2003-2004
Spiny Dogfish Specifications,
Draft Environmental Assessment,
Preliminary Economic Evaluation,
Regulatory Impact Review,
and
Initial Regulatory Flexibility Analysis

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Mid-Atlantic Fishery Management Council
300 South New Street
Dover, DE 19904-6790
(302) 674-2331

EXECUTIVE SUMMARY

The Mid-Atlantic and New England Fishery Management Councils (Mid-Atlantic Council and New England Council) initiated management of spiny dogfish (*Squalus acanthias*) pursuant to the Magnuson Stevens Fishery Conservation and Management Act (MSFMCA) of 1976 as amended by the Sustainable Fisheries Act (SFA) through the development of the Spiny Dogfish Fishery Management Plan (FMP). The lack of any regulations pertaining to the harvest of spiny dogfish in the US EEZ combined with the rapid expansion of the domestic fishery during the 1990's lead the Mid-Atlantic and New England Fishery Management Councils (Councils) to begin development of a management plan for the species in 1998.

The final rule implementing the FMP was approved on September 29, 1999 and contained the following measures: (1) A commercial quota; (2) seasonal (semi-annual) allocation of a commercial quota; (3) a prohibition on finning; (4) a framework adjustment process; (5) the establishment of a Spiny Dogfish Monitoring Committee; (6) annual FMP review; (7) permit and reporting requirements for commercial vessels, operators, and dealers; and (8) other measures regarding sea samplers, foreign fishing, and exempted fishing activities. An annual spiny dogfish commercial quota will be allocated to the fishery to control fishing mortality (F). The quota will be set at a level to assure that the F specified for the appropriate year in the FMP will not be exceeded. The annual commercial quota will be established by the Regional Administrator, Northeast Region, NMFS (RA), based upon recommendations made by the Councils. The quota recommendation will be based upon projected stock size estimates for each year, as derived from the latest stock assessment information, coupled with the target fishing mortality rate specified for each year. The quota is specified for a fishing year that begins on May 1, and is subdivided into two semi-annual periods. The period from May 1-October 31 (quota period 1) is allocated 57.9 percent of the annual quota and the period from November 1-April 30 (quota period 2) is allocated 42.1 percent of the annual quota.

The Spiny Dogfish FMP stipulates a target fishing mortality rate for year five (fishing year 2003 [FY2003]: May 2003 - April 2004) of F = 0.03 followed by F = 0.08 in subsequent years. Therefore the annual specification of a commercial quota in FY2003 is constrained to a range from zero to a maximum allowed to assure that F does not exceed 0.03. The Spiny Dogfish Monitoring Committee concluded that the (maximum) quota consistent with F = 0.03 in FY2003 is 4,000,000 pounds.

The Mid-Atlantic and New England Councils recommended different commercial quota specifications and trip limits to achieve the FMP's objectives for FY2003 at their respective meetings in October and November 2002. The Mid-Atlantic Council recommended a quota of 4,000,000 pounds and a trip limit of 600 pounds for quota period 1 and 300 pounds for quota period 2. In contrast, the New England Council recommended a quota of 8,800,000 pounds with a trip limit of 7,000 pounds for quota period 1 and 5,000 pounds for quota period 2. The FMP provides for disagreement between the Councils on management measures for the upcoming fishing year in that the Northeast Regional Administrator of the National Marine Fisheries Service may select from any option listed below that has not been rejected by both Councils.

Alternative 1 - Mid-Atlantic Council Alternative: Specify quota for FY2003 at 4.0 million pounds and trip limits of 600 pounds for quota period 1 and 300 pounds for quota period 2

Alternative 1 (the Mid-Atlantic Council alternative) includes a commercial quota of 4,000,000 pounds for FY2003. The quota is to be divided semi-annually with quota period 1 (May 1 through October 31) being allocated 2,316,000 pounds (57.9% of the 4,000,000 pound quota), and quota period 2 (November 1 through April 30) being allocated 1,684,000 pounds (42.1% of the 4,000,000 pound quota). In addition, trip limits of 600 pounds per trip and 300 pounds per trip are recommended for quota periods 1 and 2, respectively (vessels are prohibited from landing more than the specified amount in one calendar day). This alternative is designed to achieve the target F (= $F_{REBUILD}$ = 0.03), suspend directed fishing including the targeting of adult female spiny dogfish and allow for rebuilding of spiny dogfish spawning stock biomass. This alternative represents the status quo relative to the current fishing year (FY2002) for the commercial spiny dogfish fishery.

By maintaining the spiny dogfish fishery as an incidental catch fishery, with a very low annual quota and trip limits, this alternative is not expected to result in negative biological, EFH, or protected resources impacts. Although the short term economic and social impacts of the preferred alternative are negative as compared to higher trip limits and quotas (Alternative 2) or an unregulated fishery (Alternative 3), over the long term, the cumulative economic and social impacts of the preferred alternative are expected to be positive as compared with the other two alternatives because the economic and social benefits of a recovered stock will be achieved sooner. The New England Regional Administrator has selected Alternative 1 as the preferred alternative because of the three alternatives, it is the only one that ensures that the rebuilding goals of the FMP will be met.

Alternative 2 - New England Council Alternative: Specify quota for FY2003 at 8.8 million pounds and trip limits of 7,000 pounds for quota period 1 and 5,000 pounds for quota period 2

Alternative 2 (the New England Council alternative) includes a commercial quota of 8,800,000 pounds for FY2003. The quota is to be divided semi-annually with quota period 1 (May 1 through October 31) being allocated 5,095,200 pounds (57.9% of the 8,800,000 pound quota), and quota period 2 (November 1 through April 30) being allocated 3,704,800 pounds (42.1% of the 8,800,000 pound quota). In addition, trip limits of 7,000 pounds per trip and 5,000 pounds per trip are recommended for quota periods 1 and 2, respectively (vessels are prohibited from landing more than the specified amount in one calendar day). This alternative is designed to allow for a small scale directed fishery for spiny dogfish while still rebuilding spiny dogfish spawning stock biomass.

The biological impacts associated with the increase in annual quota under this alternative are expected to be generally negative compared to the status quo in that the annual fishing mortality rate (F = 0.06 under this alternative) would exceed the rate consistent with the accepted stock

rebuilding schedule (F = 0.03). Additionally, a daily trip limit designed to allow for directed fishing would likely encourage targeting of larger fish (i.e., adult females), the protection of which is deemed to be particularly important for the rebuilding process. The short term economic and social impacts of this alternative are expected to be positive compared to the Alternative 1. However, the higher fishing mortality rate is expected to have negative economic and social consequences in the longer term, since the establishment of directed sustainable harvest would be delayed for an indefinite period.

The quota and trip limits proposed under Alternative 2 would result in continued reduction of directed fishing (compared to the no-action alternative) that, in turn, will indirectly benefit EFH by maintaining the reduction in the disturbance by a gear type that impacts bottom habitats. However, compared to Alternative 1, Alternative 2 would be expected to result in increased fishing effort which could increase the chance that EFH would be negatively effected, especially if trawl use increased as a consequence.Because Alternative 2 is designed to establish a small scale directed fishery in FY2003, the corresponding increase in fishing effort brought about by this action may also elevate (relative to the status quo) the probability of interactions between the spiny dogfish fishery and endangered or threatened marine mammals and sea turtles.

Alternative 3 - No action: No specified quota or trip limits for FY2003

Alternative 3 (the no-action alternative) would effectively remove regulatory control over the spiny dogfish fishery for FY2003. Given that no quota is specified in Alternative 3, landings are expected to return to the levels approximately equal to those observed in the unregulated period of the fishery (about 25 million pounds).

Under this alternative, fishing mortality would exceed the threshold level which allows the stock to replace itself ($F_{REP} = 0.11$) and greatly exceed the target fishing mortality rate (= $F_{REBUILD}$ = 0.03). Additionally, the fishery, based on its historical pattern, is expected to resume targeting adult female spiny dogfish which would drive female SSB below current levels, eliminate progress toward a recovered stock, and in the long term, lead to depletion of the spiny dogfish population. Compared to the status quo alternative (Alternative 1), Alternative 3 is expected to have very negative consequences for spiny dogfish and non-target species taken in the spiny dogfish fishery.

Given that no quota is specified in Alternative 3, landings are expected to return to the levels approximately equal to those observed in the unregulated period of the fishery (about 25 million pounds). Although the short-term social and economic benefits of an unregulated fishery would be much greater than those associated with Alternatives 1 and 2, fishing mortality is expected to rise above the threshold level that allows the stock to replace itself ($F_{REP} = 0.11$) and stock rebuilding could not occur. In the long term, unregulated harvest would lead to depletion of the spiny dogfish population which would eventually eliminate the spiny dogfish fishery altogether.

Implementation of Alternative 3 is expected to greatly increase fishing effort, thus greatly

increasing the use of bottom-tending gear and the probability of damage to EFH relative to the status quo. Because alternative 3 is expected to return prosecution of the spiny dogfish fishery to its previous (unregulated) levels in FY2003, the corresponding increase in fishing effort brought about by this action would greatly elevate (relative to the status quo) the probability of interactions between the spiny dogfish fishery and endangered or threatened marine mammals and sea turtles.

DRAFT ENVIRONMENTAL ASSESSMENT FOR THE FISHING YEAR 2003 CATCH SPECIFICATIONS FOR SPINY DOGFISH

1.0 Purpose and Need

The purpose of this document is to specify the management measures for fishing year 2003 (FY2003: May 1, 2003 - April 30, 2004 - year five in the management program). The Spiny Dogfish Fishery Management Plan (FMP) requires that the Councils annually review and recommend management measures which will insure that the target fishing mortality rate for spiny dogfish is not exceeded. Measures which can be considered for year five include a commercial quota set in a range from zero to the maximum allowed while assuring that fishing mortality (F) does not exceed 0.03. In addition to the commercial quota, the Councils may also recommend minimum or maximum fish sizes, seasons, mesh-size restrictions, trip limits and other gear restrictions.

The Mid-Atlantic and New England Fishery Management Councils initiated management of spiny dogfish (*Squalus acanthias*) pursuant to the Magnuson Stevens Fishery Conservation and Management Act (MSFMCA) of 1976 as amended by the Sustainable Fisheries Act (SFA) through the development of the Spiny Dogfish Fishery Management Plan. For most of the first two decades of extended jurisdiction under the Magnuson Act, the spiny dogfish was considered to be an "under-utilized" species of relatively minor value to the domestic fisheries of the US East Coast. With the decline of historically more important fishery resources in recent years, an increase in directed fishing for dogfish resulted in a nearly ten-fold increase in landings from 1987-1996. The most recent stock assessment (NEFSC 1998) indicated that the spiny dogfish stock in the Northwest Atlantic declined as a result of the increases in exploitation. A particular problem is the fact that the fishery targets mature female spiny dogfish due to their greater market value. Fishery expansion during the 1990's in combination with removal of a large portion of the adult female stock has resulted in the species being designated as overfished (NEFSC 1998). As a result, the Mid-Atlantic and New England Fishery Management Councils jointly developed the Spiny Dogfish Fishery Management Plan (FMP) which was submitted to the Secretary of Commerce during the spring of 1999.

The Spiny Dogfish Fishery Management Plan (FMP) was partially approved by NMFS on September 29, 1999, and the final rule implementing the FMP was published on January 10, 2000. Included among the approved management measures in the FMP was the requirement that the Mid-Atlantic Council and New England Council jointly develop annual specifications, which include a commercial quota to be allocated on a semi-annual basis, and other restrictions to assure that fishing mortality targets will not be exceeded. The quota is to be set at a level to assure that the F target specified for the appropriate year in the FMP will not be exceeded. The quota is specified for a fishing year that begins on May 1, and is subdivided into two semi-annual periods. The period from May 1-October 31 is allocated 57.9 % of the annual quota and the period from November 1-April 30 is allocated 42.1 % of the annual quota.

The FMP established an annual procedure to develop management measures for the upcoming fishing year based on analyses of the Spiny Dogfish Monitoring Committee. The Spiny Dogfish Monitoring Committee is a joint committee made up of staff representatives from the Mid-Atlantic Council, the Northeast Regional Office, the Northeast Fisheries Science Center, and state representatives. The state representatives include any individual designated by an interested state from Maine to Florida. In addition, the Committee includes two non-voting, ex-officio industry representatives (one each from the Mid-Atlantic and New England Council regions).

The Spiny Dogfish Monitoring Committee annually reviews the best available data including, but not limited to, commercial and recreational catch/landing statistics, current estimates of fishing mortality, stock status, the most recent estimates of recruitment, VPA results or length-based stock projection models, target mortality levels, beneficial impacts of size/mesh regulations, as well as the level of noncompliance by fishermen or states. The Spiny Dogfish Monitoring Committee makes an annual recommendation to the Councils' Joint Spiny Dogfish Committee of commercial and recreational measures designed to assure that the target mortality level for spiny dogfish is not exceeded.

The Spiny Dogfish Monitoring Committee met on September 19, 2002 and developed recommendations based upon updated stock conditions estimated from 2000-2002 Spring NEFSC trawl survey data. The Spiny Dogfish Monitoring Committee recommended a 4.0 million pound quota for spiny dogfish for the FY2003 fishing season to be divided into two semi-annual periods as follows: May-October, 2,316,000 pounds (57.9%) and November-April, 1,684,000 pounds (42.1%). The Spiny Dogfish Monitoring Committee also recommended a trip limit of 600 pounds for quota period 1 and 300 pounds for quota period 2. The Spiny Dogfish Monitoring Committee concluded by consensus that discards are a major issue for stock rebuilding and that discard mortality may be overwhelming the FMP objective of rebuilding female spawning stock biomass. As a result of discarding in other fisheries, fishing mortality could be greater than the F that will allow stock rebuilding. The Spiny Dogfish Monitoring Committee was also concerned with recent increases in Canadian landings which now exceed US landings. When the FMP was being developed, Canadian landings were of minor importance.

The Joint Spiny Dogfish Committee met on September 30, 2002 to consider the recommendations of the Spiny Dogfish Monitoring Committee and to determine appropriate annual adjustments to the quota and other management measures and make recommendations to the Councils. The Joint Spiny Dogfish Committee recommended that for FY2003 the Councils adopt a quota of 8.8 million pounds (4,000 mt). In addition, the Joint Committee recommended a possession limit of 7,000 pounds for quota period 1 and a 5000 pound trip limit for quota period 2 for the FY2003 fishing year. The Councils received the report of the Joint Dogfish Committee and adopted the recommendations as outlined in section 3.0 below.

2.0 Methods of Analysis

The Mid-Atlantic and New England Fishery Management Councils adopted recommendations relative to year five (FY2003) management measures for spiny dogfish at their respective meetings in October and November 2002. The Councils failed to reach agreement on the proposed measures for spiny dogfish in FY2003. As such, the respective measures recommended by each Council are presented and analyzed below. The FMP specifies that the Regional Administrator shall review the recommendations and, if necessary, modify the annual quota and other management measures to assure that the target F will not be exceeded. As noted above, the Regional Administrator may modify the recommendations using any of the measures that were not rejected by both Councils.

The basic approach adopted in this report is to examine the potential impacts upon the environment of the three alternative management measures. Alternatives (1) and (2) were adopted by the MAFMC and the NEFMC respectively, while the third alternative consists of no action. The MAFMC alternative contains the lowest quota (most restrictive scenario) while the no action alternative comprises the least restrictive scenario considered by the Councils. A description of these alternatives is given in Section 3.0 below.

3.0 Alternatives Being Considered

3.1 Alternative 1 (Mid-Atlantic Council Alternative)

Alternative 1 (the Mid-Atlantic Council alternative) includes a commercial quota of 4,000,000 pounds for FY2003. The quota is to be divided semi-annually with quota period 1 (May 1 through October 31) being allocated 2,316,000 pounds (57.9% of the 4,000,000 pound quota), and quota period 2 (November 1 through April 30) being allocated 1,684,000 pounds (42.1% of the 4,000,000 pound quota). In addition, trip limits of 600 pounds per trip and 300 pounds per trip are recommended for quota periods 1 and 2, respectively (vessels are prohibited from landing more than the specified amount in one calendar day). This alternative is designed to achieve the target F (= $F_{REBUILD}$ = 0.03), suspend directed fishing including the targeting of adult female spiny dogfish and allow for rebuilding of spiny dogfish spawning stock biomass. This alternative represents the status quo relative to the current fishing year (FY2002) for the commercial spiny dogfish fishery.

This is the preferred alternative. By achieving the F indicated in the FMP, this alternative will ensure that the rebuilding goals of the FMP are met.

3.2 Alternative 2 (New England Council Alternative)

Alternative 2 (the New England Council alternative) includes a commercial quota of 8,800,000 pounds for FY2003. The quota is to be divided semi-annually with quota period 1 (May 1 through October 31) being allocated 5,095,200 pounds (57.9% of the 8,800,000 pound quota), and quota period 2 (November 1 through April 30) being allocated 3,704,800 pounds (42.1% of

the 8,800,000 pound quota). In addition, trip limits of 7,000 pounds per trip and 5,000 pounds per trip are recommended for quota periods 1 and 2, respectively (vessels are prohibited from landing more than the specified amount in one calendar day). This alternative is designed to allow for a small scale directed fishery for spiny dogfish while still rebuilding spiny dogfish spawning stock biomass.

