupation: tier2.census.gov/CGI-WIN/EEO/EEODATA.EXE

Table 44. Total employees, payroll, and number of entities for all sectors and fishery related sector by home county (source: County Business Patterns for 1996, U.S. Bureau of the Census, www.census.gov/cgi-bin/datamap/cnty?44=009).

	Total			Processing (SIC 2092)			Wholesale (SIC 5146)			Retail (SIC 5420)		
	Employees	Payroll $1,000's	Entities	Employees	Payroll $1,000's	Entities	Employees	Payroll $1,000's	Entities	Employees	Payroll $1,000's	Entities
New London, CT	99501	2977810	5856	0	0	0	35	1129	6	79	1196	9
Sussex, DE	43461	641497	4153	0	0	0	31(b)	9210(b)	27(b)	1942	27265	147
Barnstable, MA	61599	1491087	2640	162(e)	4413(e)	49(e)	132	3513	24	86	2091	30
Bristol, MA	185559	4608253	12201	302	11305	8	749	20402	60	221	2890	33
Dukes, MA	4454	121099	902	0	0	0	11	184	3	27	267	4
Plymouth, MA	135902	3599952	106381	0	0	0	71	2833	14	70	985	17
Worcester, MD	16602	337375	2080	1336(a)	24310(a)	14(a)	868(f)	32024(f)	42(f)	672(d)	12503(d)	80(d)
Beaufort, NC	16552	350020	1123	227(e)	5409(e)	10	40	878	5	0	0	0
Carteret, NC	16131	269306	1817	0	0	0	68	1432	14	24	290	7
Craven, NC	26080	579603	2113	4819(a)	130882(b)	113	159(b)	4903(b)	5	1123(d)	11249(b)	57
Dare, NC	9781	179056	1500	388(c)	8074(c)	45(c)	198(b)	3421(b)	11(b)	48	707	7
Hyde, NC	842	13433	164	108(a)	1808(a)	6(a)	43(b)	424(b)	6(b)	0	0	0
Pamlico, NC	1520	27771	239	78(a)	1672(a)	6(a)	47(b)	1920(b)	9(b)	128(d)	1788(d)	11(d)
Atlantic, NJ	116205	3256979	6233	240(a)	5480(a)	16(a)	9	267	4	29	524	11
Cape May, NJ	21776	553863	3962	0	0	0	14	3248	4	42	971	15
Monmouth, NJ	185036	5624790	17520	779(a)	23806(a)	28(a)	112	2136	12	90	1142	28
Ocean, NJ	97886	2362359	10233	12(e)	173(e)	3(e)	87	1737	4	110	1543	21
Nassau, NY	517628	16336734	45687	265(e)	10798(e)	12(e)	148	4098	33	478	8287	120
Suffolk, NY	467985	14104326	40208	151(e)	3307	13(e)	352	9528	62	356	5827	121
New Port, RI	23770	602981	2562	0	0	0	64	1965	12	27	327	7
Washington, RI	31342	745887	3307	118(a)	1814(a)	9(a)	268	7038	25	1730	25344	92
Accomack, VA	8500	145643	830	3267(c)	53981(c)	34	37	661	12	13	119	3
Hampton City, VA	42265	876264	2443	3819(c)	121112(c)	79(c)	192(b)	4011(b)	10(b)	1470	15988	76
Norfolk City, VA	109233	2784198	5453	180(e)	4879(e)	6(e)	32	444	4	34	647	9
Virginia Beach City, VA	125974	2525187	9673	0	0	0	2043(b)	35376(b)	54(b)	74	930	14
Isle of Wight, VA	9228	204004	534	0	0	0	11(b)	154(b)	5	0	0	0

(a) Data reported at next highest aggregated level, SIC 2000 Food and Kindred Products
(b) Data reported at next highest aggregated level, SIC 5140 Groceries and Related Products

(c) Data reported at 2-digit SIC 20- Manufacturing
(d) Data reported at next highest aggregated level, SIC 5400 Food Stores
(e) Data reported at next highest aggregated level, SIC 2090 Misc. Food and Kindred Products
(f) Data reported at next highest aggregated level, SIC 5100 Wholesale Trade: Nondurable Goods

