# 2004-2005
# Spiny Dogfish Specifications, Draft Environmental Assessment, Preliminary Economic Evaluation, Regulatory Impact Review, and Initial Regulatory Flexibility Analysis

**February 2004**

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## 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.

According to the FMP, 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 NMFS Regional Administrator, Northeast Region, 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 of F = 0.08 in fishing year 2004 (FY2004: May 2004 - April 2005) and thereafter. Management advice from the most recent stock assessment (NEFSC 2003), however, indicated that fishing mortality should not exceed the rebuilding F (0.03), given current spawning biomass, continued poor recruitment, and reduced pup survivorship. Directed harvest corresponding to F = 0.03 for 2004 is approximately 6.5 million pounds. The Spiny Dogfish Monitoring Committee concluded that because Canadian landings of spiny dogfish in 2004 will likely exceed 6.5 million pounds, additional mortality from directed U.S. landings of spiny dogfish in 2004 will result in exceeding F = 0.03. As such, the Monitoring Committee recommended that suspension of directed fishing for spiny dogfish in Federal waters continue in FY2004, and that status quo bycatch trip limits (600 pounds in Period 1 and 300 pounds in Period 2) remain in place. The Monitoring Committee also recommended a cap on bycatch landings consistent with the status quo (FY2003) quota of 4 million pounds.

The Mid-Atlantic Council endorsed the status quo quota of 4 million pounds for FY2004, but recommended an increase in the trip limit to 1,500 pounds in both quota periods. In the

judgement of the majority of the Council, an increase in the trip limit was needed in order to accommodate the demand for higher volume required by the processing sector of the spiny dogfish fishery. For this same reason, the New England Council recommended a trip limit of 1,500 pounds in both quota periods as well as a quota of 4.4 million pounds. The slightly higher quota was chosen in order to be consistent with the FY2003 quota for spiny dogfish adopted by ASMFC for state waters.

For FY2004, the ASMFC has specified reducing their overall quota and trip limits to levels consistent with Alternative 1 in this document. In that context, any of the proposed Federal management actions that increase the quota or trip limits above state maximums (i.e., Alternatives 2 - 4, below) would have no effect since the transfer of catch to dealers occurs within state jurisdictions where state restrictions apply. The ASMFC action is consistent with the original management approach stipulated in the Federal FMP and should accelerate the rebuilding objectives of FMP compared to the Federal status quo. For the past several years, more liberal state water harvest policy has been identified by the Spiny Dogfish Monitoring Committee as a constraint on spiny dogfish stock recovery. Diminished harvest activity in state waters as a result of the ASMFC action is expected to produce positive impacts to the spiny dogfish stock, essential fish habitat, and protected resources and negative short-term impacts to the socioeconomic sector. Given that an estimated 94.3% of spiny dogfish harvest in 2002 came from state waters, the relative importance of spiny dogfish harvest in the EEZ is low. As such, any additive impacts resulting from Federal actions proposed in this document are considered to be relatively small. Nevertheless, this specifications package serves to analyze the significance to the human environment of impacts that may result from the various Federal management measures proposed herein. Table E-1 presents a qualitative summary of the impacts of the various alternatives. The environmental impacts of all of the proposed measures were analyzed and information as to the anticipated level of significance of these impacts is discussed in accordance with the NEPA and NAO 216-6 formatting requirements for an EA. Because the preferred alternative is not associated with significant impacts to the biological, social or economic, or physical environment, a "Finding of No Significant Impact" has been determined.

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 - Preferred (Status Quo) Alternative: Specify quota for FY2004 at 4.0 million pounds and trip limits of 600 pounds for quota period 1 and 300 pounds for quota period 2 - most restrictive alternative**

Alternative 1 includes a commercial quota of 4,000,000 pounds for FY2004. 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 rebuilding F (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 was recommended by the Spiny Dogfish Monitoring Committee in response to the recently updated stock assessment. By maintaining the spiny dogfish fishery as an incidental catch fishery, with a low annual quota and restrictive trip limits, this alternative is expected to result in positive biological, EFH, and protected resources impacts. The short term economic and social impacts of the Alternative 1 are negative as compared to higher trip limits (Alternatives 2 and 3) or an unregulated fishery (Alternative 4). Nevertheless, over the long term, the cumulative economic and social impacts of implementing Alternative 1 in FY2004 are expected to be positive because the economic and social benefits of a recovered stock will be achieved sooner. The Northeast 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 - Mid-Atlantic Council Alternative: Specify quota for FY2004 at 4.0 million pounds and trip limits of 1500 pounds for quota periods 1 and 2**

Alternative 2 (the Mid-Atlantic Council Alternative) includes a commercial quota of 4,000,000 pounds for FY2004. 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 1,500 pounds for both quota periods are recommended. The quota under this alternative is based on the Monitoring Committee recommendation, while the trip limit is intended accommodate requirements by processors for higher volumes of spiny dogfish.