3.3. Alternative 3 (No Action Alternative)

Alternative 3 (the no-action alternative) would effectively remove regulatory control over the spiny dogfish fishery for FY2003. Given that no quota is specified in Alternative 3, landings are expected to return to the levels approximately equal to those observed in the unregulated period of the fishery (about 25 million pounds).

4.0 Affected Environment

4.1 Description of EFH

A description of essential fish habitat for spiny dogfish is given in Section 2.2.2 in the FMP.

4.2 Protected Resources Impacts

There are numerous species which inhabit the management unit of this FMP that are afforded protection under the Endangered Species Act (ESA) of 1973 (i.e., for those designated as threatened or endangered) and/or the Marine Mammal Protection Act of 1972 (MMPA). Eleven are classified as endangered or threatened under the ESA, while the remainder are protected by the provisions of the MMPA. The Council has determined that the following list of species protected either by the Endangered Species Act of 1973 (ESA), the Marine Mammal Protection Act of 1972 (MMPA), or the Migratory Bird Act of 1918 may be found in the environment utilized by spiny dogfish:

Cetaceans

Species	Status
Northern right whale (*Eubalaena glacialis*)	Endangered
Humpback whale (*Megaptera novaeangliae*)	Endangered
Fin whale (*Balaenoptera physalus*)	Endangered
Blue whale (*Balaenoptera musculus*)	Endangered
Sei whale (*Balaenoptera borealis*)	Endangered
Sperm whale (*Physeter macrocephalus*)	Endangered
Minke whale (*Balaenoptera acutorostrata*)	Protected
Beaked whales (*Ziphius and Mesoplodon spp*.)	Protected
Risso's dolphin (*Grampus griseus*)	Protected
Pilot whale (*Globicephala spp*.)	Protected
White-sided dolphin (*Lagenorhynchus acutus*)	Protected

Common dolphin (*Delphinus delphis*)	Protected
Spotted and striped dolphins (*Stenella spp*.)	Protected
Bottlenose dolphin (*Tursiops truncatus*)	Protected

Sea Turtles

Species	Status
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered
Green sea turtle (*Chelonia mydas*)	Endangered
Hawksbill sea turtle (*Eretmochelys imbricata*)	Endangered
Loggerhead sea turtle (*Caretta caretta*)	Threatened

Fish

Species	Status
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered
Atlantic salmon (*Salmo salar*)	Endangered

Birds

Species	Status
Roseate tern (*Sterna dougallii dougallii*)	Endangered
Piping plover (*Charadrius melodus*)	Endangered

Critical Habitat Designations

Species	Area
Right whale	Cape Cod Bay

As for protected marine mammals, species that may be potentially impacted by this fishery include bottlenose dolphin, pilot whale, fin whale, humpback whale, right whale, harbor porpoise, harbor seal and four species of beaked whales. The range of these species and spiny dogfish overlap. As such, there always exists a potential for an incidental kill. These potential interactions are described in section 4.3 of the EA.

4.3 Fishery Classification under Section 114 of Marine Mammal Protection Act

Under section 114 of the of the Marine Mammal Protection Act (MMPA) of 1972, NMFS must publish, and annually update, the List of Fisheries (LOF) which places all U.S. commercial fisheries in one of three categories based on the level of incidental serious injury and mortality of marine mammals in each fishery (arranging them according to a two tiered classification system). The categorization of a fishery in the LOF determines whether participants in that fishery may be required to comply with certain provisions of the MMPA, such as registration,

observer coverage, and take reduction plan requirements. The classification criteria consists of a two tiered, stock-specific approach that first addresses the total impact of all fisheries on each marine mammal stock (Tier 1) and then addresses the impact of the individual fisheries on each stock (Tier 2). If the total annual mortality and serious injury of all fisheries that interact with a stock is less than 10% of the Potential Biological Removal (PBR) for the stock then the stock is designated as Tier 1 and all fisheries interacting with this stock would be placed in Category III. Otherwise, these fisheries are subject to categorization under Tier 2. Under Tier 2, individual fisheries are subject to the following categorization:

I. Annual mortality and serious injury of a stock in a given fishery is greater than or equal to 50% of the PBR level;

II. Annual mortality and serious injury of a stock in a given fishery is greater than one percent and less than 50% of the PBR level; or

III. Annual mortality and serious injury of a stock in a given fishery is less than one percent of the PBR level.

Under Category I, there is documented information indicating a "frequent" incidental mortality and injury of marine mammals in the fishery. In Category II, there is documented information indicating an "occasional" incidental mortality and injury of marine mammals in the fishery. In Category III, there is information indicating no more than a "remote likelihood" of an incidental taking of a marine mammal in the fishery or, in the absence of information indicating the frequency of incidental taking of marine mammals, other factors such as fishing techniques, gear used, methods used to deter marine mammals, target species, seasons and areas fished, and species and distribution of marine mammals in the area suggest there is no more than a remote likelihood of an incidental take in the fishery. "Remote likelihood" means that it is highly unlikely that any marine mammal will be incidentally taken by a randomly selected vessel in the fishery during a 20-day period.

The first formal Section 7 consultation for the Spiny Dogfish FMP, required under the Endangered Species Act, was completed on August 13, 1999. The Biological Opinion concluded that fishing activities conducted under the FMP and its implementing regulations were not likely to jeopardize the continued existence of any endangered or threatened species under the jurisdiction of NMFS or result in the destruction or adverse modification of right whale habitat. On May 4, 2000 the NMFS Office of Protected Resources (NE Region) requested re-initiation of a formal Section 7 consultation for the Spiny Dogfish Fishery. The Biological Opinion concluded that the NMFS prosecution of federal fisheries managed under the Spiny Dogfish Plan, as modified by the Atlantic Large Whale Take Reduction Plan, is not likely to destroy or adversely modify critical habitat designated for the right whale, but is likely to jeopardize the continued existence of the western North Atlantic right whale. The Biological Opinion also concluded that the NMFS' prosecution of the fisheries under the Spiny Dogfish FMP is not likely to jeopardize the continued existence of humpback, fin, sei, blue, and sperm whales; or loggerhead, Kemp's Ridley, green, leatherback, or hawksbill sea turtles. The Biological Opinion identified a

reasonable and prudent alternative with multiple management components that is designed to avoid the likelihood that fisheries managed under this FMP will jeopardize the continued existence of the right whale.

The most recent Biological Opinion (June 14, 2001) made special note of the fact that the FMP, if implemented as written, would dramatically reduce directed fishing effort in the spiny dogfish fishery. This in turn is expected to greatly reduce the chance of interaction with endangered or threatened marine mammals and sea turtles. The MAFMC alternative implements the FMP. The reductions in fishing mortality proposed under Alternative 1 for FY2003 will result in significant reductions in fishing effort that, in turn, will reduce interactions with protected species including marine mammals and sea turtles. Recently published estimates of harbor porpoise bycatch for both the NE sink gill net and Mid-Atlantic coastal gill net fisheries in 1999 and 2000 indicate substantial reductions from harbor porpoise mortality and serious injury relative to historical estimates. The combination of protection measures under the HPTRP and management measures consistent with the rebuilding plan (i.e., Alternative 1) were sufficient to reduce the bycatch of harbor porpoise below PBR levels.

In May of 2000, the NMFS issued an emergency rule to close the waters along the coasts of North Carolina and Virginia to fishing with gill nets with a mesh size of 6 inches or larger to protect endangered and threatened sea turtles. This emergency action was in response to the unprecedented number of dead sea turtles which washed ashore on the North Carolina Outer Banks in April and May 2000. The vast majority of the turtles stranded during this event were loggerheads which is a threatened species. Four of the loggerheads that stranded in May were entangled in gill nets of 10 to 12 inches. NMFS analysis at the time of this closure indicated that the gill net fisheries for monkfish and dogfish were the fisheries most likely to be active during the time and area of the strandings. However, it is unlikely that gill nets of that size were used in the spiny dogfish fisheries which typically use mesh sizes much smaller than 10 inches. None the less, there still exists the chance that some of these interactions occurred as a result of the directed spiny dogfish fishery which remained unregulated until May of 2000. However, the proposed quota of 4.0 million pounds and low trips limits under the MAFMC alternative will effectively end the directed spiny dogfish fishery. As a result, the cessation of the directed dogfish fishery (Alternative 1) should virtually eliminate interactions between the dogfish fishery and sea turtles.

NMFS is currently developing a take reduction plan to reduce injuries and deaths to Atlantic bottlenose dolphins caused by fishing gear in federal waters of the Mid- and South Atlantic. A Bottlenose Dolphin Take Reduction Team was convened in November of 2001 under authority of the MMPA. The team consists of more than 40 stakeholders including those in the commercial and recreational fishing industry, the conservation community, federal and state governments, academic and scientific organizations, fishery management councils, and interstate fisheries commissions. The team was formed to develop recommendations to reduce deaths and injuries to bottlenose dolphins. Category II fisheries under the MMPA received a high priority with respect to observer coverage and consideration for measures under the Atlantic Bottlenose Dolphin Take Reduction Plan.

In 2001, the North Carolina inshore gillnet fishery was re-classified from a Category III to a Category II fishery. This change followed an evaluation of NMFS Sea Sampling data which demonstrated that inshore gillnet gear incidentally injured and killed Atlantic bottlenose dolphin (Western North Atlantic stock) during 1993-1997. Based on data presented in the proposed list of fisheries for 2001, 8 of the12 Atlantic bottlenose dolphins that died as a result of fishery interactions bore evidence of possible gill net interactions. Further evaluation of these data resulted in the conclusion that serious injury and mortality of bottlenose dolphin from the North Carolina inshore gillnet fishery is estimated to be between 1 and 50 percent of the PBR level.

Since the implementation of management measures in 2001 designed to largely eliminate the directed spiny dogfish fishery on the Atlantic coast, the North Carolina inshore gillnet fishery for spiny dogfish has disappeared. Compared to an average catch of 2.5 million pounds of spiny dogfish from 1997-2000, the North Carolina inshore gillnet fishery caught 0 pounds of spiny dogfish in 2001. Because 4 out of 15 observed Atlantic bottlenose dolphin takes from 1995 - 2000 were associated with the North Carolina spiny dogfish gillnet fishery, the elimination of this fishery should generate a major reduction in takes for this species.

4.4 Port and Community Description

A description of the ports and communities dependent upon spiny dogfish is given in the FMP (Mid-Atlantic Fishery Management Council, et. al., February 1999).

5.0 Description of Fisheries

5.1 Status of the Stock

The most recent peer-reviewed evaluation of the status of the Northwest Atlantic spiny dogfish stock was conducted at the 26th Northeast Regional Stock Assessment Workshop (NEFSC 1998). The results of that stock assessment indicate that biomass of spiny dogfish increased steadily beginning in the early 1970's, but then began to decline in the early 1990's following increases in exploitation. Starting in the mid-1990's, estimated fishing mortality exceeded the level which allows for replacement of the stock (F_{rep} = 0.11 [Applegate et al. 1998]; F_{1992} = 0.17; F_{1993} = 0.11; F_{1994} = 0.24; F_{1995} = 0.32; F_{1996} = 0.18; F_{1997} = 0.41 [NEFSC 1998]). Although fishable biomass (defined as biomass of dogfish $\geq$ 31.5 in) increased six-fold from around 100 million pounds in 1969 to a peak of over 600 million pounds in 1989, it declined to less than 331 million pounds by 1997.

Different trends in the male and female components of stock biomass are consistent with the preferential harvest of females by the spiny dogfish fishery (NEFSC 1998). The female component of fishable biomass declined by 50% from 1990 to 1997 while the male component remained relatively stable. Length frequencies from fishery-independent surveys and commercial landings indicate a decrease in the average size of female spiny dogfish in recent years. In the 1997 NEFSC spring trawl survey, 75% of the females were below L_{50} (the size at which 50%

of females are reproductively mature; NEFSC 1998). The mean length of female spiny dogfish in the commercial fishery declined from 38 inches in 1982 to 33 inches (84 cm) in 1996.

Targeting of adult females by the spiny dogfish fishery in the1990s appears to have greatly compromised the reproductive capacity of the stock. Prior to the increases in exploitation, the spiny dogfish stock included an accumulation of large adult females (>80 cm) and a substantial number of small dogfish (<40 cm) which were the offspring from the reserve of adult females. Following the reductions in the adult female portion of the stock, pup production declined dramatically. The survey indices for pups have been the lowest in the time series for the past six consecutive years (1997-2002), indicating recruitment failure, as a result of the dramatic reduction in adult female biomass.

An update of the status of the spiny dogfish stock was presented at the September 2002 meeting of the Spiny Dogfish Monitoring Committee based on the most recent (through spring 2002) audited NEFSC spring trawl survey data. The current three year (2000-2002) moving average of adult female biomass is 72.6 mt vs 68.4 mt for the previous (1999-2001) value. The biomass estimates of adult male dogfish is essentially unchanged. The 2000-2002 average of total stock biomass was 377 mt compared to 380 mt for 1999-2001. The Spiny Dogfish Monitoring Committee concluded that, based on recent survey updates, stock abundance, including female SSB, appears to be stable. This contrasts the pronounced declines of previous years.

Based on NEFSC survey catches of dogfish less than 36 cm, pup production in 2002 was poor for the sixth consecutive year. NMFS is collecting additional information about the relationship between female spiny dog fish size and fecundity, size at maturity and the size and mortality of pups.

The Spiny Dogfish Monitoring Committee recommended that a new method of estimating fishing mortality be developed because lags inherent in the current method prevent detection of recent changes in mortality. This issue should be addressed in the development of Amendment 1 and be evaluated in the upcoming SARC which is scheduled for the spring of 2003.

5.2 Stock Characteristics and Ecological Relationships

A description of spiny dogfish stock characteristics and ecological relationships is given in Section 2.1.3 in the FMP.

5.3 Economic and Social Environment

5.3.1 Description of the Fisheries for Dogfish

5.3.1.1 Historical Commercial Fishery

A description of the historical fishery for spiny dogfish is given in Section 2.3.1 of the FMP. Updated information in Tables 1-3 allow comparison of recent landings with historic levels.

5.3.1.2 Description of 2001 Commercial Fishery

A total of 4.94 million pounds of spiny dogfish valued at 1.126 million dollars was landed commercially during FY2001 based on unpublished NMFS dealer reports (see Tables 4, 5). These landings include dogfish landed in the "unclassified" category. Spiny dogfish were landed in all months in FY2001 with peak landings occurring in May and November - the months beginning each period (Table 4). Massachusetts accounted for the largest share of the landings (79.2 %), followed by New Hampshire (10.6 %), Rhode Island (6.7 %), Virginia (1.8%) and New York (1.1 %) (Table 4).

Landings by port for FY2001 are given in Table 6. Chatham, MA accounted for the largest share of the landings (64.8%), followed by Gloucester, MA (6.2%), Plymouth, MA (4.8%), Newport, RI (4.6%), Portsmouth, NH (3.7%), "Unspecified", NH (3.1%), Hampton/Seabrook, NH (2.1%), Point Judith, RI (2.0%), Rye, NH (1.8%), Other Accomac, VA (1.7%), Rockport, MA (1.3%), and other (4.0%). The value of spiny dogfish landings by port relative to total landings value by port is given in Table 7.

The 2001 spiny dogfish fishery was dramatically reduced compared to previous years. The 2001 catch (4.9 million pounds) is about 13% of the average catch from 1994-2000 (36.4 million pounds). Important changes also took place with regard to the relative importance of gear types used to harvest spiny dogfish (Table 8). While gillnet landings comprised an average of 75.8% of total spiny dogfish landings from 1994 - 2000, gillnets contributed only 33.1% in 2001. Additionally, trawl landings were reduced from a 1994-2000 average of 15.5% of total landings to 9.8% of the total in 2001. A large increase in proportional landings by gear occurred in the line fishery (includes longline and handline). Although 2001 spiny dogfish landings by the line fishery (2.83 million pounds) were fairly consistent with the 1994-2000 average (2.93 million pounds), landings increased from 8.0% to 56.7 % as a proportion of total catch, making this the most important gear component of the spiny dogfish fishery in 2001 (Table 8).

5.3.1.3 Analysis of Human Environment/Permit Data

According to unpublished NMFS permit file data, 2,825 vessels possessed federal spiny dogfish permits in FY2001. The distribution of these vessels by home port state is given in Table 9. Most of these vessels were from the states of Massachusetts (41.5%), Maine (11.8%), New York (11.0%), New Jersey (8.2%), Rhode Island (6.3%), Virginia (5.4%), North Carolina (5.1%) and New Hampshire(4.2%) and other states (6.5%). Of the 2,825 vessels with spiny dogfish permits in FY2001, NMFS dealer reports identified 280 vessels which landed 4.94 million pounds of spiny dogfish valued at $1.126 million. Most of these vessels were from the states of Massachusetts (41.8%), New York (22.9%), New Hampshire (11.3%), Rhode Island (8.5%), Maine (6.0%), New Jersey (2.8%), North Carolina (2.1%), Unknown (2.1%) and other states (1.1%) (Table 5). Data for North Carolina are incomplete with respect to vessel activity due to data confidentiality constraints.

NMFS dealer report data indicate that 232 dealers possessed spiny dogfish dealer permits in

2001. The distribution of these dealers by state is given in Table 10. Of the 232 dealers who possessed spiny dogfish dealer permits in FY2001, there were 53 dealers who reported buying spiny dogfish (Table 10) These dealers were from the states of Massachusetts (34.0%), New York (28.3%), Rhode Island (15.1%), Virginia (7.5%), and other states (15.1%). Data for North Carolina are incomplete with respect to dealer activity due to data confidentiality constraints.