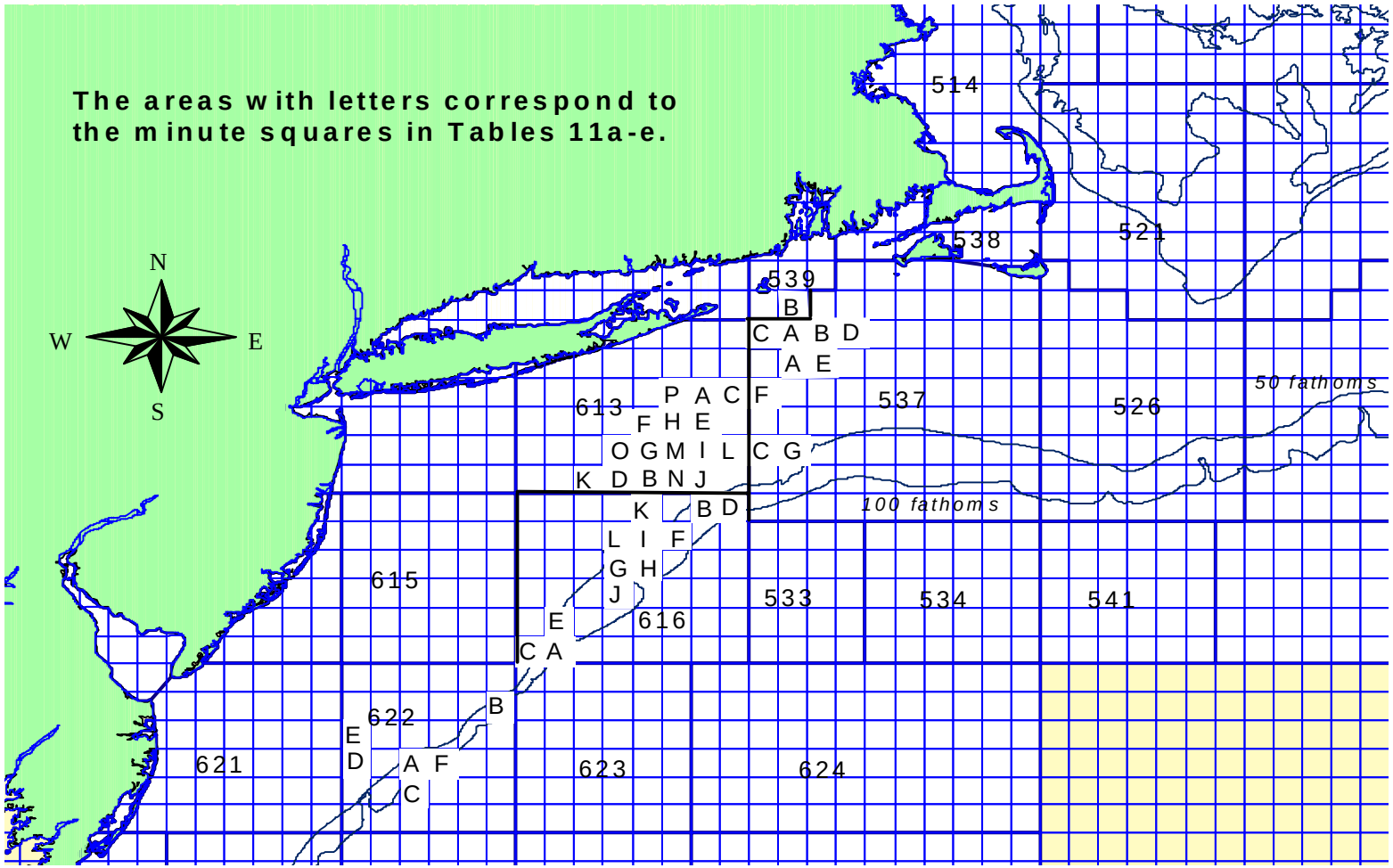
6.2 INDIRECT IMPACTS

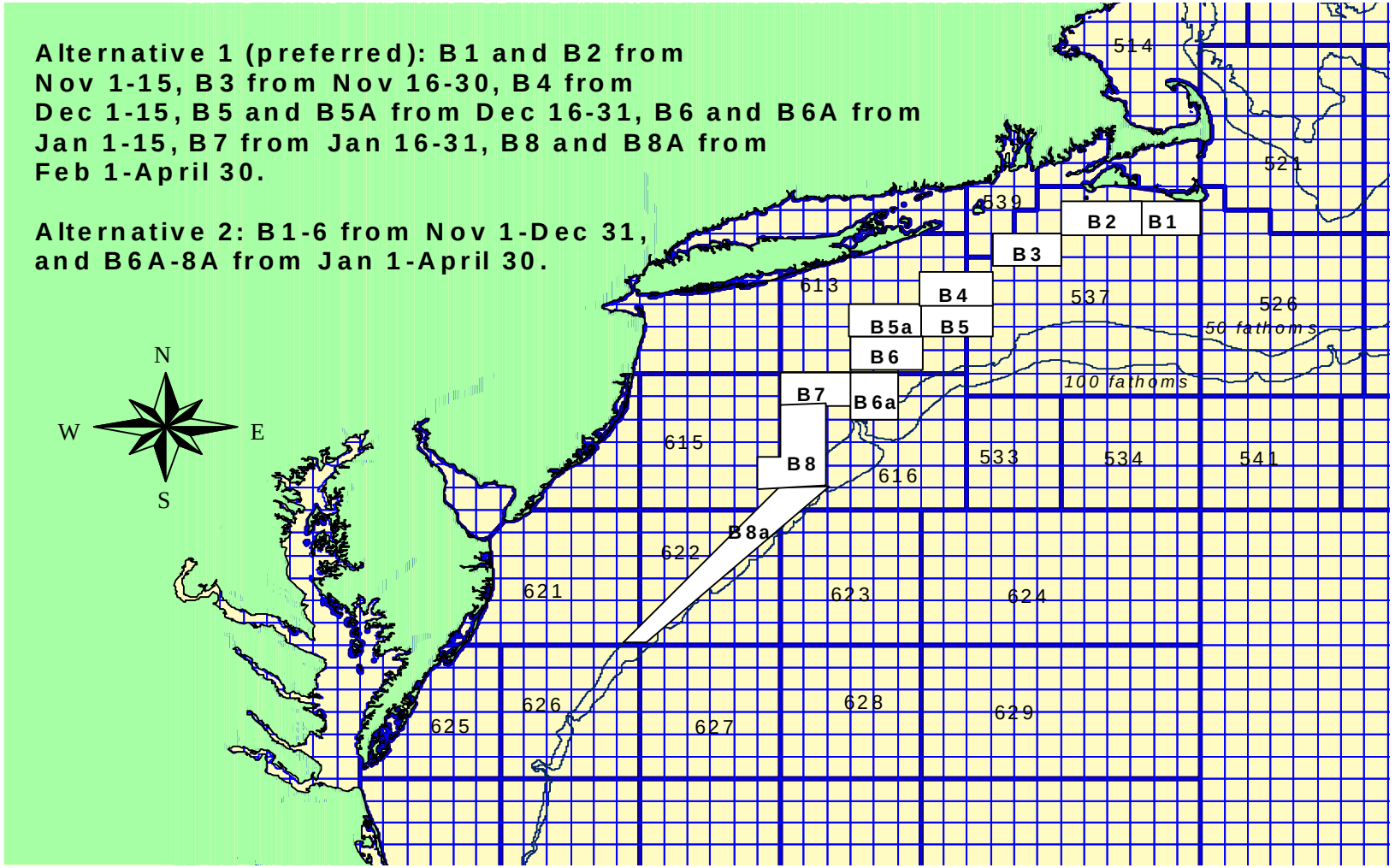
For the commercial sector, the regulations will have direct effects on both commercial fishing and processing. These sectors are identified by their 4-digit Standard Industrial Classification (SIC) code as 0910 and 2092 respectively. The economic sectors that will be indirectly affected were identified in the following manner: An Input/Output model of the United States economy was estimated using a PC-Based software program called IMPLAN. IMPLAN has been in use since its development by the U.S. Forest Service in 1979. IMPLAN is based on Bureau of Economic Analysis (BEA) data for 521 industries. The U.S. model provides information on linkages among industries as well as an estimate of the required amount of purchases from all sectors in order to produce one dollar's worth of output in a given sector. The indirectly affected economic sectors for commercial fishing and processing were listed in Table 45, along with the SIC codes that comprise those sectors. Note that the list of sectors is not exhaustive, but include sectors in descending order of impact and only reports those sectors whose cumulative impact was 90 percent or greater.