The biological impacts associated with the increase in trip limits under this alternative are expected to be negative compared to the status quo in that a greater (albeit, unknown) probability for directed fishing will result and thus fishing mortality is more likely to exceed the rate consistent with management advice (F = 0.03; NEFSC 2003). Additionally, a trip limit that encourages directed harvest may also encourage targeting larger, more valuable fish (i.e., mature females), the protection of which is critical for stock recovery. The short term economic and social impacts of this alternative are expected to be positive compared to the Alternative 1. However, a higher fishing mortality rate will produce cumulatively negative economic and social consequences in the long term, since harvest at sustainable yield would be delayed. Increased fishing effort could increase impacts to EFH , especially if trawl use increases as a consequence. This action may also increase (relative to the status quo) the probability of interactions between the spiny dogfish fishery and protected resources. However, the magnitude of these negative impacts is not known.

**Alternative 3 - New England Council Alternative: Specify quota for FY2003 at 4.4 million pounds and trip limits of 1500 pounds for quota periods 1 and 2**

Alternative 3 (the New England Council Alternative) includes a commercial quota of 4.4 million pounds for FY2004. The quota is to be divided semi-annually with quota period 1 (May 1 through October 31) being allocated 2,547,600 pounds (57.9% of the quota), and quota period 2 (November 1 through April 30) being allocated 1,852,400 pounds (42.1% of the quota). Trip limits of 1,500 pounds are recommended for both quota periods. The quota under this alternative is intended to be consistent with the 2003 ASMFC quota, while the trip limit is intended accommodate requirements by processors for higher volumes of spiny dogfish.

The 4.4 million pound quota would result in a 10% increase above the status quo quota. Note, however, that actual spiny dogfish harvest in FY2002 was 4.76 million pounds, and therefore, full compliance with the Alternative 3 quota would actually produce a 7.5% decrease in harvest. As explained in Section 6.1.1, below, the 4.0 million pound quota is not expected to be harvested under Alternative 1. Achieving the larger 4.4 million pound quota under Alternative 3 trip limits may be more likely, but would probably be a function of the amount of targeting induced by the trip limit increases.

The biological impacts associated with the increase in trip limits under this alternative are expected to be negative compared to the status quo in that a greater (albeit, unknown) probability for directed fishing will result and thus fishing mortality is more likely to exceed the rate consistent with management advice (F = 0.03; NEFSC 2003). Additionally, a trip limit that encourages directed harvest may also encourage targeting larger, more valuable fish (i.e., mature females), the protection of which is critical for stock recovery. The short term economic and social impacts of this alternative are expected to be positive compared to the Alternative 1. However, a higher fishing mortality rate will produce cumulatively negative economic and social consequences in the long term, since harvest at sustainable yield would be delayed. Increased fishing effort could increase impacts to EFH , especially if trawl use increases as a consequence. This action may also increase (relative to the status quo) the probability of interactions between the spiny dogfish fishery and protected resources. However, the magnitude of these negative impacts is not known.

**Alternative 4 - No Action: No specified quota or trip limits for FY2004 - least restrictive alternative**

Alternative 4 (the No Action Alternative) would effectively remove regulatory control over the spiny dogfish fishery for FY2004. Given that no quota is specified in Alternative 4, 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 is expected to rise dramatically, exceeding the target fishing mortality rate (0.03) in the short term, and leading to stock collapse in the long term. Compared to the Preferred Alternative (Alternative 1), Alternative 4 is expected to have negative consequences for spiny dogfish and non-target species taken in the spiny dogfish fishery. Additionally, the probability of impacts to EFH, and

interactions between the spiny dogfish fishery and protected resources would increase greatly relative to the status quo.