5.3.1.4 Recreational Fishery for spiny dogfish

Estimates of recreational catch and landings of dogfish were obtained from the NMFS Marine Recreational Fishery Statistics Survey (MRFSS). Recreational catch data have been collected in a consistent fashion since 1981. Methodological differences between the current survey and intermittent surveys before 1981 preclude the use of the earlier data. The MRFSS consists of two complementary surveys of anglers *via* on-site interviews and households *via* telephone. The angler-intercept survey provides catch data and biological samples while the telephone survey provides a measure of overall effort. Surveys are stratified by state, type of fishing (mode), and sequential two-month periods (waves). Annual catches pooled over all waves and modes and grouped by subregion (Maine to Connecticut, New York to Virginia and North Carolina to Florida) were examined.

Catches are partitioned into three categories: A, B1, and B2. Type A catches represent landed fish enumerated by the interviewer, while B1 are landed catches reported by the angler. Type B2 catches are those fish caught and returned to the water. In as much as dogfish are generally caught with live bait and are often mishandled by anglers, NEFSC (1998) assumed 100% discard mortality. The MRFSS provides estimates of landings in terms of numbers of fish. Biological information on dogfish is generally poor, resulting in wide annual fluctuations in mean lengths and weights. As a result, to compute total catch in weight NEFSC (1998) assumed an average weight of 5.5 pounds (2.5 kg) per fish for all years. This assumption was used to the estimate recreational catch in weight.

Recreational landings are given in Table 1. Excluding the recreational estimate for 1981, total recreational catches increased from about 150,000 pounds in 1982-83 to greater than 900,000 pounds in 1989. Since then the estimated weight of the spiny dogfish recreational catch has declined. Total catch in weight declined to 56,881 pounds in 1996, increased to 146,295 pounds in 1997 and reached an all time low of about 11,237 pounds in 2000. The weight of the recreational catch in 2001 was estimated to be 61,760 pounds.

The total number of spiny dogfish caught (Type A + B1 + B2) increased six-fold from 1982-1989. In the North Atlantic subregion (Maine-Connecticut), catches peaked in 1988 at 110,000 fish and declined to fewer than 10,000 in 1991, reached a low of less than 900 fish in 2000 and increased to about 4,200 fish in 2001.. Peak catches of 38,000 fish occurred in the Mid-Atlantic states (New York-Virginia) in 1990. The catch declined to about 4,000 fish in 1996, reached a low of 1,100 fish in 2000, and increased to about 7,000 fish in 2001. Catches of spiny dogfish from North Carolina to Florida are highly variable, but are generally lower than observed in the Mid-Atlantic and New England states.

NEFSC (1998) considered the possibility that recreational catches may simply reflect increased reporting by anglers. If so, there should be no relation between catch and fishery-independent indices of abundance. The log of total catch was significantly correlated (r = 0.62, p value = 0.015) with the log of average weight per tow from the NEFSC spring research vessel survey. Thus, increases in recreational catches roughly parallel increases in abundance and the hypothesis of an increased reporting rate was not supported (NEFSC 1998).

Even when all of the Type B2 catch is assumed to die after release, recreational catches constitute only about 2.5% of the total landings. Therefore, any imprecision in the estimation of recreational landings is considered inconsequential relative to the commercial landings and discards, especially in recent years.

5.3.2 Description of areas fished

Spiny dogfish landings in 2001 by NMFS NER statistical area are given in Table 11. Statistical areas 521, 514, 513, 539, and 526 accounted for greater than 97% the commercial spiny dogfish landings in 2001, with statistical area 521 comprising 62.9% of the total. Note the difference between VTR reported total landings (3.424 million pounds) and total landings from dealer reports (4.941 million pounds).

6.0 Environmental Consequences and Preliminary Economic Evaluation (PREE) of the Alternatives

6.1 Impacts of Alternative 1 - Mid-Atlantic Council Alternative

6.1.1 Biological Impacts of Alternative 1

The 4,000,000 pound quota included in the Mid-Atlantic Council Alternative was arrived at by estimating the landings that would correspond to the target fishing mortality rate (= $F_{REBUILD}$ = 0.03). Constraining harvest to levels needed to achieve the rebuilding F should have the effect of increasing female SSB, which should increase recruitment and thus contribute to overall stock recovery. The relatively limited harvest that occurred in FY2001 may have already contributed to the apparent stabilization in stock size observed in the most recent swept area biomass estimates (see Section 5.1 Status of the Stock).

An explicit goal of the FMP is to temporarily eliminate the directed spiny dogfish fishery, which is known to target large female spiny dogfish. In order to achieve this goal, trip limits should be restrictive enough to reduce landings of spiny dogfish and encourage vessel owners to direct on other species and avoid spiny dogfish. Thus, the Mid-Atlantic Council proposes a 600 pound trip limit in quota period 1 and a 300 pound trip limit in quota period 2 for the purpose of ending the directed fishery. The trip limits of 600 pounds and 300 pounds for quota periods 1 and 2, respectively, would have similar impacts on spiny dogfish trips during their respective quota periods, based on an analysis of NMFS landings data (see Trip Limit Analysis in RIR below). A trip limit of 300 pounds during quota period 2 and a trip limit of 600 pounds during quota period

1, would impact approximately 66% and 60% of spiny dogfish trips, respectively. These trip limits would help ensure that the F = 0.03 target is achieved because they will largely eliminate the directed spiny dogfish fishery.

An analysis of the trip limits determined the regulatory savings and discards of spiny dogfish based on economic decisions of vessels when faced with a trip limit. This analysis indicates that trip limits in combination with a low commercial quota would produce a high level of regulatory discards because spiny dogfish are encountered, landed and discarded in nearly all major fisheries in the region. However, the goal of the Spiny Dogfish FMP and the FY2003 specifications is to eliminate the directed fishery in order to meet the F=0.03 target. The Spiny Dogfish FMP demonstrated that high discards are also associated with the directed fishery because the landed fish are primarily large females and all other fish are discarded. Allowing for a directed fishery would increase the likelihood that the goals of the Spiny Dogfish FMP will not be achieved. In addition, since dogfish is a low value species that is difficult to handle onboard vessels, discards represented in the trip limit analyses may be overestimated since vessel owners are expected to make efforts to avoid spiny dogfish while targeting other species.

The primary goal of the FMP is to rebuild the spawning stock biomass of the spiny dogfish stock to levels which will support directed harvest at long term, sustainable levels. The recent unregulated fishery, left unchecked, would deplete the adult spawning portion of the stock by about 90% within ten years leading to stock collapse. Yields would be expected to plummet and the Councils would be faced with an extended rebuilding period which could be decades in duration. The FMP stipulates rebuilding of the adult spawning stock in the short term and then allows for a sustainable directed fishery. This alternative is designed to allow the spiny dogfish fishery to rebuild and, therefore, is expected to have a positive biological impact on the species.

6.1.2 Socioeconomic Impacts of Alternative 1

Changes in gross revenues anticipated for Alternative 1 in FY2003 were estimated by comparison to FY2001 since it is the latest *complete* fishing year. Because the specifications would remain unchanged, revenues from dogfish harvest under Alternative 1 should be equivalent with dogfish revenues from the FY2001 reference year outside of changes in market value. Note, however, that the FY2001 quota (4.00 million pounds) is 19.0% less than what was actually landed (4.94 million pounds). Therefore, a reduction in dogfish revenues is expected under the Alternative 1 quota despite the consistency in the quota specifications. Assuming participation in the FY2003 dogfish fishery is identical to that observed in FY2001, the fleet should experience a decrease in dogfish fishing opportunity equal to the decrease associated with full compliance (19.0%). If the 19.0% decrease in dogfish fishing opportunity is applied evenly to dogfish revenue for each vessel in the FY2001 reference fleet, and revenue from participation in other fisheries remains constant, the change in gross revenue per vessel can be calculated. Based on this method of evaluation, gross revenues for vessels engaged in the directed spiny dogfish fishery are expected to decline by an average of 1.02%. There are 43 vessels (15.4% of the fleet) that are expected to experience a decrease in gross revenue greater than 1%, 16 vessels (5.7% of

the fleet) that are expected to experience a decrease in gross revenue greater 5% and 10 vessels (3.6% of the fleet) that are expected to experience a decrease in gross revenues greater than 10%. It is important to note that revenue losses will differ from these estimated values if the market price changes for the dogfish fishery or any other fishery relative to FY2001 and/or if actual harvest differs from the proposed quota.

Frequency distribution of vessel length and gross registered tonnage for vessels that landed spiny dogfish in FY2001 are presented in Table 12. Of the 280 vessels that reported landing spiny dogfish in FY2001, unpublished NMFS permit file data contain vessel length and gross tonnage information for 277 vessels. The length distribution of these vessels was as follows: less than 24 ft length class: 1 vessel (0.4%); 25-49 ft length class: 194 vessels (70.0%); 50-74 ft length class: 68 vessels (24.5%); 75ft plus length class: 14 vessels (5.1%). The tonnage distribution of these vessels was as follows: class 1: 12 vessels (4.3%); class 2: 214 vessels (77.3%); class 3: 43 vessels (15.5%); class 4: 8 vessels (2.9%).

Gross revenue impacts expected for Alternative 1 specifications were analyzed to determine whether the impact would be equitable among the length and tonnage classes. The results, (Table 13) indicate some differences. For example, 70.0% of the 277 vessels (with length and tonnage info) which landed spiny dogfish in FY2001 were in the 25-49 ft length class, but 92.9% of the vessels expected to have a greater than 1% decrease in gross revenues were in this length class, 93.3% of the vessels expected to have a greater than 5% decrease in gross revenues were in this length class and 88.9% of the vessels expected to have a greater than 10% decrease in gross revenues were in this length class. Similarly, while 77.3% of the 277 vessels (with length and tonnage info) which landed spiny dogfish in FY2001 were in the class 2 tonnage class, 90.5% of the vessels expected to have a greater than 1% decrease in gross revenues were in this tonnage class and 86.7% of the vessels expected to have a greater than 5% decrease in gross revenues were in this tonnage class.

Gross revenue impacts expected for Alternative 1 specifications were also analyzed to determine whether the impacts would be equitable by home port state (Table 14). Overall, Massachusetts is expected to incur the greatest impact in terms of percentage of affected vessels. For example, while 42.2% of the vessels that landed spiny dogfish in FY2001 claim Massachusetts as their home port state, 76.2% of the vessels expected to have > 1% decrease were from Massachusetts, 86.7% of the vessels expected to have > 5% decrease were from Massachusetts and 88.9% of the vessels expected to have > 10% decrease in gross revenues were from Massachusetts.

In addition to the quota of 4.0 million pounds, the MAFMC recommended the continuation of status quo trip limits of 600 pounds in quota period 1 and 300 pounds during quota period 2 in FY2003. Trip limit analysis (see Section 3.3.1 in RIR below) addressed a number of the impacts of these limits. The Mid-Atlantic Council's rational for the 600/300 pound recommendation is as follows: 1) the intent of the FMP was to close the directed fishery for adult female spiny dogfish after year one and allow only for incidental catch of spiny dogfish during the rebuilding period; 2) low trip limits should discourage a derby fishery; and 3) the 600 and 300 pound limits should equitably distribute landings during the fishing year and along the coast.

While the short term economic and social impacts of the status quo trip limits are negative compared to higher trip limits (Alternative 2) or an unregulated fishery (Alternative 3), stock rebuilding is expected to proceed according to the approved rebuilding schedule. Among the three alternatives, Alternative1 rebuilds the stock fastest and thus economic and social benefits of a recovered stock will be achieved more quickly.

6.1.3 EFH Impacts of Alternative 1

Spiny dogfish have EFH designated in many of the same bottom habitats that have been designated as EFH for most of the 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. Broadly, EFH is designated as the bottom habitats consisting of varying substrates (depending upon species) within the Gulf of Maine, Georges Bank, and the continental shelf off southern New England and the mid-Atlantic south to Cape Hatteras for the juveniles and adults of these groundfish. In general, these areas are the same as those designated for spiny dogfish. For a more detailed description of the spiny dogfish's EFH, please see the "Description of Habitat" section in the spiny dogfish FMP. (Mid-Atlantic Fishery Management Council, et. al., February 1999).

Fishing activities for spiny dogfish occur in these EFH areas. Gears utilized to harvest spiny dogfish include otter trawls, gill nets and lines. Of these gears, the otter trawl is the most likely to be associated with adverse impacts to bottom habitat since it is a bottom-tending mobile gear. The primary impact associated with this type of gear is reduction of habitat complexity (Auster and Langton, 1998).

The spiny dogfish FMP includes a stock rebuilding program which will result in fishing effort reductions in excess of 90% compared to an unregulated fishery. This should reduce gear impacts to bottom habitats by reducing the harvest of the managed species within this FMP. Any reductions in harvesting effort may indirectly benefit EFH by creating an overall reduction of disturbance by a gear type that impacts bottom habitats. Other management actions already in place should control redirection of effort into other bottom habitats

Important changes took place in 2001 with regard to the relative importance of gear types used to harvest spiny dogfish. A large increase in proportional landings occurred in the line fishery (includes longline and handline). Although 2001 spiny dogfish landings by the line fishery (2.83 million pounds) were fairly consistent with the 1994-2000 average (2.93 million pounds), landings as a proportion of total catch increased from 8.0% to 56.7% making this the most important gear category for the spiny dogfish fishery in 2001. Gear used by the line fishery is not expected to adversely affect essential fish habitat since it is not in contact with the seabed. The increase in the relative importance of line gear came about because of the reductions in gillnet landings (reduced from a 1994-2000 average of 27.64 million pounds to 1.65 million pounds in 2001) and in trawl landings (reduced from a 1994-2000 average of 5.65 million pounds to 0.49 million pounds in 2001). The current distribution of gear effort by gear type is

expected to be maintained in FY2003 if Alternative 1 is adopted. Additionally, since the quota proposed under Alternative 1 represents the FY2002 status quo, it should not increase fishing effort. This alternative is not expected to adversely affect essential fish habitat.

6.1.4 Protected Resources Impacts of Alternative 1

Alternative 1 implements the FMP for FY2003 and should minimize the chance of interactions between the spiny dogfish fishery and endangered or threatened marine mammals and sea turtles by maintaining the substantial reductions in fishing effort compared to the unregulated fishery that existed prior to FY2000.

Thus far, the combination of protective measures under the HPTRP and management measures consistent with the spiny dogfish rebuilding plan (i.e., Alternative 1) have been sufficient to reduce the bycatch of harbor porpoise below PBR levels. This trend should be maintained in FY2003 under Alternative 1.

Among the various components of the spiny dogfish fishery, the North Carolina gillnet fishery for spiny dogfish has been particularly important (historically) in takes of both sea turtles and Atlantic bottlenose dolphins (see Section 4.3). In FY2001, and under status quo specifications proposed to be maintained by Alternative 1, the gillnet fishery for spiny dogfish in North Carolina was eliminated. Implementation of Alternative 1 in FY2003 should maintain the reduced interaction between the spiny dogfish fishery, sea turtles and Atlantic bottlenose dolphins.

6.2 Impacts of Alternative 2 - New England Council Alternative

6.2.1 Biological Impacts of Alternative 2

The biological impacts associated with the increase in annual quota under this alternative are expected to be generally negative compared to the status quo in that the annual fishing mortality rate ($F = 0.06$ under this alternative) would exceed the rate consistent with the accepted stock rebuilding schedule ($F = 0.03$). Additionally, a daily trip limit designed to allow for directed fishing would likely encourage targeting of larger fish (i.e., adult females), the protection of which is deemed to be particularly important for the rebuilding process. Increased effort associated with Alternative 2 is expected to have relatively negative consequences for spiny dogfish and non-target species compared to the status quo.

6.2.2 Socioeconomic Impacts of Alternative 2

The Alternative 2 quota specification would constitute a 120% increase in landings relative to the status quo quota (4.0 million pounds) and a 79.6% increase in landings relative to actual landings (4.94 million pounds) in the FY2001 reference year. Changes in gross revenues anticipated for Alternative 2 in FY2003 were estimated by comparison to FY2001 since it is the

latest complete fishing year. Because the specifications would increase landings, revenues from dogfish harvest under Alternative 2 should also increase. Assuming participation in the FY2003 dogfish fishery is identical to that observed in FY2001, the fleet should experience an increase in dogfish fishing opportunity equal to the increase associated with achieving the new quota (79.6%). If the 79.6% increase in dogfish fishing opportunity is applied evenly to dogfish revenue for each vessel in the FY2001 reference fleet, and revenue from participation in other fisheries remains constant, the change in gross revenue per vessel can be calculated. Based on this method of evaluation, gross revenues for vessels engaged in the directed spiny dogfish fishery are expected to rise by an average of 4.22%. There are 84 vessels (30.0% of the fleet) that are expected to experience an increase in gross revenue greater than 1%, 40 vessels (14.3% of the fleet) that are expected to experience an increase in gross revenue greater 5% and 24 vessels (8.6% of the fleet) that are expected to experience an increase in gross revenues greater than 10%. It is important to note that revenue changes will differ from estimated values if the market price changes for the dogfish fishery or any other fishery relative to FY2001 and/or if actual harvest differs from the proposed quota.