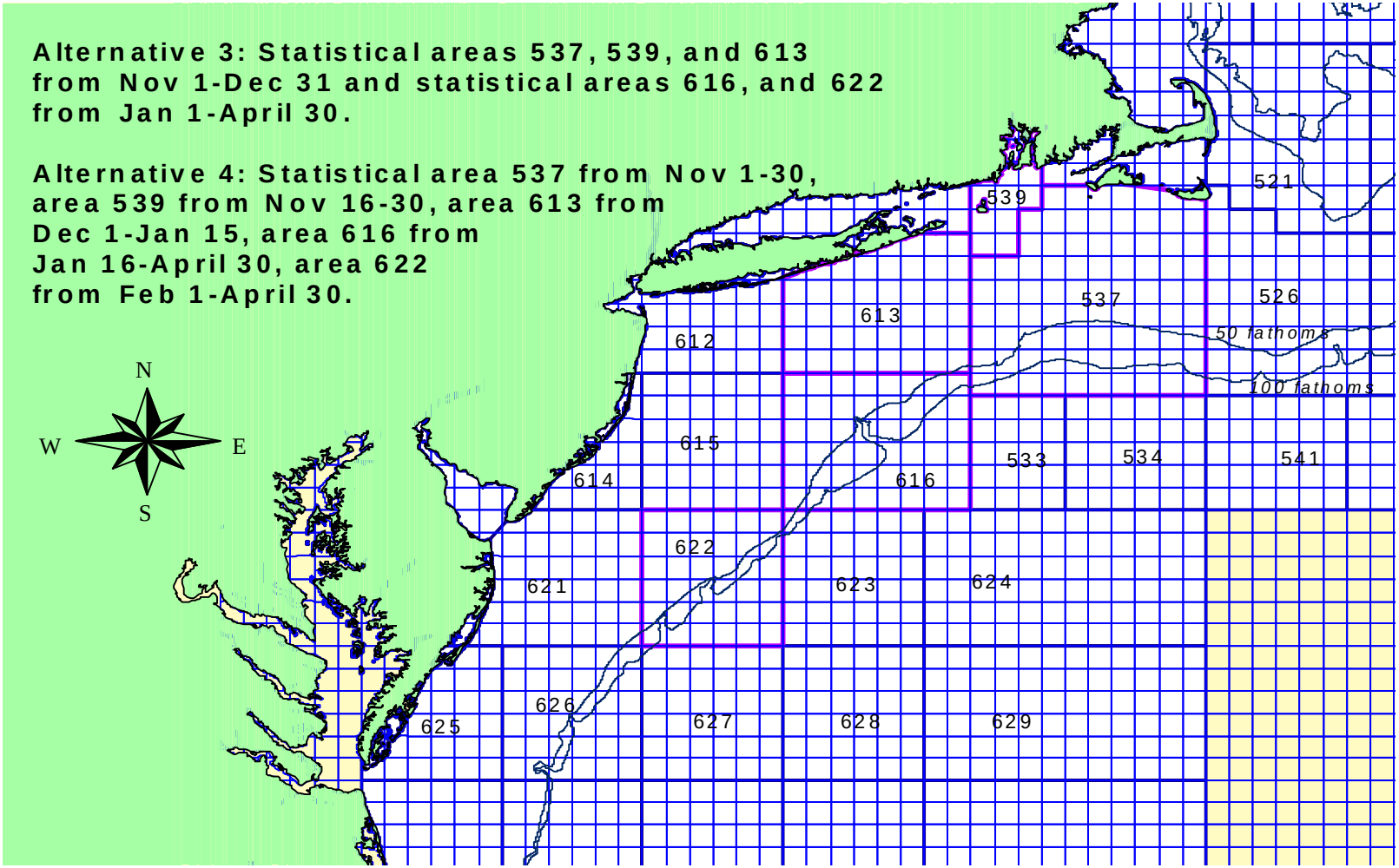
In each column of Table 45 headed by the title "Impact Percent" are estimated proportions of expenditures by directly affected sectors on purchased inputs (i.e. expenses per dollar of commercial fishing output net of value added) from each of the indirectly affected sectors. For example, of the inputs used by commercial vessels, 22.88 percent were from SIC sector 2992 (lubricating oils and greases). Value added includes payments that go to labor (captain and crew) and profits. This means that for every dollar spent to produce a dollar's worth of commercial fishing $0.75 goes to value added and $0.25 goes to purchased inputs other than labor. Thus, the effect on indirectly affected industries is the product of $0.25 and the "Impact Percent". Sector 2992 has the highest impact percent (22.88) and revenues in that sector would change at a rate of $0.057 per dollar of output change in the commercial fishing sector. Based on the projected impacts to the directed fisheries, it is unlikely that the indirect impacts would be substantial.