Table E-1. Qualitative summary of the expected impacts of various alternatives considered for FY2004 spiny dogfish specifications. A plus sign (+) is used for a positive impact, a minus sign (-) signifies an expected negative impact, and a plus/minus (+/-) is used for unknown impacts contingent on the level of response by the fishery (see note below table).

| Proposed Federal Action | | Environmental Dimension | | | | |
|---|---|---|---|---|---|---|
| FY2004 Spiny Dogfish Management Alternatives | | Biological | Economic | Social | Protected Resources | EFH |
| Alt. 1 | Quota: 4 million lbs<br>Trip Limits: 600/300 lbs | + | - | - | + | + |
| Alt. 2* | Quota: 4 million lbs<br>Trip Limits: 1,500/1,500 lbs | +/- | + | + | +/- | +/- |
| Alt. 3* | Quota: 4.4 million lbs<br>Trip Limits: 1,500/1,500 lbs | +/- | + | + | +/- | +/- |
| Alt. 4 | Unrestricted | - | + | + | - | - |

* While either Alternative 2 or 3 is expected to result in a greater probability of directed fishing for spiny dogfish relative to the status quo, it is unknown whether the level of directed fishing they produce will result in measurable biological, EFH, or protected resource impacts as compared to the status quo. Either alternative is expected to have positive effects on these environmental dimensions when compared to Alternative 4 (no action alternative).

**DRAFT ENVIRONMENTAL ASSESSMENT FOR THE FISHING YEAR 2004 CATCH SPECIFICATIONS FOR SPINY DOGFISH**

## 1.0 Purpose and Need

The purpose of this document is to specify Federal spiny dogfish management measures for fishing year 2004 (FY2004: May 1, 2004 - April 30, 2005 - year six 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 six include a commercial quota set in a range from zero to the maximum allowed while assuring that fishing mortality (F) does not exceed 0.08. 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, Virtual Population Analysis 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 10, 2003 and developed recommendations based on stock conditions estimated from the latest peer-reviewed stock assessment (NEFSC 2003). The Spiny Dogfish FMP stipulates a target fishing mortality rate of F = 0.08 in fishing year 2004 (FY2004: May 2004 - April 2005) and thereafter. Management advice from the 37$^{th}$ SAW (NEFSC 2003), however, indicated that fishing mortality should not exceed the rebuilding F (0.03) given current spawning biomass, continued poor recruitment, and reduced pup survivorship. Directed harvest corresponding to F = 0.03 for 2004 is approximately 6.5 million pounds. The Spiny Dogfish Monitoring Committee concluded that because Canadian landings of spiny dogfish in 2004 will likely exceed 6.5 million pounds, additional mortality from directed U.S. landings of spiny dogfish in 2004 will result in exceeding F = 0.03. As such, the Monitoring Committee recommended that suspension of directed fishing for spiny dogfish in Federal waters continue in FY2004, and that status quo bycatch trip limits (600 pounds in Period 1 and 300 pounds in Period 2) remain in place. The Monitoring Committee recommended a cap on bycatch landings consistent with the status quo (FY2003) quota of 4 million pounds. The Committee agreed by consensus that discards continue to be a major issue for stock rebuilding and that effort should be made to reduce discard incidence and mortality. The Committee recognized that Federal management actions designed to promote stock recovery will have limited effects if conflicting management actions persist in state waters.

The Joint Spiny Dogfish Committee met on October 7, 2003 to consider the recommendations of the Spiny Dogfish Monitoring Committee and to either endorse those recommendations or make its own to the Councils. Questioning the validity of the conclusions of the 37$^{th}$ SAW, the Joint Spiny Dogfish Committee recommended that for FY2004 the Councils adopt a quota of 8 million pounds (3,629 mt) and that no possession limit be established for the EEZ in the FY2004 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 (FY2004) management measures for spiny dogfish at their respective meetings in October and November 2003. The Councils failed to reach agreement on the proposed measures for spiny dogfish in FY2004. 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 four alternative management measures. Alternative 1 is the preferred alternative and represents the status quo, while Alternatives (2) and (3) were adopted by the MAFMC and the NEFMC respectively, and Alternative 4 consists of no action. The status quo alternative contains the lowest quota (most restrictive scenario) while the no action alternative consists of 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 (Preferred Alternative): Specify quota for FY2004 at 4.0 million pounds and trip limits of 600 pounds for quota period 1 and 300 pounds for quota period 2

Alternative 1 includes a commercial quota of 4,000,000 pounds for FY2004. 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).