A frequency distribution of vessel length and gross registered tonnage for vessels that landed spiny dogfish in FY2001 are presented in Table 8. Of the 280 vessels that reported landing spiny dogfish in FY2001, unpublished NMFS permit file data contain vessel length and gross tonnage information for 277 vessels. The length distribution of these vessels was as follows: less than 24 ft length class: 1 vessel (0.4%); 25-49 ft length class: 194 vessels (70.0%); 50-74 ft length class: 68 vessels (24.5%); 75ft plus length class: 14 vessels (5.1%). The tonnage distribution of these vessels was as follows: class 1: 12 vessels (4.3%); class 2: 214 vessels (77.3%); class 3: 43 vessels (15.5%); class 4: 8 vessels (2.9%).

Gross revenue impacts expected for Alternative 2 specifications were analyzed to determine whether the impact would be equitable among the length and tonnage classes. Results (Table 15) indicate some differences. For example, 70.0% of the 277 vessels (with length and tonnage information) which landed spiny dogfish in FY2001 were in the 25-49 ft length class, but 84.1% of the vessels expected to have a greater than 1% increase in gross revenues were in this length class, 92.3% of the vessels expected to have a greater than 5% increase in gross revenues were in this length class and 95.7% of the vessels expected to have a greater than 10% increase in gross revenues were in this length class. Similarly, while 77.3% of the 277 vessels which landed spiny dogfish in FY2001 were in the class 2 tonnage class, 89.0% of the vessels expected to have a greater than 1% increase in gross revenues were in this tonnage class, 89.7% of the vessels expected to have a greater than 5% increase in gross revenues were in this tonnage class, and 91.3% of the vessels expected to have a greater than 10% increase in gross revenues were in this tonnage class.

Gross revenue impacts expected for Alternative 2 specifications were also analyzed to determine whether the impacts would be equitable by home port state (Table 16). Overall, Massachusetts is expected to incur the greatest impact in terms of percentage of affected vessels. While 42.2% of the vessels that landed spiny dogfish in FY2001 claim Massachusetts as their home port state, 64.6% of the vessels expected to have >1% increase, 76.9% of the vessels expected to have >

5% increase, and 87.0% of the vessels expected to have > 10% increase in gross revenues were from Massachusetts.

In addition to the quota of 8.8 million pounds, the NEFMC recommended trip limits of 7,000 pounds in quota period 1 and 5,000 pounds during quota period 2 in FY2003. Extensive evaluation of these trip limits was done through trip limit analysis (see section 3.3.1 in RIR below). The New England Council's rational for the larger trip limits (compared to 600 and 300 pounds in Alternative 1) is as follows: 1) convert discards to landings; 2) allow for a limited directed fishery for spiny dogfish. The short term economic and social impacts of the larger trip limits are expected to be positive compared to the Alternative 1. However, a delay in stock rebuilding is also expected since corresponding fishing mortality would exceed 0.06 (F = 0.03 is the approved rebuilding fishing mortality rate). The higher fishing mortality rate is expected to have negative economic and social consequences in the longer term, since the establishment of directed sustainable harvest would be delayed for an indefinite period.

6.2.3 EFH Impacts of Alternative 2

The quota and trip limits proposed under Alternative 2 would result in continued reduction of directed fishing (compared to the no-action alternative) that, in turn, will indirectly benefit EFH by maintaining the reduction in the disturbance by a gear type that impacts bottom habitats. However, compared to Alternative 1, Alternative 2 would be expected to result in increased fishing effort which could increase the chance that EFH would be negatively effected, especially if trawl use increased as a consequence.

6.2.4 Protected Resources Impacts of Alternative 2

Because Alternative 2 is designed to establish a small scale directed fishery in FY2003, the corresponding increase in fishing effort brought about by this action may also elevate (relative to the status quo) the probability of interactions between the spiny dogfish fishery and endangered or threatened marine mammals and sea turtles.

Thus far, the combination of protective measures under the HPTRP and management measures consistent with the spiny dogfish rebuilding plan (maintained via Alternative 1) have been sufficient to reduce the bycatch of harbor porpoise below PBR levels. If a small scale directed fishery is established under Alternative 2, there exists some possibility of an increase in interactions between the spiny dogfish fishery and harbor porpoises.

Among the various components of the spiny dogfish fishery, the North Carolina gillnet fishery for spiny dogfish has been particularly important (historically) in takes of both sea turtles and Atlantic bottlenose dolphins (see Section 4.1.3.2). In FY2001, the gillnet fishery for spiny dogfish in North Carolina was eliminated. Implementation of Alternative 2 in FY2003 may re-establish directed gill net fishing for spiny dogfish in North Carolina. This would increase the probability of interactions between the spiny dogfish fishery, sea turtles and Atlantic bottlenose dolphins.

6.3 Impacts on the Environment of Alternative 3 - No Action Alternative

6.3.1 Biological Impacts of Alternative 3

Under this alternative, fishing mortality would exceed the threshold level which allows the stock to replace itself ($F_{REP} = 0.11$) and greatly exceed the target fishing mortality rate (= $F_{REBUILD}$ = 0.03). Additionally, the fishery, based on its historical pattern, is expected to resume targeting adult female spiny dogfish which would drive female SSB below current levels, eliminate progress toward a recovered stock, and in the long term, lead to depletion of the spiny dogfish population. Compared to the status quo alternative (Alternative 1), Alternative 3 is expected to have very negative consequences for spiny dogfish and non-target species taken in the spiny dogfish fishery.

6.3.2 Socioeconomic Impacts of Alternative 3

Given that no quota is specified in Alternative 3, landings are expected to return to the levels approximately equal to those observed in the unregulated period of the fishery (about 25 million pounds). This would constitute a 525% increase in fishing opportunity compared to the status quo (4.0 million pounds) and a 406% increase in fishing opportunity compared to actual FY2001 landings (4.94 million pounds). Although the short-term social and economic benefits of an unregulated fishery would be much greater than those associated with Alternatives 1 and 2, fishing mortality is expected to rise above the threshold level that allows the stock to replace itself ($F_{REP} = 0.11$) and stock rebuilding could not occur. In the long term, unregulated harvest would lead to depletion of the spiny dogfish population which would eventually eliminate the spiny dogfish fishery altogether.

6.3.3 EFH Impacts of Alternative 3

Implementation of Alternative 3 is expected to greatly increase fishing effort, thus greatly increasing the use of bottom-tending gear and the probability of damage to EFH relative to the status quo.

6.3.4 Protected Resources Impacts of Alternative 3

Because Alternative 3 is expected to return prosecution of the spiny dogfish fishery to its previous (unregulated) levels in FY2003, the corresponding increase in fishing effort brought about by this action would greatly elevate (relative to the status quo) the probability of interactions between the spiny dogfish fishery and endangered or threatened marine mammals and sea turtles.

Thus far, the combination of protective measures under the HPTRP and management measures consistent with the spiny dogfish rebuilding plan (maintained via Alternative 1) have been sufficient to reduce the bycatch of harbor porpoise below PBR levels. If an unregulated spiny dogfish fishery is established under Alternative 3, there is a very strong possibility of increased

takes of harbor porpoises by the spiny dogfish fishery.

Among the various components of the spiny dogfish fishery, the North Carolina gillnet fishery for spiny dogfish has been particularly important (historically) in takes of both sea turtles and Atlantic bottlenose dolphins (see Section 4.1.3.2). In FY2001, the gillnet fishery for spiny dogfish in North Carolina was eliminated. Implementation of Alternative 3 in FY2003 is expected to re-establish directed gill net fishing for spiny dogfish in North Carolina. This would greatly increase the probability of takes of sea turtles and Atlantic bottlenose dolphins by the spiny dogfish fishery.

6.4 Cumulative Impacts of the Preferred Alternative (No. 1)

A cumulative impact analysis is required as specified by the Council on Environmental Quality's regulation for implementing NEPA. Cumulative effects are defined under NEPA as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other action (40 CFR § 1508.7)."

Actions implemented by the FMP thus far were intended to address the management objectives described in section 1.1.3 of the FMP. The FMP implemented the current annual specifications process to set commercial quotas and trip limits. In addition, the FMP addressed the requirements of the SFA, including the National Standards overfishing definition (National Standard 1), the effects on fishing communities (National Standard 8), bycatch reduction (National Standard 9), and safety at sea (National Standard 10), and identification of EFH for spiny dogfish. Finally, the FMP added a framework adjustment procedure that allowed the Council to add or modify management measures through a streamlined public review process. The spiny dogfish fishery is managed via an annual commercial quota to control fishing mortality. The specification process allows for the review and modifications to the commercial quota, recreational harvest limit, and other management measurers on an annual basis.

Assessment of historic spiny dogfish harvest in the unregulated period prior to FY2000 indicated that fishing mortality was well above sustainable levels for the stock. As other stocks declined during the 1980s and 1990s, and as European markets were developed, many fishers who had prosecuted other fisheries began landing the relatively abundant spiny dogfish as a means of filling in for the decline in their catches. This resulted in nearly a ten-fold increase in spiny dogfish landings from 1987-1996. As a result of these increases in exploitation, the Northeast Fisheries Science Center stock assessment in 1998 indicated that the spiny dogfish fishery had declined and designated the stock as overfished. The management objectives established in the spiny dogfish FMP are designed to have a positive cumulative impact on the spiny dogfish stock, enabling it to rebuild to the point where it can eventually allow for sustainable fishing.

The purpose of this specifications package is to examine the impacts to the environment that would result from the implementation of the FY2003 management measures for the spiny dogfish fishery. These measures include commercial harvest limits and other measures that

allow the target exploitation rate to be achieved. The annual quota setting process ensures that the rebuilding schedule for spiny dogfish is maintained so the FMP remains in compliance with the MSFCMA as amended by the SFA.

By continuing to meet the national standards and other requirements of the SFA through future FMP amendments and actions under the annual specification process, the expectation is that the management objectives will be met and the expected benefits will not be compromised. In addition, the framework adjustment procedure, allows the Council to add or modify management measures through a streamlined public review process. As such, the Council will insure that cumulative impacts of these actions will remain positive, both for the ports and communities that depend on these fisheries and the Nation through a sustainable spiny dogfish fishery.

The preferred alternative, by maintaining the spiny dogfish fishery as an incidental catch fishery, with a very low annual quota and trip limits, is not expected to result in negative biological, EFH, or protected resources impacts. Specifically, the alternative is designed to allow the spiny dogfish fishery to rebuild to sustainable levels, thereby restoring the biological resource. Maintaining fishing effort at low levels will likely have a beneficial impact on EFH, especially in light of the recent shift in the spiny dogfish fishery to the increased relative use of longlines and handlines, as opposed to gear that is more damaging to the bottom habitat. And given that the current spiny dogfish specifications have reduced interactions between the fishery and protected resources, the continuation of such specifications, as would be the case with the implementation of the preferred alternative, is expected to maintain the same level of protection for those resources. In light of all these factors, the cumulative biological, EFH, and protected resource impacts of the preferred alternative are not expected to be negative.

The purpose of the specification process in this action and future actions is expected to result in a rebuilt fishery. As the stock rebuilds it is possible that catch efficiency by the fishery will increase, which could result in overall decreases in fishing effort to achieve a given yield. If this action in addition to future actions result in a decrease in fishing effort, additional positive cumulative impacts will result relative to non-target species, EFH, and protected resources.

Although the short term economic and social impacts of the preferred alternative are negative as compared to higher trip limits and quotas (Alternative 2) or an unregulated fishery (Alternative 3), over the long term, the cumulative economic and social impacts of the preferred alternative are expected to be positive as compared with the other two alternatives because the economic and social benefits of a recovered stock will be achieved sooner.

The FMP evaluated a wide range of non-fishery impacts on the spiny dogfish resource, including those potentially arising from coastal development, construction, non-point source pollution, dredging, hydroelectric development, global climate change, and sewage treatment and disposal. Although some of these activities might have a negative impact on the spiny dogfish fishery, it is expected that such impacts would be relatively small and localized. Given the vast area over which spiny dogfish migrate and spawn, none of these non-fishing activities is expected to have a significant impact on the species. Please see the FMP for further information on the cumulative

effects on non-fishery activities on the spiny dogfish fishery (Mid-Atlantic Fishery Management Council, et. al., February 1999)

7.0 Essential Fish Habitat Assessment

Spiny dogfish have EFH designated in many of the same bottom habitats that have been designated as EFH for most of the 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. Broadly, EFH is designated as the bottom habitats consisting of varying substrates (depending upon species) within the Gulf of Maine, Georges Bank, and the continental shelf off southern New England and the mid-Atlantic south to Cape Hatteras for the juveniles and adults of these groundfish. In general, these areas are the same as those designated for spiny dogfish.

Fishing activities for spiny dogfish occur in these EFH areas. The primary gears utilized to harvest these species are otter trawls and gill nets. Since the otter trawl is a bottom- tending mobile gear, it is most likely to be associated with adverse impacts to bottom habitat. The primary impact associated with this type of gear is reduction of habitat complexity (Auster and Langton, 1998).

The spiny dogfish FMP includes a stock rebuilding program which has resulted in fishing effort reductions in excess of 90% compared to the historic unregulated fishery. This should reduce gear impacts to bottom habitats by reducing the harvest of the managed species within this FMP. Any reductions in harvesting effort may indirectly benefit EFH by creating an overall reduction of disturbance by a gear type that impacts bottom habitats. Other management actions already in place should control redirection of effort into other bottom habitats.

The reductions in fishing mortality proposed under either Alternatives 1 or 2 will maintain significant reductions in fishing effort (compared to Alternative 3 - no action) that, in turn, will indirectly benefit EFH by producing a reduction in the disturbance by a gear type that impacts bottom habitats.

8.0 List of agencies and persons consulted in formulating the action

In preparing this annual specifications analysis the Council consulted with the NMFS, New England Fishery Management Council, and the states of Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and North Carolina through their membership on the Council.

9.0 List of preparers

This environmental assessment was prepared by the following members of the MAFMC staff: Dr. Christopher M. Moore, Richard J. Seagraves, James L. Armstrong, and Kathy Collins.

10.0 Finding of no significant environmental impact

National Oceanic and Atmospheric Administration Order (NAO) 216-6 (revised May 20, 1999) provides nine criteria for determining the significance of the impacts of a proposed action. These criteria are discussed below:

1. Can the proposed action be reasonably expected to jeopardize the sustainability of any target species that may be affected by the action?

This action is intended to achieve the F = 0.03 target, end overfishing and continue to rebuild the spiny dogfish spawning stock biomass. The proposed action is not expected to jeopardize the sustainability of any target species that may be affected by the action.

2. Can the proposed action be reasonably expected to allow substantial damage to the ocean and coastal habitats and/or EFH as defined under the Magnuson-Stevens Act and identified in FMPs?

The proposed action is not expected to allow substantial damage to the ocean and coastal habitats and/or EFH as defined under the Magnuson-Stevens Act and identified in the FMP. In general, EFH that occurs in areas where the fishery occurs is designated as the bottom habitats consisting of varying substrates (depending upon species) within the Gulf of Maine, Georges Bank, and the continental shelf off southern New England and the Mid-Atlantic south to Cape Hatteras. The primary gears utilized to harvest spiny dogfish are otter trawls and gillnets. The FMP concluded that the stock rebuilding program would result in fishing effort reductions in excess of 90% compared to an unregulated fishery. Any reductions in harvesting effort may indirectly benefit EFH by creating an overall reduction of disturbance by a gear type that impacts bottom habitats. Other management actions already in place should control redirection of effort into other bottom habitats. Therefore, the proposed action is expected to have the least impact on EFH of all the alternatives considered.

3. Can the proposed action be reasonably expected to have a substantial adverse impact on public health or safety?

The proposed action is not expected to have a substantial adverse impact on public health or safety since the proposed action maintains the status quo for FY2003.

4. Can the proposed action be reasonably expected to have an adverse impact on endangered or threatened species, marine mammals, or critical habitat of these species?

The proposed action is not reasonably expected to have an adverse impact on endangered or threatened species, marine mammals, or critical habitat for these species. As stated in Section 5.3 of the EA, the activities to be conducted under the proposed action are within the scope of

the FMP and do not change the basis for the determinations made in previous consultations. The proposed action maintains the status quo and, thus, no increase or redistribution of effort is expected.

5. Can the proposed action be reasonably expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

The proposed action is not expected to result in cumulative adverse effects that could have a substantial effect on target or non-target species. The proposed action represents a status quo fishery and, as was anticipated in the FMP, eliminates the directed fishery for spiny dogfish. Therefore, the proposed action is not expected to result in any increased impacts that have not been previously analyzed, nor is it expected to result in any cumulative adverse effects to target or non-target species.

6. Can the proposed action be reasonably expected to jeopardize the sustainability of any non-target species?

The proposed action is not expected to jeopardize the sustainability of any non-target species. As proposed, this action would essentially result in a bycatch fishery for spiny dogfish. Based on this expected effort level, the bycatch of non-target species is likely to be minimal.

7. Can the proposed action be expected to have a substantial impact on biodiversity and ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?

The proposed action is not expected to have a substantial impact on biodiversity and ecosystem function within the affected area. This will be the fifth year of spiny dogfish management under the FMP. Due to their slow growth rate and low fecundity, if the remaining biomass of mature, female dogfish continues to be depleted through the prosecution of a directed fishery, stock rebuilding could take decades. The proposed measures are intended to rebuild the spiny dogfish resource to sustainable levels for future recruitment. Therefore, the proposed action will likely ensure biodiversity and ecosystem stability over the long term as the resource continues to rebuild.