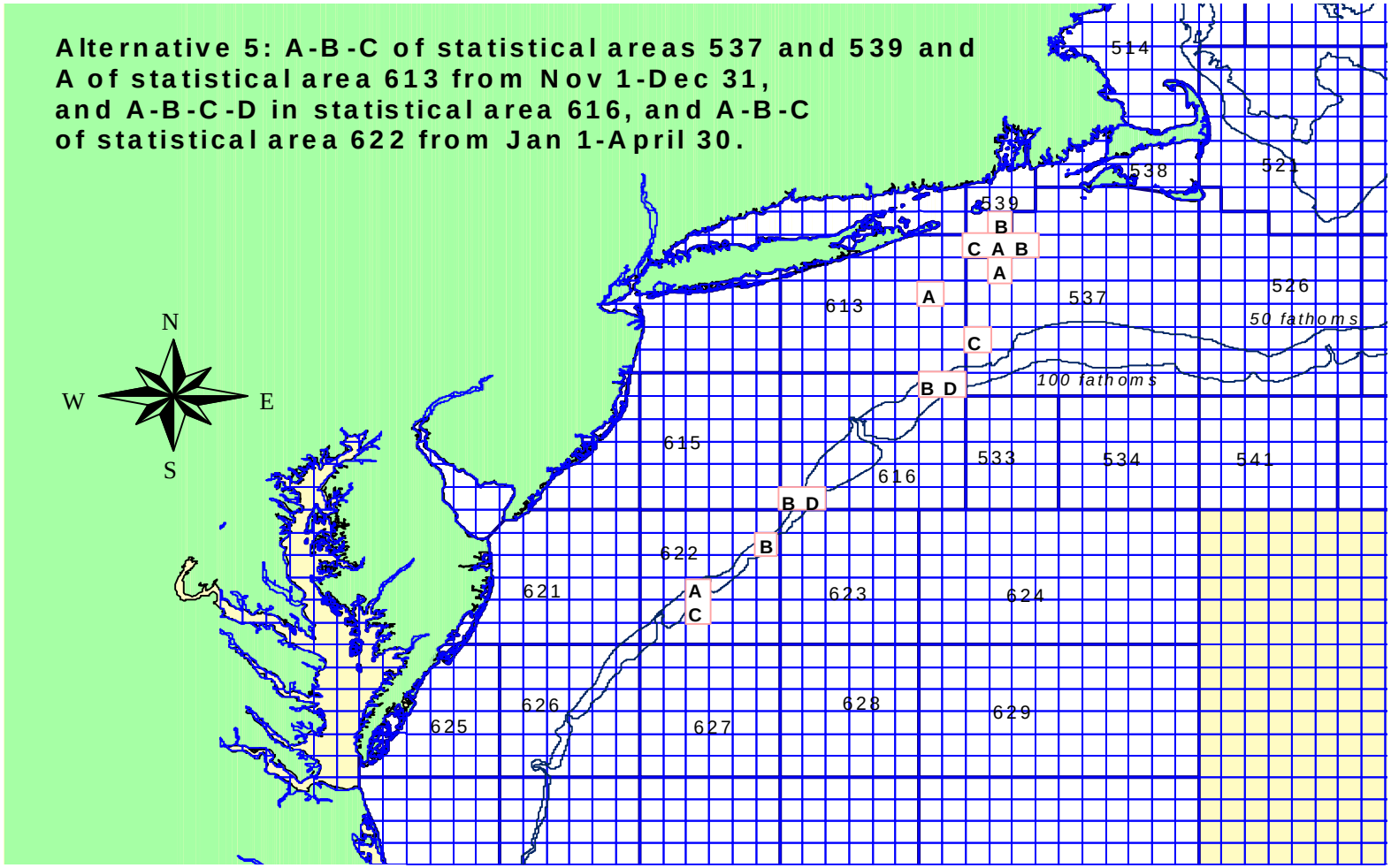
Table 45. List of indirectly affected industry sectors.