### 3.2 Alternative 2 - (Mid-Atlantic Council Alternative): Specify quota for FY2004 at 4.0 million pounds and trip limits of 1500 pounds for quota periods 1 and 2

Alternative 2 (the Mid-Atlantic Council Alternative) includes a commercial quota of 4,000,000 pounds for FY2004. 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 1,500 pounds for both quota periods are recommended. The quota under this alternative is based on the Monitoring Committee recommendation, while the trip limit is intended accommodate requirements by processors for higher volumes of spiny dogfish.

### 3.3 Alternative 3 - (New England Council Alternative): Specify quota for FY2003 at 4.4 million pounds and trip limits of 1500 pounds for quota periods 1 and 2

Alternative 3 (the New England Council alternative) includes a commercial quota of 4.4 million pounds for FY2004. The quota is to be divided semi-annually with quota period 1 (May 1 through October 31) being allocated 2,547,600 pounds (57.9% of the quota), and quota period 2 (November 1 through April 30) being allocated 1,852,400 pounds (42.1% of the quota). Trip limits of 1,500 pounds are recommended for both quota periods. The quota under this alternative is intended to be consistent with the 2003 ASMFC quota, while the trip limit is intended accommodate requirements by processors for higher volumes of spiny dogfish.

### 3.4. Alternative 4 - (No Action Alternative): No specified quota or trip limits for FY2004

Alternative 4 (the no-action alternative) would effectively remove regulatory control over the spiny dogfish fishery for FY2004. Given that no quota is specified in Alternative 4, 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

The affected environment for this action encompasses all of the spiny dogfish EFH. A more complete description of essential fish habitat for spiny dogfish is given in Section 2.2.2 in the FMP.

For juvenile spiny dogfish, EFH is defined as: 1) North of Cape Hatteras, the waters of the Continental shelf from the Gulf of Maine through Cape Hatteras, North Carolina in areas that encompass the highest 90% of all ranked ten-minute squares for the area where juvenile dogfish were collected in the NEFSC trawl surveys. 2) South of Cape Hatteras, the waters over the Continental Shelf from Cape Hatteras, North Carolina through Cape Canaveral, Florida, to depths of 1280 ft. 3) Inshore, the "seawater" portions of the estuaries where dogfish are common or abundant on the Atlantic coast, from Passamaquoddy Bay, Maine to Cape Cod Bay, Massachusetts. Generally, juvenile dogfish are found at depths of 33 to 1280 ft in water temperatures ranging between 37$^{o}$F and 82$^{o}$F.

For adults: 1) North of Cape Hatteras, EFH is the waters of the Continental shelf from the Gulf of Maine through Cape Hatteras, North Carolina in areas that encompass the highest 90% of all ranked ten-minute squares for the area where adult dogfish were collected in the NEFSC trawl surveys. 2) South of Cape Hatteras, EFH is the waters over the Continental Shelf from Cape Hatteras, North Carolina through Cape Canaveral, Florida, to depths of 1476 ft . 3) Inshore, EFH is the "seawater" portions of the estuaries where dogfish are common or abundant on the Atlantic coast, from Passamaquoddy Bay, Maine to Cape Cod Bay, Massachusetts. Generally, adult dogfish are found at depths of 33 to 1476 ft in water temperatures ranging between 37° F

and 82° F.

### 4.2 Description of Protected Resources

There are numerous species which inhabit the environment within 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 the spiny dogfish fisheries:

**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 |

**4.2.1 Description of Species Listed as Endangered which inhabit the management unit of the FMP**

**North Atlantic Right Whale**

Right whales have occurred historically in all the world's oceans from temperate to subarctic latitudes. NMFS recognizes three major subdivisions of right whales: North Pacific, North Atlantic, and Southern Hemisphere. NMFS further recognizes two extant subunits in the North Atlantic: eastern and western (Waring *et al.* 2002). A third subunit may have existed in the central Atlantic (migrating from east of Greenland to the Azores or Bermuda), but this stock appears to be extinct (Perry *et al.* 1999).

The north Atlantic right whale has the highest risk of extinction among all of the large whales in the worlds oceans. The scarcity of right whales is the result of an 800-year history of whaling that continued into the 1960s. By the time the species was internationally protected in 1935, there may have been fewer than 100 western north Atlantic right whales in the western Atlantic (Hain 1975; Reeves *et al.* 1992; Kenney *et al.* 1995 in Waring *et al.* 2002).