8. Are significant social or economic impacts interrelated with significant natural or physical environmental effects?

In order to achieve the fishing mortality objectives, management measures must be restrictive enough to reduce the amount of spiny dogfish landings. As discussed in Section 5.2.1. of the EA, the proposed trip limits were developed to ensure that the quota of 4.0 million lb is not exceeded and that the F = 0.03 target is achieved. The proposed trip limits represent a continuation of the trip limits established for fishing year 2001 and have no new impact. These lower trip limits are expected to cause vessels to shift their effort to areas where spiny dogfish concentrations are low, to avoid having to sort and discard spiny dogfish, while still allowing incidental

catch to be landed. Therefore, there are no significant social or economic impacts interrelated with significant natural or physical environmental impacts.

9. To what degree are the effects on the quality of the human environment expected to be highly controversial?

The issue of spiny dogfish management continues to be highly controversial as evidenced by the differing alternatives recommended by the Mid-Atlantic and New England Councils. However, the proposed measures for FY2003 would maintain the FY2002 status quo, therefore, the measures contained in this action are not expected to be highly controversial. Although the Councils continue to disagree about whether or not a small-scale directed spiny dogfish fishery should be allowed, the directed fishery has traditionally targeted larger, mature females: the component of the stock most in need of protection. According to updated estimates of biomass and fishing mortality rates for spiny dogfish, the biomass of mature females is rapidly being depleted and the production of pups is low. Due to their slow growth rate and low fecundity, if the remaining biomass of mature, female dogfish continues to be depleted through the prosecution of a directed fishery, stock rebuilding could take decades. In fact, the rebuilding time frame associated with the FMP has already increased from approximately 10 years to 17 years because of the continued harvest of mature female spiny dogfish that occurred during the development and implementation of the FMP. The proposed action would implement measures for the upcoming fishing year that will address overfishing of the spiny dogfish resource in order to rebuild spiny dogfish stocks to a level that is consistent with the adult female biomass rebuilding target.

FONSI Statement

Having reviewed the environmental assessment and the available information relating to the proposed 2003 annual specifications for Spiny Dogfish, 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 concerns the collection of information. The intent of the Act is to minimize the Federal paperwork burden for individuals, small business, state and local governments, and other persons as well as to maximize the usefulness of information collected by the Federal government.

The Councils are not proposing measures under this regulatory action that will involve increased paper work and consideration under this Act.

2.0 Relevant Federal Rules

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

PRELIMINARY ECONOMIC EVALUATION (PREE) AND REGULATORY IMPACT REVIEW FOR THE FISHING YEAR 2003 CATCH SPECIFICATIONS FOR SPINY DOGFISH

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 or regulation. The RIR is part of the process of preparing and reviewing FMPs and provides a comprehensive review of the changes in net economic benefits to society associated with proposed regulatory actions. The analysis also provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve the problems. The purpose of the analysis is to ensure that the regulatory agency systematically and comprehensively considers all available alternatives so that the public welfare can be enhanced in the most efficient and cost-effective way.

2.0 Evaluation of E.O. 12866 Significance

The economic benefits of the spiny dogfish FMP were evaluated during plan development. The conclusions reached in the initial benefit-cost analyses of the FMP remain unchanged. 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 preliminary data (Maine-North Carolina) the total commercial value for the spiny dogfish fishery was estimated at $1.13 million in fishing year 2001 (FY2001: May 1, 2001 - Apr 30, 2002). Therefore, the measures considered in this regulatory action will not affect total revenues generated by the commercial industry to the extent that a $100 million annual economic impact will occur. The proposed actions are necessary to rebuild the overfished spiny dogfish stock. The proposed action will not adversely affect, in the long-term, competition, jobs, the environment, public health or safety, or state, local, or tribal government communities. Secondly, the proposed actions 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 spiny dogfish fisheries in the EEZ. Thirdly, the proposed actions will not materially alter the budgetary impact of entitlement s, grants, user fees, or loan programs or the rights and obligations of their participants. Finally, the proposed actions do not raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

Employment in the processing sector of the spiny dogfish industry may face the most severe effects of the implementation of the FY2003 spiny dogfish specifications. The FMP indicated that due to the low commercial quotas mandated by the plan, and the labor-intensive nature of hand-processing spiny dogfish, employment reductions in the processing sector may result from the loss of dogfish supply. The extent of these employment reductions will most likely be determined by whether or not processors can find alternative species which require hand

processing. If this does not occur, it is likely that seasonal or permanent reductions in employment may occur as a result of this action. With landings valued as high as $11 million, the value of the processing sector would have to expand the value of landings by a factor of 10 to have an impact on the economy greater than 100 million dollars, which is unlikely to occur. It is therefore likely that the impact of the management measures on the harvesting and processing sectors would result in an annual effect on the economy that is less than the 100 million dollar level. Other considerations under E.O. 12866 for significance are unchanged in consideration of impacts on the processing sector. Therefore, the FY2003 specifications would not constitute a significant regulatory action.

Benefit-cost analysis is conducted to evaluate the net social benefit arising from changes in consumer and producer surpluses that are expected to occur upon implementation of a regulatory action. Total Consumer Surplus (CS) is the difference between the amounts consumers are willing to pay for products or services and the amounts they actually pay. Thus CS represents net benefits to consumers. When the information necessary to plot the supply and demand curves for a particular commodity is available, consumer surplus is represented by the area that is below the demand curve and above the market clearing price where the two curves intersect. Since an empirical model describing the elasticities of supply and demand for these species is not available, it was assumed that the price for these species was determine by the market clearance price market or the interaction of the supply and demand curves. These prices were the base prices used to determine potential changes in prices due to changes in landings.

Net benefit to producers is producer surplus (PS). Total PS is the difference between the amounts producers actually receive for providing goods and services and the economic cost producers bear to do so. Graphically, it is the area above the supply curve and below the market clearing price where supply and demand intersect. Economic costs are measured by the opportunity cost of all resources including the raw materials, physical and human capital used in the process of supplying these goods and services to consumers.

One of the more visible costs to society of fisheries regulation is that of enforcement. From a budgetary perspective, the cost of enforcement is equivalent to the total public expenditure devoted to enforcement. However, the economic cost of enforcement is measured by the opportunity cost of devoting resources to enforcement vis à vis some other public or private use and/or by the opportunity cost of diverting enforcement resources from one fishery to another.

Alternative 1 - Mid-Atlantic Council Alternative (status quo)

Alternative 1 (the Mid-Atlantic Council alternative) includes a commercial quota of 4,000,000 pounds for FY2003. The quota is to be divided semi-annually with quota period 1 (May 1 through October 31) being allocated 2,316,000 pounds (57.9% of the 4,000,000 pound quota), and quota period 2 (November 1 through April 30) being allocated 1,684,000 pounds (42.1% of the 4,000,000 pound quota). In addition, trip limits of 600 pounds per trip and 300 pounds per trip are recommended for quota periods 1 and 2, respectively (vessels are prohibited from landing more than the specified amount in one calendar day). This alternative is designed to

achieve the target F (= $F_{REBUILD}$ = 0.03), suspend directed fishing including the targeting of adult female spiny dogfish and allow for rebuilding of spiny dogfish spawning stock biomass. This alternative represents the status quo relative to the current fishing year (FY2002) for the commercial spiny dogfish fishery.

Due to a lack of an empirical model for this fishery and knowledge of elasticities of supply and demand, a qualitative approach to the economic assessment was adopted. Nevertheless, quantitative measures are provided whenever possible.

Landings

Although Alternative 1 is the status quo alternative, a decrease of 0.94 million pounds is expected if the Alternative 1 quota (4,000,000 pounds) is adopted. This is because the quota was exceeded by 0.94 million pounds in FY2001 (FY2001 landings = 4.94 million pounds).

Prices

Given the decrease in spiny dogfish landings expected under alternative 1, the price for this species could increase.

Consumer Surplus

Given the potential increase in spiny dogfish prices under Alternative 1, consumer surplus associated with this fishery may decrease.

Harvest Costs

No changes to harvest costs are expected as a result of Alternative 1 for spiny dogfish.

Producer surplus

Given the potential increase in spiny dogfish prices under Alternative 1, producer surplus associated with this fishery may decrease.

Enforcement Costs

The Alternative 1 measures are not expected to change enforcement costs.

Distributive Effects

There are no changes to the quota allocation process for spiny dogfish under Alternative 1. As such, no distributional effects are identified.

Alternative 2 - New England Council Alternative

Alternative 2 (the New England Council alternative) includes a commercial quota of 8,800,000 pounds for FY2003. The quota is to be divided semi-annually with quota period 1 (May 1 through October 31) being allocated 5,095,200 pounds (57.9% of the 8,800,000 pound quota), and quota period 2 (November 1 through April 30) being allocated 3,704,800 pounds (42.1% of the 8,800,000 pound quota). In addition, trip limits of 7,000 pounds per trip and 5,000 pounds per trip are recommended for quota periods 1 and 2, respectively (vessels are prohibited from landing more than the specified amount in one calendar day). This alternative is designed to allow for a small scale directed fishery for spiny dogfish while still rebuilding spiny dogfish spawning stock biomass.

Due to a lack of an empirical model for this fishery and knowledge of elasticities of supply and demand, a qualitative approach to the economic assessment was adopted. Nevertheless, quantitative measures are provided whenever possible.

Landings

An increase of 3.86 million pounds is expected if the Aternative 2 quota (8,800,000 pounds) is adopted. This is the difference between harvest in the last complete fishing year (FY2001; 4.94 million pounds) and the quota recommended under Alternative 2 (8.8 million pounds).

Prices

Given the increase in spiny dogfish landings expected under Alternative 2, the price for this species could decrease.

Consumer Surplus

Given the potential decrease in spiny dogfish prices under Alternative 2, consumer surplus associated with this fishery may increase.

Harvest Costs

Since a small directed fishery is expected to resume under Alternative 2, harvest should shift from incidental catch to targeting spiny dogfish. As such, harvest costs related to the directed harvest of spiny dogfish are expected to increase as a result of Alternative 2.

Producer surplus

Given the potential decrease in spiny dogfish prices under Alternative 2, producer surplus associated with this fishery may increase.

Enforcement Costs

The Alternative 2 measures are not expected to change enforcement costs.

Distributive Effects

There are no changes to the quota allocation process for spiny dogfish under Alternative 2. As such, no distributional effects are expected.

Alternative 3 - No Action Alternative

Alternative 3 (the no-action alternative) would effectively remove regulatory control over the spiny dogfish fishery for FY2003. Given that no quota is specified in Alternative 3, landings are expected to return to the levels approximately equal to those observed in the unregulated period of the fishery (about 25 million pounds).

Due to a lack of an empirical model for this fishery and knowledge of elasticities of supply and demand, a qualitative approach to the economic assessment was adopted. Nevertheless, quantitative measures are provided whenever possible.

Landings

An increase of about 20 million pounds is expected if the unrestricted harvest allowed under Alternative 3 is adopted. This is the difference between harvest in the last complete fishing year (FY2001; 4.94 million pounds) and the expected harvest in the absence of regulations (about 25 million pounds).

Prices

Given the increase in spiny dogfish landings expected under Alternative 3, the price for this species could decrease.

Consumer Surplus

Given the potential decrease in spiny dogfish prices under Alternative 3, consumer surplus associated with this fishery may increase.

Harvest Costs

Since a directed fishery is expected to resume under Alternative 3, harvest should shift from incidental catch to targeting spiny dogfish. As such, harvest costs related to the directed harvest of spiny dogfish are expected to increase as a result of Alternative 3.

Producer surplus

Given the potential decrease in spiny dogfish prices under Alternative 3, producer surplus

associated with this fishery may increase.

Enforcement Costs

In the absence of regulated harvest under the Alternative 3 measures, enforcement costs are expected to decrease.

Distributive Effects

There is no quota allocation process for spiny dogfish under Alternative 3. As such distributional changes in participation in the spiny dogfish fishery are expected. Specifically, the distribution of participation in the fishery should resemble that in the period prior to the establishment of a regulated fishery.

Summary of Impacts

The overall impacts of spiny dogfish landings on prices, consumer surplus, and producer surplus are difficult to determine without detailed knowledge of the relationship between supply and demand factors for these fisheries. In the absence of detailed empirical models for these fisheries and knowledge of elasticities of supply and demand, a qualitative approach was employed to assess potential impacts of the proposed management measures.

The impact of each of the regulatory alternatives relative to the base year (FY2001) is summarized in Table PREE-1. A "-1" indicates that the level of the given feature would be reduced given the action as compared to the base year. A "+1" indicates that the level of the given feature would increase relative to the base year and a "0" indicates no change. In this analysis, the base line condition was FY2001 landings. This comparison will allow for the evaluation of the potential fishing opportunities associated with each alternative in FY2003 versus the fishing opportunities that occurred in FY2001.

The status quo alternative is the only alternative expected to decrease landings, however, the expected decrease is not relative to the quota itself, but rather to real landings which exceeded the FY2001 quota. Both Alternatives 2 and 3 may be expected to have similar directional impacts with Alternative 3 having a much more dramatic impacts due to the removal of regulatory control.

No changes in the competitive nature of these fisheries is expected to occur under Alternatives 1 and 2. These alternatives should maintain the competitive structure of the fishery since they present no changes in the manner in which the quotas are allocated by period. Under Alternative 3, however, the large increases in harvest level and the absence of any allocation system may alter the competitive structure of the fishery so that it more closely resembles the pre-FMP unregulated fishery. In that respect, landings should be more evenly distributed among states and are less likely to be dominated by Massachusetts.

No changes in enforcement costs or harvest costs have been identified for Alternative 1 and 2. Under Alternative 3, enforcement costs should decrease as a result of the absence of harvest regulations.

It is important to mention that although the measures that are evaluated in this specification package are for the 2003 fisheries, the annual specification process for these fisheries could have potential cumulative impacts. The extent of any cumulative impacts from measures established in previous years is largely dependent on how effective those measures were in meeting their intended objectives and the extent to which mitigating measures compensated for any quota overages. Section 6.0 of the EA has a description or historical account of cumulative impacts of the measures established under the FMP since it was implemented .

Table PREE-1. Qualitative comparative summary of economic effects of regulatory alternatives for spiny dogfish in 2003 relative to 2001.

Feature	Alternative 1	Alternative 2	Alternative 3
Landings	-1	+1	+1
Prices	+1	-1	-1
Consumer Surplus	-1	+1	+1
Harvest Costs	0	+1	+1
Producer Surplus	-1	+1	+1
Enforcement Costs	0	0	-1
Distributive Impacts	0	0	+1
"-1" denotes a reduction relative FY2001; "0" denotes no change relative FY2001; and "+1" denotes an increase relative to FY2001.			

3.0 INITIAL REGULATORY FLEXIBILITY ANALYSIS

Because this action is accompanied by a proposed rulemaking, an initial regulatory flexibility analysis (IRFA) was prepared as required under Section 603 of the Regulatory Flexibility Act.

3.1 Introduction and Methods

A description of the action, why it is being considered, and the legal basis for this action are contained in the Executive Summary and Section 1 of the Environmental Assessment. This proposed rule does not duplicate, overlap, or conflict with other Federal rules. There are no new reporting or recordkeeping requirements contained in any of the alternatives considered for this action. There are 2,825 vessels permitted in the dogfish fishery; 280 vessels landed dogfish in 2001, the last full fishing year where data is available.

Since per vessel costs are not available for vessels participating in the dogfish fishery, individual vessel profitability could not be estimated. Therefore, changes in gross revenue of the aggregate fleet is used as a proxy for changes in individual vessel profitability. Further, an assumption is made that losses and gains in gross revenue are shared equally among these vessels. There are no large entities (vessels) participating in this fishery, as defined in Section 601 of the Regulatory Flexibility Act; therefore, there are no economic impacts resulting from disproportionate sizes of vessels in the fishery.

The proposed measures for spiny dogfish for FY2003 could affect any vessel which landed spiny

dogfish in the past or current holders of federal spiny dogfish commercial permits. Unpublished data from the Northeast dealer report database are available for the latest complete fishing year (FY2001). The NMFS Northeast dealer report database indicated that a total of 280 vessels landed 4.94 million pounds of spiny dogfish in FY2001. All of these vessels readily fall within the definition of small businesses. Therefore, in the analysis that follows in section 3.3.4, an active participant in the spiny dogfish fishery was defined as any vessel that reported having landed one or more pounds of spiny dogfish in the Northeast dealer data during FY2001. 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 any valid Federal fishing permit in the Northeast region. Beginning in 2000, commercial vessels fishing for spiny dogfish in the EEZ were required to obtain a federal spiny dogfish permit. In the present IRFA, the primary unit of observation for purposes of the analysis is a vessel that reported landing spiny dogfish during FY2001 regardless of their permit status. However, any of the 2,825 vessels which possessed spiny dogfish permits in 2001 could potentially be affected by the proposed measures.