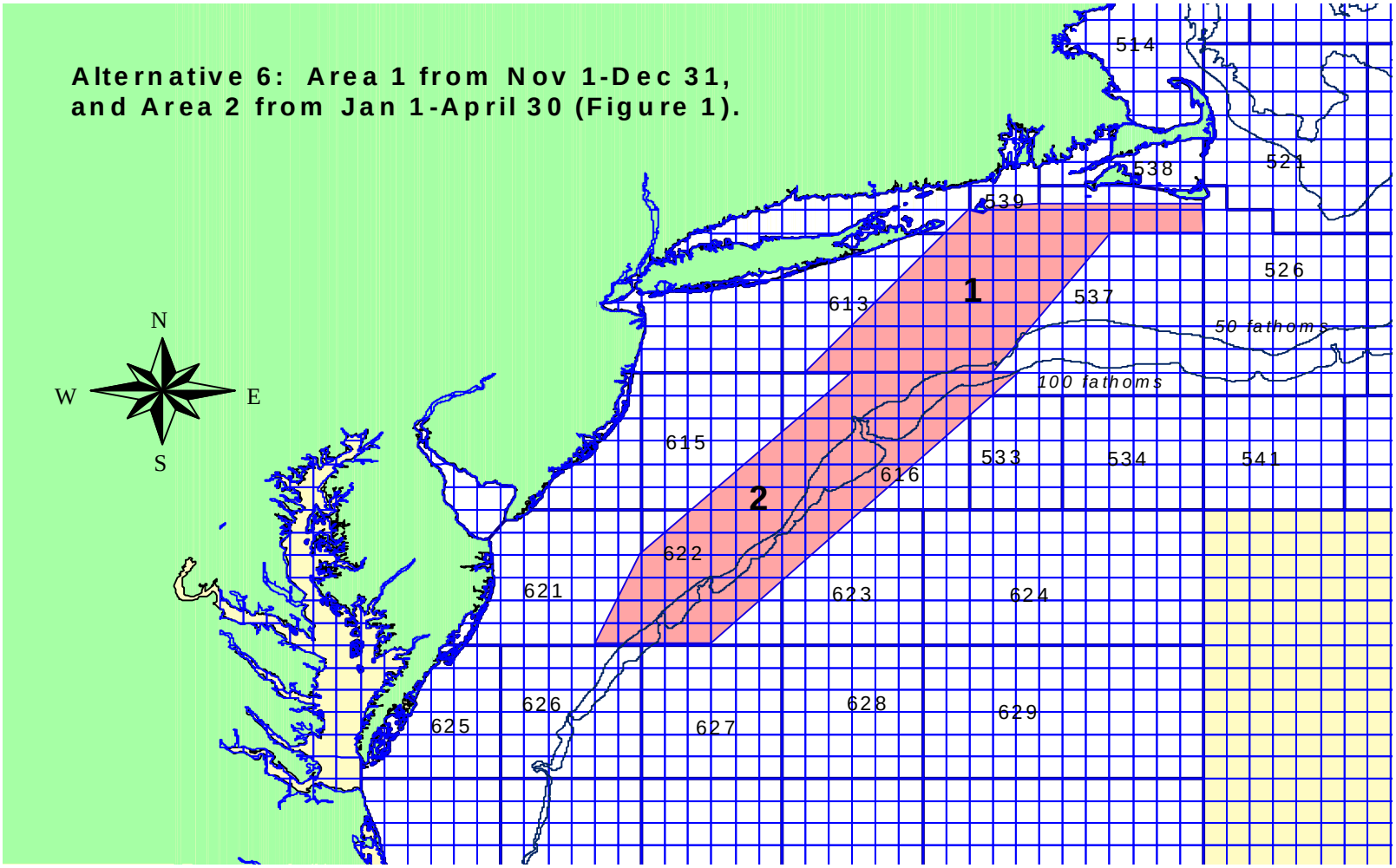
		Impact		Processors (2092)		Impact
Sector	SIC Code(s)	Percent		Sector	SIC Code(s)	Percent
LUBRICATING OILS AND GREASES	2992	22.88		COMMERCIAL FISHING	910	36.
CORDAGE AND TWINE	2298	11.84		BUILDING MATERIALS AND GARDENING SUPPLIES	5200	18.07
SHIP BUILDING AND REPAIRING	3731	11.72		PREPARED FRESH OR FROZEN FISH OR SEAFOOD	2092	15.12
MISCELLANEOUS REPAIR SHOPS	7690	6.53		MISCELLANEOUS LIVESTOCK	0191, 0219, 0259, 0271, 0272, 0273, 0279, 0291	9.30
MANUFACTURED ICE	2097	5.55		WATER TRANSPORTATION	4400	6.05
PETROLEUM REFINING	2910	4.76		PAPERBOARD CONTAINERS AND BOXES	2650	4.03
BOAT BUILDING AND REPAIRING	3732	4.23		COMMUNICATIONS, EXCEPT RADIO AND TV	4810, 4820, 4849, 4890	2.36
INSURANCE CARRIERS	6300	3.53		GAS PRODUCTION AND DISTRIBUTION	4920, 4930	1.36
AUTOMOBILE RENTAL AND LEASING	7510	2.24				92.32
WATER TRANSPORTATION	4400	2.05				
MAINTENANCE AND REPAIR OTHER FACILITIES	1500, 1600, 1700	1.96				
CANVAS PRODUCTS	2394	1.61				
MOTOR FREIGHT TRANSPORT AND WAREHOUSING	4200, 4789	1.41				
BANKING	6000	1.33				
HOTELS AND LODGING PLACES	7000	1.16				
MANAGEMENT AND CONSULTING SERVICES	8740	1.11				
COMMERCIAL FISHING	910	1.04				
AUTOMOTIVE DEALERS & SERVICE STATIONS	5500	1.03				
HARDWARE, NEC	3429	0.95				
AUTOMOBILE REPAIR AND SERVICES	7530	0.92				
INTERNAL COMBUSTION ENGINES, N.E.C.	3519	0.86				
MANIFOLD BUSINESS FORMS	2760	0.77				
BUSINESS ASSOCIATIONS	8610	0.62				
		90.10				