The effects of proposed actions were analyzed by employing quantitative approaches to the extent possible. Where quantitative data were not available, qualitative analyses were conducted. The economic effects of the quota scenarios were estimated as follows. First, the Northeast dealer data were queried to identify all vessels that landed at least one or more pounds of spiny dogfish in FY2001. As noted above, FY2001 was chosen because it is the last complete fishing year for which vessel level data are available. Data from FY2002 were not used in this analysis because the year is not complete and these data are not available at the vessel level . As such, FY2001 landing data by vessel were used as a proxy for FY2002. The second step was to sum the revenues from spiny dogfish landings and all species in total by vessel for FY2001 to determine the proportion of total revenue attributable to spiny dogfish for each vessel. To estimate the reduction in revenues by vessel as a consequence of the proposed actions in FY2003, it was assumed that the distribution by vessel of spiny dogfish landings in FY2003 would be the same as was observed in FY2001. In other words, it was assumed that the 280 vessels which landed spiny dogfish in FY2001 will land spiny dogfish in FY2003 in the same relative proportions as was observed in FY2001. The percent reduction in landings by vessel represented by each of the proposed actions for FY2003 was applied to the spiny dogfish revenues by vessel. The percent reduction/increase in total revenues corresponding to each alternative was then calculated. Vessels expected to experience a >1%, >5%, and >10% change in total revenues were tallied. These results were further summarized by vessel size class (length and GRT) and home state as defined by permit application data.

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. Also, dealers that buy exclusively from state waters only vessels, and have no Federal permits, are not subject to Federal reporting requirements. Thus, it is possible that some vessel activity cannot be tracked with the NMFS dealer landing and revenue data that are available. Thus, some of these vessels that could be affected by the proposed measures may not be included in the threshold analysis. This problem

has two consequences for the analyses that follow. First, the stated number of entities subject to the proposed measures is a lower bound estimate, since all vessels may not be counted. Second, the portion of activity by these uncounted vessels may cause the estimated economic impacts to be over- or underestimated. The threshold analysis described above is intended to identify impacted vessels and to characterize the potential economic impact on directly affected entities. It is presumed that the impacts on vessels that cannot be identified will be similar to the participating vessels that are analyzed herein.

3.1.1 Trip Limit Analysis of Expected Reductions in Spiny Dogfish Exploitation

As they are typically conducted, trip limit analyses involve relatively straightforward methods. Data on pounds per trip on occasions where the species of interest was landed are gathered and sorted in ascending order. All trips where actual landings were less than the proposed trip limit are assumed to be unaffected. Trips where landings exceed the proposed trip limit can be treated in any one of several different ways. One possibility is to simply truncate the landings distribution and assume that all trips above the trip limit do not occur. This approach has an obvious tendency to overstate the conservation benefit of a trip limit. At the other extreme, it could be assumed that the trip limit would have no effect on expected fishing patterns and fishermen would simply discard any catch in excess of the trip limit. The conservation benefit in this case would be limited to discard survival. An alternative approach is to make some assumption about how a trip limit would affect fishing choices.

The question of whether a trip limit will affect fishing patterns depends upon the interaction of several variables including the trip limit itself, revenues earned from bycatch or component catch, and fishing costs. Based on the assumption that, for a given trip, vessel owners seek to maximize revenues net of operating costs (i.e., seek to maximize profits), a simple economic model was developed to predict how trip limits would affect fishing behavior. On trips where landings are expected to exceed the trip limit, vessel owners are given the choice between continuing to fish while discarding any fish in excess of the trip limit, or simply not fishing at all. The model assumes that if a vessel owner can expect to earn enough revenue from the combination of regulated spiny dogfish (up to the trip limit) and the component catch to cover its operating costs then the trip would take place. If projected operating costs exceed potential revenues, it is assumed that no trip will take place. The model does not take into account any efforts made by vessel operators to avoid spiny dogfish given a certain trip limit or closure of the fishery, and may therefore overestimate regulatory discards.

The model was applied to landings data of spiny dogfish collected through the Northeast logbook program during 1994, 1995, 1996, 1997, and 1998 to project how a proposed trip limit would have affected landings and discards during those years. All trips were retained on which one or more pounds of spiny dogfish were landed. Average prices were obtained from Northeast dealer weighouts and average costs were adjusted for inflation and calculated by ton class from data obtained through NMFS sea sampling program and from the Capital Construction Fund (CCF) program. Sea sampling data was used to estimate daily operating costs for gillnet vessels and the CCF data provided an estimate of daily operating costs for otter trawl vessels. In

combination, these two gear types comprised over 90% of the landings of spiny dogfish during those years. Gillnet costs were assigned to the remaining gear types by ton class. The model includes only daily operating costs (ice, water, food, fuel, oil, gear, supplies, lumping, auction, and packing fees). These are the costs vessel owners likely consider when deciding whether or not to make a fishing trip. Finally, all logbook landings and discard estimates were expanded according to dealer weighouts. The following provides a brief technical description of the economic model.

Trip Limit Model

The trip limit model is based upon the assumption that, for a given trip, individuals seek to maximize revenues net of operating costs. In the absence of a trip limit net revenues (NR) may be calculated as:

$$NR = \sum_{i}^{I} \sum_{j}^{J} p_{ij} q_{ij} - VC \quad (1)$$

where: p is price, q is quantity, VC is variable costs, i denotes spiny dogfish, that may be subject to a trip limit, and j denotes component species. For any given trip Equation 1 is unchanged if q_i (i.e., landings on the trip) are less than the trip limit. For trips where q_i exceeds the trip limit, q_i is replaced by the trip limit (TL_i) and net returns are calculated as:

$$NR = p_i(TL_i) + \sum_{i}^{J} p_j q_j - VC \quad (2)$$

The interaction of several variables including the trip limit itself, revenues earned from component catch, and fishing costs determine how a trip limit will affect fishing patterns. To explore these relationships further it was necessary to express equation 1 in terms of unit time:

$$NR_t = [\sum_{i}^{I} p_i(CPU_i) + \sum_{j}^{J} p_j(CPU_j)] - VC_t \quad (3)$$

where: days absent (DA) is used as the time unit (t), VC_t is variable costs per day absent and CPU_i is landings per day absent for spiny dogfish subject to the trip limit and CPU_j is landings per day absent for component species.

As before, if DA times CPU_i is less than the trip limit then the trip limit would not be exceeded. In cases where DA times CPU_i exceeds the trip limit the vessel owner is confronted with a choice between continuing to fish while discarding any spiny dogfish in excess of the trip limit, switching to another fishery or area where discard rates might possibly be lower, or simply not

fishing at all. Since the trip limit analysis relies upon observed trips the second possibility of switching to another fishery or area was not incorporated in the model.

In cases where landings of spiny dogfish are expected to exceed the trip limit an individual would be assumed to choose the strategy (continue to fish and discard all spiny dogfish above the trip limit or stay tied-up at the dock and not go fishing) that yields the highest net return. In this model, it is assumed that if a vessel owner can expect to earn enough money from the combination of regulated spiny dogfish (up to the trip limit) and component species to cover its operating costs then the trip would take place.

3.1.2 Description of Fishing Year 2001 and Effects of Quota Overages

As noted in earlier sections, a total of 4.94 million pounds of spiny dogfish was landed during the FY2001 based on unpublished NMFS dealer reports. The quota specification for FY2001 was 4.0 million pounds. Thus, the annual quota specification for the FY2001 was exceeded by 0.94 million pounds or 23.5 %.

3.2 Description of Proposed Alternatives

3.2.1 Alternative 1 - Mid-Atlantic Council Alternative

Alternative 1 (the Mid-Atlantic Council alternative) includes a commercial quota of 4,000,000 pounds for FY2003. The quota is to be divided semi-annually with quota period 1 (May 1 through October 31) being allocated 2,316,000 pounds (57.9% of the 4,000,000 pound quota), and quota period 2 (November 1 through April 30) being allocated 1,684,000 pounds (42.1% of the 4,000,000 pound quota). In addition, trip limits of 600 pounds per trip and 300 pounds per trip are recommended for quota periods 1 and 2, respectively (vessels are prohibited from landing more than the specified amount in one calendar day). This alternative is designed to achieve the target F (= $F_{REBUILD}$ = 0.03), suspend directed fishing including the targeting of adult female spiny dogfish and allow for rebuilding of spiny dogfish spawning stock biomass. This alternative represents the status quo relative to the current fishing year (FY2002) for the commercial spiny dogfish fishery.

3.2.2 Alternative 2 - New England Council Alternative

Alternative 2 (the New England Council alternative) includes a commercial quota of 8,800,000 pounds for FY2003. The quota is to be divided semi-annually with quota period 1 (May 1 through October 31) being allocated 5,095,200 pounds (57.9% of the 8,800,000 pound quota), and quota period 2 (November 1 through April 30) being allocated 3,704,800 pounds (42.1% of the 8,800,000 pound quota). In addition, trip limits of 7,000 pounds per trip and 5,000 pounds per trip are recommended for quota periods 1 and 2, respectively (vessels are prohibited from landing more than the specified amount in one calendar day). This alternative is designed to allow for a small scale directed fishery for spiny dogfish while still rebuilding spiny dogfish spawning stock biomass.

3.2.3 Alternative 3 - No Action Alternative

Alternative 3 (the no-action alternative) would effectively remove regulatory control over the spiny dogfish fishery for FY2003. Given that no quota is specified in Alternative 3, landings are expected to return to the levels approximately equal to those observed in the unregulated period of the fishery (about 25 million pounds).

3.3 Analyses of Impacts of Alternatives

Because the spiny dogfish has been designated as overfished, the Councils were required under the Sustainable Fisheries Act to implement a stock rebuilding strategy which will allow the spiny dogfish stock to rebuild to levels which will support MSY. The rebuilding schedule and corresponding annual quotas, as described in the FMP, were developed assuming an implementation date of May 1, 1999. According to the rebuilding schedule adopted by the Councils for the period May 1, 1999, to April 30, 2000, F is reduced to 0.2, which resulted in a quota of 22,059,228 pounds for the first year. The semi-annual allocations for this period were 12,772,293 pounds for the period May 1, 1999-October 31, 1999; and 9,286,935 pounds for the period November 1, 1999-April 30, 2000.

For year five (FY2003) of the rebuilding plan, the FMP specifies that F will be reduced to 0.03. This has been projected to result in an annual quota of 4,000,000 pounds in FY2003 by the Spiny Dogfish Monitoring Committee.

3.3.1 Trip Limit Analysis Results

The results for a commercial quota of 4,000,000 pounds with trip limits of 600 pounds and 300 pounds in quota periods one and two, respectively, (MAFMC alternative) are provided in Tables 17 and 18, respectively. The results for a commercial quota of 8,800,000 pounds with a trip limit of 7000 pounds in quota periods one and 5000 pounds in quota period two (NEFMC alternative) are given in Tables 19 and 20.

Tables 17 and 18 show projected landings, discards, and the likely closure date, based on landings alone, associated with trip limits of 600 pounds and 300 pounds for quota periods 1 and 2. A 75% discard mortality rate was assumed.. Model results are presented for quota periods by fishing year (Column 1). A commercial quota of 2,316,000 pounds is considered for quota period 1 and 1,684,000 pounds is considered for quota period 2. Results based on a 50% discard mortality rate are not discussed here because such a mortality rate it has not been scientifically justified.

Column 2 (Projected Quota Period 1 or 2 Closure Date) shows the date on which spiny dogfish landings would be projected to achieve the commercial quota. On average, given a trip limit of 600 pounds, the quota would be exceeded in approximately 128 days (May 1 - Sept 5) in quota period 1 (Table 17). On average, given a 300 pound trip limit, the commercial quota would not be exceeded because there would never be enough trips to trigger a closure (Table 18). On

average, given a trip limit of 7,000 pounds, the quota would be exceeded in approximately 55 days (May 1 - June 24) in quota period 1 (Table 19) and the 5,000 pound trip limit in approximately 92 days (Nov 1 - Feb 2) in quota period 2 (Table 20).

Considering a commercial quota of 4,000,000 pounds (Tables 17 and 18), the analysis projected that, on average, under a 600 pounds trip limit for quota period 1, landings will exceed the semi-annual quota of 2,316,000 pounds on about September 5, 2000 (128 days). During quota period 2, however, landings were projected not to exceed the semi-annual quota of 1,684,000 pounds. The analysis projected landings of only 615,000 pounds during quota period 2. Thus, approximately 1,069,000 pounds of allowable spiny dogfish landings were projected not to be harvested. Although the commercial quota is 4,000,000 pounds, total projected landings would only reach 2,930,000 pounds. However, the analysis does not account for behavioral changes by vessel operators which could impact the amount of landings. Also, since vessels without federal permits are not captured in the analyses, additional landings could occur.

The projected landings and closure times rest on the assumption that the marginal revenues of dogfish landings are sufficient to explain the future behavior of fishermen and that the proposed measures will be implemented in both state and federal waters. The absence of a large processing sector may further reduce landings. Similarly, avoidance of dogfish by fishermen will likely further reduce landings and discard mortalities. The ability of fishermen to actively avoid large dogfish concentrations while targeting other species is unknown, but likely, given feedback from industry and previous practice.

3.3.2 Alternative 1 - Mid-Atlantic Council Alternative

Changes in gross revenues anticipated for Alternative 1 in FY2003 were estimated by comparison to FY2001 since it is the latest complete fishing year. Because the specifications would remain unchanged, revenues from dogfish harvest under Alternative 1 should be equivalent with dogfish revenues from the FY2001 reference year outside of changes in market value. Note, however, that the FY2001 quota (4.00 million pounds) is 19.0% less than what was actually landed (4.94 million pounds). Therefore, a reduction in dogfish revenues is expected under the Alternative 1 quota despite the consistency in the quota specifications. Assuming participation in the FY2003 dogfish fishery is identical to that observed in FY2001, the fleet should experience a decrease in dogfish fishing opportunity equal to the decrease associated with full compliance (19.0%). If the 19.0% decrease in dogfish fishing opportunity is applied evenly to dogfish revenue for each vessel in the FY2001 reference fleet, and revenue from participation in other fisheries remains constant, the change in gross revenue per vessel can be calculated. Based on this method of evaluation, gross revenues for vessels engaged in the directed spiny dogfish fishery are expected to decline by an average of 1.02%. There are 43 vessels (15.4% of the fleet) that are expected to experience a decrease in gross revenue greater than 1%, 16 vessels (5.7% of the fleet) that are expected to experience a decrease in gross revenue greater 5% and 10 vessels (3.6% of the fleet) that are expected to experience a decrease in gross revenues greater than 10%. It is important to note that revenue losses will differ from these estimated values if the market price changes for the dogfish fishery or any other fishery relative to FY2001 and/or if actual

harvest differs from the proposed quota.

In addition to the quota of 4.0 million pounds for year two, the MAFMC also recommended that a trip limits of 600 pounds in quota period 1 and 300 pounds during quota period 2 be implemented for the fishing year 2002-2003. The Mid-Atlantic Councils rational for these recommendations was as follows 1) the Quota associated with an F=0.03 in year four (as specified in the FMP) is 4.0 million pounds; 2) 600 and 300 pounds are the trip limits necessary to accommodate a bycatch fishery specified in the FMP during the rebuilding period to achieve an F=0.03; 3) the intent of the FMP was to close the directed fishery for adult female spiny dogfish after year one and allow for the landing of incidental bycatch of spiny dogfish only during the rebuilding period; and 4) to prevent a derby fishery and allow for an equitable distribution of landings in time and space.

The 600 and 300 pound trip limits proposed by the MAFMC would allow only for the landing of spiny dogfish taken incidentally by fishing effort directed at other species. As such, this low trip limit should discourage or eliminate fishing directed at mature female dogfish, which is the primary objective of the FMP (i.e., to rebuild the adult female portion of the spiny dogfish stock). The effects of the proposed 600 and 300 pound trip limits are discussed above in section 3.3.1. The economic analysis was based on results presented by the Dogfish Technical Committee using 1994-1997 NMFS unpublished Vessel Trip Report (VTR) data to determine the effect of trip limits on landings and estimated discards. The trip limit economic model assumed that all trips above the trip limit would continue as long as revenues from the truncated trips exceeded the cost of making the trip. It also assumed that if this criteria is met, fishing will continue when the trip limit is reached and the remaining dogfish would simply be discarded. Regulatory discard mortality (estimated assuming a discard mortality rate of 75%) and regulatory savings (estimated as the quantity of fish that would not be caught at all) were estimated for trip limits of 600 pounds in quota period 1 and 300 pounds in quota period 2. The model also indicated that regulatory discards due to trip limits are projected to be high and that trip limits alone may not allow stock rebuilding.

However, several factors may contribute to an overestimation of regulatory discard mortality from the economic model. First, the mortality rate for dogfish discards was assumed to be 75%, a higher overall rate than was assumed in the most recent stock assessment. Numerous members of industry have testified in the past at Council meetings and public hearings that the rate of discard mortality assumed in the last assessment was greatly overestimated. In fact, the true level of discard mortality for spiny dogfish is poorly known, but an overall rate of 75% for all gears is probably too high. Secondly, the economic trip limit model assumes that as long as revenues for a trip under the trip limit exceed the cost of making the trip, the trip will proceed exactly as it would have prior to imposition of the trip limit, except that all dogfish taken in excess of the trip limit will be discarded. That is, the model assumes that fishermen will not modify their fishing behavior once the trip limit is reached. Given the testimony by spiny dogfish fishermen and fishermen from other fisheries, it appears unlikely that this assumption would be met. Given the low economic value of dogfish relative to other species and the opportunity cost of handling dogfish taken incidentally in other fisheries, it is reasonable to

assume that fishermen will tend to avoid spiny dogfish under restrictive trip limits. The MAFMC concluded that high trip limits would encourage directed fishing on mature females, and that once the low quota required for stock rebuilding was quickly taken that discards would represent additional mortality. The MAFMC noted that estimated regulatory discards were estimated to be high regardless of the trip limit specified, but that 600 and 300 pound trip limits would produce lower total mortality relative to other trip limits considered by the Councils (short of a total fishery closure) and tend to discourage directed fishing on mature female dogfish. These trip limit levels will allow for the landing of bycatch levels of spiny dogfish taken incidental to the prosecution of other fisheries and are not intended to allow for directed fishing.