The areas with letters correspond to the minute squares in Tables 11a-e.
N
W
E
S
514
538
521
539
B
C A B D
A E
613
P A C F
F H E
O G M I L C G
K D B N J
537
526
50 fathoms
100 fathoms
K
B D
L I F
G H
J
615
533
534
541
E
616
C A
622
B
E
D
A F
C
621
623
624


Alternative 1 (preferred): B1 and B2 from Nov 1-15, B3 from Nov 16-30, B4 from Dec 1-15, B5 and B5A from Dec 16-31, B6 and B6A from Jan 1-15, B7 from Jan 16-31, B8 and B8A from Feb 1-April 30.
Alternative 2: B1-6 from Nov 1-Dec 31, and B6A-8A from Jan 1-April 30.
N
W
E
S
514
521
539
B2
B1
B3
613
B4
537
526
B5a
B5
50 fathoms
B6
100 fathoms
B7
B6a
615
B8
533
534
541
616
B8a
622
621
623
624
626
628
625
627
629


Alternative 3: Statistical areas 537, 539, and 613 from Nov 1-Dec 31 and statistical areas 616, and 622 from Jan 1-April 30.
Alternative 4: Statistical area 537 from Nov 1-30, area 539 from Nov 16-30, area 613 from Dec 1-Jan 15, area 616 from Jan 16-April 30, area 622 from Feb 1-April 30.
N
W
E
S
521
539
537
526
613
612
50 fathoms
100 fathoms
615
614
616
533
534
541
622
621
623
624
626
625
627
628
629


Alternative 5: A-B-C of statistical areas 537 and 539 and
A of statistical area 613 from Nov 1-Dec 31,
and A-B-C-D in statistical area 616, and A-B-C
of statistical area 622 from Jan 1-April 30.
N
W
E
S
514
538
521
539
B
C A B
A
526
613
A
537
50 fathoms
C
100 fathoms
B D
615
533
534
541
616
B D
622
B
621
A
C
623
624
626
628
629
625
627


Alternative 6: Area 1 from Nov 1-Dec 31,
and Area 2 from Jan 1-April 30 (Figure 1).
N
W
E
S
514
538
521
539
526
613
1
537
50 fathoms
100 fathoms
615
533
534
541
616
2
622
621
623
624
626
628
629
625
627