3.3.3 Alternative 2 - New England Council Alternative

The Alternative 2 quota specification would constitute a 120% increase in landings relative to the status quo quota (4.0 million pounds) and a 79.6% increase in landings relative to actual landings (4.94 million pounds) in the FY2001 reference year. Changes in gross revenues anticipated for Alternative 2 in FY2003 were estimated by comparison to FY2001 since it is the latest complete fishing year. Because the specifications would increase landings, revenues from dogfish harvest under Alternative 2 should also increase. Assuming participation in the FY2003 dogfish fishery is identical to that observed in FY2001, the fleet should experience an increase in dogfish fishing opportunity equal to the increase associated with achieving the new quota (79.6%). If the 79.6% increase in dogfish fishing opportunity is applied evenly to dogfish revenue for each vessel in the FY2001 reference fleet, and revenue from participation in other fisheries remains constant, the change in gross revenue per vessel can be calculated. Based on this method of evaluation, gross revenues for vessels engaged in the directed spiny dogfish fishery are expected to rise by an average of 4.22%. There are 84 vessels (30.0% of the fleet) that are expected to experience an increase in gross revenue greater than 1%, 40 vessels (14.3% of the fleet) that are expected to experience an increase in gross revenue greater 5% and 24 vessels (8.6% of the fleet) that are expected to experience an increase in gross revenues greater than 10%. It is important to note that revenue changes will differ from estimated values if the market price changes for the dogfish fishery or any other fishery relative to FY2001 and/or if actual harvest differs from the proposed quota.

3.3.4 Alternative 3 - No Action Alternative

Given that no quota is specified in Alternative 3, landings are expected to return to the levels approximately equal to those observed in the unregulated period of the fishery (about 25 million pounds). This would constitute a 525% increase in fishing opportunity compared to the status quo (4.0 million pounds) and a 406% increase in fishing opportunity compared to actual FY2001 landings (4.94 million pounds). Although the short-term social and economic benefits of an unregulated fishery would be much greater than those associated with Alternatives 1 and 2, fishing mortality is expected to rise above the threshold level that allows the stock to replace itself ($F_{REP} = 0.11$) and stock rebuilding could not occur. In the long term, unregulated harvest would lead to depletion of the spiny dogfish population which would eventually eliminate the

spiny dogfish fishery altogether. Thus, Alternative 3 appears to be the least favorable option in terms of social and economic consequences.

4.0 Paper Work Reduction Act of 1995

The Paperwork Reduction Act concerns the collection of information. The intent of the Act is to minimize the Federal paperwork burden for individuals, small business, state and local governments, and other persons as well as to maximize the usefulness of information collected by the Federal government.

The Councils are not proposing measures under this regulatory action that will involve increased paper work and consideration under this Act.

5.0 Impacts of the Plan Relative to Federalism

The 2001-2002 spiny dogfish specifications do not contain policies with federalism implications sufficient to warrant preparation of a federalism assessment under Executive Order 12612.

LITERATURE CITED

Barlow, J., and P. J. Clapham. 1997. A new birth-interval approach to estimating demographic parameters of humpback whales. Ecology, 78: 535-546.

Bowman, R., R. Eppi and M. Grosslein. 1984. Diet and Consumption of Spiny Dogfish in the Northwest Atlantic. NOAA, NMFS, NEFC, Woods Hole, MA. 16 pp.

Carr, A.F. 1963. Panspecific convergence in Lepidochelys kempii. Ergebn. Biol., 26: 298-303.

Castro, J.I. 1983. The sharks of North American waters. College Station: Texas A & M University Press. 180 p.

Clark, C.W. 1995. Application of U.S. Navy underwater hydrophone arrays for scientific research on whales. Rep. Int. Whal. Commn. 45: 210-212.

Crouse, D.T., L.B. Crowder, H. Caswell. 1987. A stage based population model for loggerhead sea turtles and implications for conservation. Ecology 68(5):1412-1423.

Dadswell, M.J. 1979. Biology and population characteristics of the shortnose sturgeon, Acipenser brevirostrum, LeSueur 1818 (Osteichthyes: Acipenseridae), in the Saint John River Estuary, New Brunswick, Canada. Can. J. Zool. 57:2186-2210.

Griffith, D. 1996. Impacts of new regulations on North Carolina fisherman: a classificatory analysis. North Carolina Sea Grant College Program, Publication Number: UNC-SG-96-07

Hain, J.H.W., M.J.Ratnaswamy, R.D.Kenney, and H.E.Winn. 1992. The fin whale, Balaenopteraphysalus, in waters of the northeastern United States continental shelf. Rep. Int. Whal. Comm. 42: 653-669.

Hoenig, J.M. 1983. Empirical use of longevity data to estimate mortality rates. Fish. Bull. U.S. 81:898-903.

Hoenig, J.M. and S.H. Gruber. 1990. Life-history patterns in the elasmobranchs: implications for fisheries management. *In:* Elasmobranchs as Living Resources: Advances in the Biology, Ecology, Systematics, and the Status of the Fisheries (H.L. Pratt, Jr., S.H. Gruber, and T. Taniuchi, eds.). U.S. Dep. of Commer., NOAA Tech. Rep. NMFS. 90:1-16.

Holden, M.J. 1973. Are long-term sustainable fisheries for elasmobranchs possible? *In*: Fish, Stocks and Recruitment (F.R. Harden-Jones, ed.) Rapp. P.-v. Reun. Cons. int. Explor. Mer. 164:360-367.

Holden, M.J. 1974. Problems in the rational exploitation of elasmobranch populations and some suggested solutions. *In*: Sea Fisheries Research (F.R. Harden-Jones, ed.). pp. 117-137. Halsted

Press, New York.

Holden, M.J. 1977. Elasmobranchs. *In*: Fish Population Dynamics (J.A. Gulland, ed.). John Wiley and Sons, New York. 187-215.

Holden, M.J. and P.S. Meadows. 1962. The structure of the spine of the spur dogfish (*Squalus acanthias* L.) and its use for age determination. J. Mar. Biol. Ass. UK. 42:179-197.

Katona, S.K., and J.A. Beard. 1990. Population size, migrations, and feeding aggregations of the humpback whale (Megaptera novaeangliae) in the Western North Atlantic Ocean. Rep. Int. Whal. Comm., Special Issue 12: 295-306.

Kenny, R.D., M.A.M. Hyman, and H.E. Winn. 1985 Calculation of standing stocks and energetic requirements of the cetaceans of the northeast United States outer continental shelf. NOAA Tech. Mem. NMFS-F/NEC-41. 99 p.

Ketchen, K.S. 1975. Age and growth of dogfish *Squalus acanthias* in British Columbia waters. J. Fish. Res. Board Can. 32:43-59.

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

Lutcavage, M. and J.A. Musick. 1985. Aspects of the biology of sea turtles in Virginia. Copeia 1985(2):449-456.

McCay, B.J., B. Blinkoff, R. Blinkoff, and D. Bart. 1993. Report, part 2, phase I, fishery impact management project, to the MAFMC. Dept. of Human Ecology, Cook College, Rutgers Univ., New Brunswick, N.J. 179 p.

McFarlane, G.A. and R.J. Beamish. 1987. Validation of the dorsal spine method of age determination for spiny dogfish. *In*: The age and growth

Mid-Atlantic Fishery Management Council, New England Fishery Management Council, in Cooperation with the National Marine Fisheries Service. 1999. Spiny Dogfish Fishery Management Plan (includes Final Environmental Impact Statement and Regulatory Impact Review).

Nammack, M.F., J.A. Musick and J.A. Colvocoresses. 1985. Life history of spiny dogfish off the northeastern United States. Transactions of the Amer. Fish. Society 114: 367-376.

National Marine Fisheries Service 1991. Final recovery plan for the northern right whale (Eubalae na glacialis). Prepared by the Right Whale Recovery Team for the National Marine Fisheries Service. 86 pp.

National Marine Fisheries Service. 1998. Endangered Species Act Section 7 consultation, biological opinion and conference. Consultation in accordance with Section 7(a) of the Endangered Species Act Regarding the Federal Monkfish Fishery. National Marine Fisheries Service, Northeast Regional Office, Gloucester, MA. December 21, 1998.

National Marine Fisheries Service and U.S. Fish and Wildlife Service. 1995. Status reviews for sea turtles listed under the Endangered Species Act of 1973. NMFS, Silver Spring, Maryland. 139 p.

Northeast Fisheries Science Center (NEFSC). 1994. Report of the 18th Northeast Regional Stock Assessment Workshop: Stock Assessment Review Committee Consensus Summary of Assessments. NEFSC Ref. Doc. 94-22.

Northeast Fisheries Science Center (NEFSC). 1998. Report of the 26th Northeast Regional Stock Assessment Workshop: Stock Assessment Review Committee Consensus Summary of Assessments. NEFSC Ref. Doc. 98-03.

Soldat, V.T. 1979. Biology, Distribution, and abundance of the spiny dogfish in the Northwest Atlantic. ICNAF Res. Doc. 79/VI/102. Serial No. 5467:9 pp.

Swingle, W.M., S.G. Barco, T.D. Pitchford, W.A. McLellan, and D.A. Pabst. 1993. Appearance of juvenile humpback whales feeding in the nearshore waters of Virginia. Mar. Mamm. Sci. 9:309-31 5.

Turtle Expert Working Group. 1998. An assessment of the Kemp's ridley (Lepicochelys kempii) and loggerhead (Caretta caretta) sea turtle populations in the Western North Atlantic. NOAA Technical Memorandum NMFS-SEFSC-409. 96 pp.

Vladakov, V.D. and R. Greeley. 1963. Order Aciperseroidei: In Fishes of the North Atlantic. Part III. Mem. Sears Found. Mar. Res. 1, p, 24-60.

Waring, G.T., D.L. Palka, P.J. Clapham, S. Swartz, M.C. Rossman, T.V.N. Cole, K.D. Bisack, and L.J. Hansen. 1999. U.S. Atlantic marine mammal stock assessments -- 1998. NOAA Tech. Mem. NMFS-NE-116.

Watkins, W.A., K.E. Moore, J. Sigurjonsson, D. Wartzok, and G. Notarbartolo di Sciara. 1984. Fin whale (Balaenoptera physalus) tracked by radio in the lrminger Sea. Rit Fiskideildar 8(1): 1-14.

Watkins, W.A., and W.E. Schevill. 1982. Observations of right whales (Eubalaena glacialis) in Cape Cod waters. Fish. Bull. 80(4): 875-880.

Wood, C.C., K.S. Ketchen and R.J. Beamish. 1979. Population dynamics of spiny dogfish (*Squalus acanthias*) in British Columbia waters. J. Fish. Res. Board Can. 36:747-656.

Yustin, C. 1999. Personal communication - February 1999. NMFS, Gloucester, MA.

TABLES

Table 1. Landings of spiny dogfish (lbs) in the Northwest Atlantic Ocean from 1962 to 2001.

Year	Canada	US Comm	US Rec	US Total	USSR	Other	Total
1962	-	518,081	-	518,081	-	-	518,081
1963	-	1,344,806	-	1,344,806	-	2,205	1,347,011
1964	-	1,609,358	-	1,609,358	-	35,274	1,644,632
1965	19,841	1,075,845	-	1,075,845	41,465	22,046	1,159,197
1966	85,979	1,274,259	-	1,274,259	20,698,989	-	22,059,227
1967	-	612,879	-	612,879	5,370,406	-	5,983,285
1968	-	38,327	-	38,327	9,709,058	-	9,747,385
1969	-	249,120	-	249,120	19,460,004	800,270	20,509,394
1970	41,887	233,688	-	233,688	10,855,450	1,578,494	12,709,519
1971	8,818	160,936	-	160,936	23,814,089	1,684,314	25,668,157
1972	6,614	152,117	-	152,117	51,371,589	1,518,969	53,049,289
1973	44,092	196,209	-	196,209	31,347,207	10,083,840	41,671,348
1974	79,366	279,984	-	279,984	45,070,842	8,970,517	54,400,709
1975	2,205	324,076	-	324,076	49,230,923	423,283	49,980,487
1976	6,614	1,212,530	-	1,212,530	36,774,933	235,892	38,229,969
1977	2,205	2,052,483	-	2,052,483	15,304,333	566,582	17,925,603
1978	185,186	1,825,409	-	1,825,409	1,272,054	99,207	3,381,856
1979	2,934,323	10,597,512	-	10,597,512	231,483	180,777	13,944,095
1980	1,477,082	9,027,837	-	9,027,837	773,815	546,741	11,825,475
1981	1,243,394	15,282,287	3,284,831	18,567,118	1,137,574	1,009,707	21,957,793
1982	2,100,984	11,929,091	154,946	12,084,037	59,524	742,950	14,987,495
1983	-	10,795,926	147,560	10,943,486	791,451	231,483	11,966,420
1984	8,818	9,810,470	200,888	10,011,358	641,539	220,460	10,882,175
1985	28,660	8,880,129	196,169	9,076,298	1,529,992	701,063	11,336,013
1986	46,297	6,058,241	403,073	6,461,314	471,784	339,508	7,318,903
1987	617,288	5,959,034	673,514	6,632,548	255,734	50,706	7,556,276
1988	-	6,845,283	792,380	7,637,663	1,265,440	160,936	9,064,039
1989	365,964	9,903,063	921,476	10,824,539	372,577	191,800	11,754,880
1990	2,901,254	32,475,963	392,750	32,868,713	844,362	22,046	36,636,375
1991	643,743	29,050,014	287,892	29,337,906	480,603	35,274	30,497,526
1992	1,827,613	37,165,147	534,804	37,699,951	57,320	90,389	39,675,273
1993	3,156,987	45,509,558	263,368	45,772,926	-	-	48,929,913
1994	4,010,167	41,446,480	340,698	41,787,178	-	-	45,797,345
1995	2,107,598	50,068,671	148,654	50,217,325	-	-	52,324,923
1996	950,183	59,222,609	56,881	59,279,490	-	-	60,229,673
1997	na	44,975,097	146,295	45,121,392	-	-	45,121,392
1998	na	47,321,368	133,513	47,454,881	-	-	47,454,881
1999	na	33,487,985	119,378	33,607,363	-	-	33,607,363
2000	na	20,781,040	11,237	20,792,277	-	-	20,792,277
2001	na	4,987,210	61,760	5,048,970	-	-	5,048,970

Source: unpublished NMFS Dealer Reports, South Atlantic General Canvass, MRFSS data and SAW-26.

Table 2. Commercial landings (lbs) of spiny dogfish by state from 1996 through 2001.

State	1996	1997	1998	1999	2000	2001
Maine	905	449	274	35	8	0
New Hampshire	1,080	1,009	1,893	1,243	2,334	536
Massachusetts	26,954	21,819	25,035	14,930	5,762	3,912
Rhode Island	1,050	907	1,643	1,262	305	332
Connecticut	706	347	267	88	30	8
New York	1,132	409	1,386	1,220	1,583	56
New Jersey	4,625	3,931	6,271	3,821	5,220	17
Delaware	-	-	2	0	-	0
Maryland	7,150	4,227	2,398	2,127	450	0
Virginia	2,412	4,269	3,189	5,044	1,543	125
North Carolina	13,211	7,608	4,961	3,719	3,550	0
Total	59,223	44,975	47,321	33,487	20,785	4,987

Source: Unpublished NMFS Dealer Reports and North Carolina Trip Ticket data.

Table 3. Commercial landings (1000's lbs) of spiny dogfish by state and month, 1996-2001 combined.

State	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maine	21	0	15	17	42	305	903	268	80	10	4	12
New Hampshire	68	46	30	82	103	925	1,672	1,998	1,184	912	679	239
Massachusetts	415	261	300	825	5,895	17,009	21,186	17,527	13,307	12,316	7,277	1,659
Rhode Island	506	175	79	388	300	1,050	372	665	859	934	273	349
Connecticut	146	31	86	131	95	249	114	39	127	210	142	76
New York	764	682	989	196	264	337	148	112	82	476	1,081	1,483
New Jersey	3,123	3,058	2,946	2,960	671	87	43	86	169	3,030	5,092	2,787
Delaware	-	-	-	0	0	1	1	0	0	-	0	0
Maryland	4,377	2,322	5,220	2,808	37	208	41	-	-	2	391	956
Virginia	5,730	3,906	2,450	1,437	292	28	8	3	1	10	457	2,314
North Carolina	8,263	10,854	7,623	792	8	12	1	4	1	1	418	5,072
New England Total	1,156	514	510	1,443	6,433	19,538	24,247	20,497	15,557	14,382	8,375	2,335
Mid-Atlantic Total	22,257	20,822	19,230	8,193	1,271	673	241	204	254	3,519	7,437	12,612
Grand Total	23,413	21,336	19,739	9,636	7,705	20,210	24,489	20,702	15,810	17,901	15,812	14,947

Source: Unpublished NMFS Dealer Reports and North Carolina Trip Ticket data.

Table 4. Commercial spiny dogfish landings (lbs) for fishing year 2001 (Period 1: May through Oct 2001; Period 2: Nov 2001 through April 2002) .

	Period 1		Period 2		Total FY2001	
State	Landings	Percent of total	Landings	Percent of total	Landings	Percent of total
Massachusetts	2,077,543	80.4%	1,834,793	77.9%	3,912,336	79.2%
New Hampshire	42,083	1.6%	483,244	20.5%	525,327	10.6%
Rhode Island	303,827	11.8%	28,186	1.2%	332,013	6.7%
Virginia	88,247	3.4%	21	0.0%	88,268	1.8%
New York	47,677	1.8%	7,152	0.3%	54,829	1.1%
Other	24,899	1.0%	2,612	0.1%	27,511	0.6%
Total	2,584,276	100.0%	2,356,008	100.0%	4,940,284	100.0%

Period 1

Month	May	June	July	August	September	October	Total
Total Landings	300,389	2,265,692	4,072	6,102	2,767	5,254	2,584,276
Percent of Total	11.6%	87.7%	0.2%	0.2%	0.1%	0.2%	100.0%

Period 2

Month	November	December	January	February	March	April	Total
Total Landings	2,352,916	178	3	58	2,649	204	2,356,008
Percent of Total	99.9%	0.0%	0.0%	0.0%	0.1%	0.0%	100.0%

Source: unpublished NMFS Dealer Reports.

Table 5. Ex-vessel value (1000s dollars) and price per pound of commercially landed spiny dogfish from Maine - North Carolina in calender and fishing years 1996-2001.

Calendar Year	Value	Price	Fishing Year	Value	Price
1996	10,922	0.18	1996	10,420	0.18
1997	6,808	0.15	1997	5,720	0.14
1998	7,857	0.17	1998	8,374	0.17
1999	5,417	0.16	1999	5,513	0.17
2000	4,338	0.21	2000	1,985	0.24
2001	1,139	0.23	2001	1,126	0.23

Source: Unpublished NMFS Dealer Reports and South Atlantic General Canvass data.

Table 6. Commercial landings (1000s pounds) and value (1000s dollars) of spiny dogfish by port for fishing year 2001.

Port	Landings	Pct of Total	Value	Pct of Total
Chatham, MA	3,201	64.8%	704	62.6%
Gloucester, MA	307	6.2%	71	6.3%
Plymouth, MA	236	4.8%	52	4.6%
Newport, RI	227	4.6%	45	4.0%
Portsmouth, NH	182	3.7%	50	4.4%
"Unspecified", NH	153	3.1%	46	4.1%
Hampton/Seabrook, NH	102	2.1%	26	2.3%
Point Judith, RI	101	2.0%	19	1.7%
Rye, NH	88	1.8%	23	2.1%
Other Accomac, VA	86	1.7%	26	2.3%
Rockport, MA	62	1.3%	15	1.4%
Other	195	4.0%	48	4.2%
Total	4,940	100.0%	1,126	100.0%

Source: unpublished NMFS Dealer Reports.

Table 7. Ports where the value of dogfish landings was greater than 1% of the value of total commercial landings in FY2001.

Port	Total Value ($)	Dogfish Value ($)	Pct Dogfish
"Unspecified", NH	196,056	46,020	23.5%
Chatham, MA	10,901,012	704,343	6.5%
Plymouth, MA	1,103,675	51,736	4.7%
Rye, NH	10,88096,	23,276	2.1%
Rockport, MA	765,369	15,335	2.0%
Portsmouth, NH	4,733,131	49,980	1.1%
Hampton/Seabrook, NH	2,605,045	25,732	1.0%

Source: unpublished NMFS Dealer Reports.

Table 8. Commercial spiny dogfish landings by gear category from 1996 - 2001.

	GILL NET		BOTTOM TRAWL		LINE		OTHER		GRAND TOTAL
Calendar Year	Landings	Pct of Total	Landings	Pct of Total	Landings	Pct of Total	Landings	Pct of Total	Total Landings
1994	23,872,582	76.0%	6,231,987	19.8%	1,040,258	3.3%	280,355	0.9%	31,425,182
1995	30,832,688	76.3%	5,687,710	14.1%	3,320,473	8.2%	571,032	1.4%	40,411,903
1996	36,245,540	78.8%	6,668,087	14.5%	2,909,396	6.3%	188,851	0.4%	46,011,874
1997	33,700,795	84.0%	3,836,198	9.6%	2,447,119	6.1%	120,924	0.3%	40,105,036
1998	35,650,579	79.3%	5,892,210	13.1%	3,316,280	7.4%	107,027	0.2%	44,966,096
1999	23,659,286	73.1%	4,645,227	14.4%	3,523,693	10.9%	519,322	1.6%	32,347,528
2000	9,500,078	47.3%	6,622,092	33.0%	3,935,585	19.6%	21,520	0.1%	20,079,275
2001	1,649,591	33.1%	487,736	9.8%	2,825,154	56.7%	24,729	0.5%	4,987,210

Source: unpublished NMFS Dealer Reports.

Table 9. Federally permitted dogfish vessel activity by home port state in FY2001. Active vessels are defined as vessels reported to have landed spiny dogfish in FY2001.

State	Permitted Vessels	Pct of Total	State	Active Vessels	Pct of Total
Massachusetts	1172	41.5%	Massachusetts	117	41.8%
Maine	333	11.8%	New York	64	22.9%
New York	311	11.0%	New Hampshire	32	11.4%
New Jersey	231	8.2%	Rhode Island	24	8.6%
Rhode Island	178	6.3%	Maine	17	6.1%
Virginia	152	5.4%	New Jersey	8	2.9%
North Carolina	145	5.1%	North Carolina	6	2.1%
New Hampshire	119	4.2%	Virginia	3	1.1%
Pennsylvania	63	2.2%	Connecticut	3	1.1%
Connecticut	40	1.4%	Other	6	2.1%
Other	81	2.9%			
Total	2825	100.0%	Total	280	100.0%

Source: Unpublished NMFS permit data

Table 10. Federally permitted spiny dogfish dealers by state in FY2001. Active dealers are defined as dealers who reported having bought spiny dogfish in FY2001.

State	Permitted Dealers	Pct of Total	State	Active Dealers	Pct of Total
Massachusetts	64	27.6%	Massachusetts	18	34.0%
New York	51	22.0%	New York	15	28.3%
North Carolina	25	10.8%	Rhode Island	8	15.1%
Rhode Island	25	10.8%	Virginia	4	7.5%
New Jersey	24	10.3%	Other	8	15.1%
Virginia	18	7.8%			
Maine	12	5.2%			
New Hampshire	4	1.7%			
Connecticut	4	1.7%			
Maryland	3	1.3%			
Other	2	0.9%			
Total	232	100.0%	Total	53	100.0%

Source: Unpublished NMFS permit data

Table 11. Landings of spiny dogfish by NMFS statistical area for FY2001. Note the discrepancy in VTR total landings (3.42 million pounds) and total landings from dealer reports (4.94 million pounds).

Statistical Area	Landings	Pct
521	2,153,435	62.9%
514	488,352	14.3%
513	320,231	9.4%
539	225,416	6.6%
526	144,085	4.2%
Other	93,080	2.7%
Total	3,424,599	100.0%

Source: NMFS unpublished VTR data.

Table 12. Vessel lengths and gross registered tonnages for vessels that landed spiny dogfish in FY2001

Length Class	Vessels	Pct of fleet
0-24	1	0.4%
25-49	194	70.0%
50-74	68	24.5%
75-99	14	5.1%
N	277	100.0%

Tonnage Class [1]	Vessels	Pct of fleet
1	12	4.3%
2	214	77.3%
3	43	15.5%
4	8	2.9%
N	277	100.0%

[1] TC 1= <5 GRT; TC 2= 5 - 50 GRT; TC 3= 51 - 150- GRT; TC 4= >150 GRT
Source: Unpublished NMFS permit and dealer weighout data.

Table 13. Expected distribution of Alternative 1impacts on per vessel total revenue by vessel length and gross tonnage class.

Length Class	Pct of the affected vessels with >1% rev impact	Pct of the affected vessels with >5% rev impact	Pct of the affected vessels with >10% rev impact
0-24	0.0%	0.0%	0.0%
25-49	92.9%	93.3%	88.9%
50-74	7.1%	6.7%	11.1%
75-99	0.0%	0.0%	0.0%
N	42	15	9

Tonnage Class[1]	Pct of the affected vessels with >1% rev impact	Pct of the affected vessels with >5% rev impact	Pct of the affected vessels with >10% rev impact
1	4.8%	6.7%	11.1%
2	90.5%	86.7%	77.8%
3	4.8%	6.7%	11.1%
4	0.0%	0.0%	0.0%
N	42	15	9

[1] TC 1= <5 GRT; TC 2= 5 - 50 GRT; TC 3= 51 - 150- GRT; TC 4= >150 GRT

Table 14. Expected impact of Alternative 1 on per vessel total revenue by home port state.

	Gross revenue impacts (percent decrease)							
	Overall		1%		5%		10%	
State	Vessels	Pct	Vessels	Pct	Vessels	Pct	Vessels	Pct
Massachusetts	117	42.2%	32	76.2%	13	86.7%	8	88.9%
New York	64	23.1%	3	7.1%	2	13.3%	1	11.1%
New Hampshire	32	11.6%	4	9.5%	0	0.0%	0	0.0%
Rhode Island	24	8.7%	1	2.4%	0	0.0%	0	0.0%
Maine	17	6.1%	2	4.8%	0	0.0%	0	0.0%
New Jersey	8	2.9%	0	0.0%	0	0.0%	0	0.0%
North Carolina	6	2.2%	0	0.0%	0	0.0%	0	0.0%
Connecticut	3	1.1%	0	0.0%	0	0.0%	0	0.0%
Virginia	3	1.1%	0	0.0%	0	0.0%	0	0.0%
Pennsylvania	2	0.7%	0	0.0%	0	0.0%	0	0.0%
Maryland	1	0.4%	0	0.0%	0	0.0%	0	0.0%
Total	277	100%	42	100%	15	100%	9	100%

Table 15. Expected impact of Alternative 2 on per vessel total revenue by length and gross tonnage class.

Length Class	Pct of the affected vessels with >1% rev impact	Pct of the affected vessels with >5% rev impact	Pct of the affected vessels with >10% rev impact
0-24	0.0%	0.0%	0.0%
25-49	84.1%	92.3%	95.7%
50-74	15.9%	7.7%	4.3%
75-99	0.0%	0.0%	0.0%
N	82	39	23

Tonnage Class[1]	Pct of the affected vessels with >1% rev impact	Pct of the affected vessels with >5% rev impact	Pct of the affected vessels with >10% rev impact
1	3.7%	5.1%	4.3%
2	89.0%	89.7%	91.3%
3	7.3%	5.1%	4.3%
4	0.0%	0.0%	0.0%
N	82	39	23

[1] TC 1= <5 GRT; TC 2= 5 - 50 GRT; TC 3= 51 - 150- GRT; TC 4= >150 GRT

Table 16. Expected impact of Alternative 2on per vessel total revenue by home port state.

	Gross revenue impacts (percent increase)							
	Overall		1%		5%		10%	
State	Vessels	Pct	Vessels	Pct	Vessels	Pct	Vessels	Pct
Massachusetts	117	42.2%	53	64.6%	30	76.9%	20	87.0%
New York	64	23.1%	7	8.5%	3	7.7%	2	8.7%
New Hampshire	32	11.6%	8	9.8%	3	7.7%	1	4.3%
Rhode Island	24	8.7%	7	8.5%	1	2.6%	0	0.0%
Maine	17	6.1%	5	6.1%	2	5.1%	0	0.0%
New Jersey	8	2.9%	1	1.2%	0	0.0%	0	0.0%
North Carolina	6	2.2%	1	1.2%	0	0.0%	0	0.0%
Connecticut	3	1.1%	0	0.0%	0	0.0%	0	0.0%
Virginia	3	1.1%	0	0.0%	0	0.0%	0	0.0%
Pennsylvania	2	0.7%	0	0.0%	0	0.0%	0	0.0%
Maryland	1	0.4%	0	0.0%	0	0.0%	0	0.0%
Total	277	100%	82	100%	39	100%	23	100%

Table 17. Projected Landings (lbs), Discards (lbs), and Closure Date Associated with a 600 lb Trip Limit for Spiny Dogfish During Quota Period 1 (May 1 - Oct 31) Quota = 2.316 million lbs. Estimated Closure Date Calculation Excludes Discard Mortality. Assumes 75% Discard Mortality Rate

Fishing year	Projected quota period 1 closure date	Estimated percent reduction in effort during quota period 1	Projected landings at period 1 closure date	Projected mortality of regulatory discards at period 1 closure date	Projected mortality of background discards at period 1 closure date	Projected mortality of background discards after closure up to quota period 2	Projected mortality of regulatory discards after closure up to quota period 2	Projected total mortality during quota period 1
94	18-Oct-94	17.90	2,315,850	9,358,375	905,357	112,941	408,112	13,100,634
95	25-Jul-95	17.50	2,315,275	10,750,362	427,699	279,554	4,149,768	17,922,658
96	7-Sep-96	24.84	2,315,376	9,917,871	295,329	96,970	3,009,806	15,635,353
97	12-Sep-97	21.82	2,315,657	9,260,220	195,028	33,557	2,139,774	13,944,236
98	24-Aug-98	23.88	2,315,094	7,866,577	171,963	103,059	4,353,712	14,810,404
Avg	5-Sep	21.19	2,315,450	9,430,681	399,075	125,216	2,812,234	15,082,657

Table 18. Projected Landings (lbs), Discards (lbs), and Closure Date Associated with a 300 lb Trip Limit for Spiny Dogfish During Quota Period 2 (Nov 1 - April 30) Quota = 1.684 million lbs. Estimated Closure Date Calculation Excludes Discard Mortality. Assumes 75% Discard Mortality Rate

Fishing year	Projected quota period 2 closure date	Estimated percent reduction in effort during quota period 2	Projected landings at period 2 closure date	Projected mortality of regulatory discards at period 2 closure date	Projected mortality of background discards at period 2 closure date	Projected mortality of background discards after closure up to quota period 1	Projected mortality of regulatory discards after closure up to quota period 1	Projected total mortality during quota period 2
94/95	30-Apr-95	27.39	420,235	3,935,860	214,113	0	0	4,570,208
95/96	30-Apr-96	29.52	528,859	4,822,282	140,097	0	0	5,491,237
96/97	30-Apr-97	20.01	915,961	5,923,497	158,387	0	0	6,997,845
97/98	30-Apr-98	19.56	595,799	2,925,222	64,416	0	0	3,585,436
Avg	30-Apr	24.12	615,213	4,401,715	144,253	0	0	5,161,182

Table 19. Projected Landings (lbs), Discards (lbs), and Closure Date Associated with a 7000 lb Trip Limit for Spiny Dogfish During Quota Period 1 (May 1 - Oct 31) Quota = 5,095,200 lbs. Estimated Closure Date Calculation Excludes Discard Mortality. Assumes 75% Discard Mortality Rate.

Fishing year	Projected quota period 1 closure date	Estimated percent reduction in effort during quota period 1	Projected landings at period 1 closure date	Projected mortality of regulatory discards at period 1 closure date	Projected mortality of background discards at period 1 closure date	Projected mortality of background discards after closure up to quota period 2	Projected mortality of regulatory discards after closure up to quota period 2	Projected total mortality during quota period 1
94	7-Jul-94	16.72	5,091,078	782,418	503,292	1,277,385	5,417,900	13,072,073
95	18-Jun-95	25.80	5,092,654	717,783	237,015	1,279,790	7,497,654	14,824,896
96	28-Jun-96	29.60	5,090,503	725,288	248,278	882,552	6,862,424	13,809,046
97	11-Jun-97	23.40	5,087,928	447,281	43,681	378,422	7,467,533	13,424,845
98	26-Jun-98	24.65	5,093,367	284,289	84,509	477,677	8,804,396	14,744,237
Avg	24-Jun	24.03	5,091,106	591,412	223,355	859,165	7,209,981	13,975,019

Table 20. Projected Landings (lbs), Discards (lbs), and Closure Date Associated with a 5,000 lb Trip Limit for Spiny Dogfish During Quota Period 2 (Nov 1 - April 30) Quota = 3,704,800 lbs. Estimated Closure Date Calculation Excludes Discard Mortality. Assumes 75% Discard Mortality Rate.

Fishing year	Projected quota period 2 closure date	Estimated percent reduction in effort during quota period 2	Projected landings at period 2 closure date	Projected mortality of regulatory discards at period 2 closure date	Projected mortality of background discards at period 2 closure date	Projected mortality of background discards after closure up to quota period 1	Projected mortality of regulatory discards after closure up to quota period 1	Projected total mortality during quota period 2
94/95	7-Mar-95	10.96	3,703,284	1,692,879	335,726	59,275	1,148,478	6,939,641
95/96	30-Jan-96	17.71	3,703,356	1,340,906	126,239	93,277	1,909,903	7,173,682
96/97	18-Dec-96	15.54	3,704,138	1,194,736	93,172	151,869	3,236,482	8,380,397
97/98	13-Feb-98	8.32	3,703,678	916,300	51,820	28,062	929,422	5,629,282
Avg	1-Feb	13.13	3,703,614	1,286,205	151,739	83,121	1,806,071	7,030,750