NMFS designated right whale critical habitat on June 3, 1994 (59 FR 28793) to help protect important right whale foraging and calving areas within the U.S. These include the waters of Cape Cod Bay and the Great South Channel off the coast of Massachusetts, and waters off the coasts of southern Georgia and northern Florida. The northern right whale was listed as endangered throughout it's range on June 2, 1970 under the ESA. The current population is considered to be at a low level and the species remains designated as endangered (Waring *et al.* 2002). A Recovery plan has been published and currently is in effect (NMFS 1991). This is a strategic stock because the average annual fishery-related mortality and serious injury from all fisheries exceeds the Potential Biological Removal (PBR).

Right whales may be adversely affected by habitat degradation, habitat exclusion, acoustic trauma, harassment, or reduction in prey resources due to trophic effects resulting from a variety of activities including the operation of commercial fisheries. However, the major known sources of anthropogenic mortality and injury of right whales clearly are ship strikes and entanglement in commercial fishing gear. Waring *et al.* (2002) give a detailed description of the annual human related mortalities of right whales.

**Humpback Whale**

The humpback whale was listed as endangered throughout it's range on June 2, 1970. This species is the fourth most numerically depleted large cetacean worldwide. Humpback whales calve and mate in the West Indies and migrate to feeding areas in the northwestern Atlantic during the summer months. Six separate feeding areas are utilized in northern waters after their return (Waring *et al.* 2002). Only one of these feeding areas, the GOM, lies within U.S. waters and is within the action area of this consultation. Most of the humpbacks that forage in the GOM visit Stellwagen Bank and the waters of Massachusetts and Cape Cod Bays. Sightings are most frequent from mid-March through November between 41º N and 43º N, from the Great South Channel north along the outside of Cape Cod to Stellwagen Bank and Jeffreys Ledge (CeTAP 1982), and peak in May and August. Small numbers of individuals may be present in this area year-round. They feed on a number of species of small schooling fishes, particularly sand lance and Atlantic herring, by targeting fish schools and filtering large amounts of water for their associated prey. Humpback whales have also been observed feeding on krill (Wynne and Schwartz 1999).

The major known sources of anthropogenic mortality and injury of humpback whales include entanglement in commercial fishing gear and ship strikes. Based on photographs of the caudal peduncle of humpback whales, Robbins and Mattila (1999) estimated that at least 48% --- and possibly as many as 78% --- of animals in the Gulf of Maine exhibit scarring caused by entanglement. For the period 1996 through 2000, the total estimated human-caused mortality and serious injury to the Gulf of Maine humpback whale stock is estimated as 3.0 per year (USA waters, 2.4; Canadian waters, 0.6). Humpback whales may also be adversely affected by habitat degradation, habitat exclusion, acoustic trauma, harassment, or reduction in prey resources due to trophic effects resulting from a variety of activities including the operation of commercial fisheries.

**Fin Whale**

Fin whales inhabit a wide range of latitudes between 20-75/ N and 20-75/ S (Perry *et al.* 1999). NMFS has designated one stock of fin whale for U.S. waters of the North Atlantic (Waring *et al.* 1998) where the species is commonly found from Cape Hatteras northward. The fin whale was listed as endangered throughout it's range on June 2, 1970 under the ESA. Hain *et al.* (1992) estimated that about 5,000 fin whales inhabit the northeastern United States continental shelf waters. The minimum population estimate for the western North Atlantic fin whale is 2,362. There is not enough information to estimate population trends.

The major known sources of anthropogenic mortality and injury of fin whales include ship strikes and entanglement in commercial fishing gear. Fin whales may also be adversely affected by habitat degradation, habitat exclusion, acoustic trauma, harassment, or reduction in prey resources due to trophic effects resulting from a variety of activities including the operation of commercial fisheries.

**Sei Whale**

Sei whales are a widespread species in the world's temperate, subpolar and subtropical and even tropical marine waters. Mitchell and Chapman (1977) suggested that the sei whale population in the western North Atlantic consists of two stocks, a Nova Scotian Shelf stock and a Labrador Sea stock. The Nova Scotian Shelf stock includes the continental shelf waters of the northeastern United States, and extends northeastward to south of Newfoundland. The IWC boundaries for this stock are from the U.S. east coast to Cape Breton, Nova Scotia and east to longitude 42/ (Waring *et al.* 2000). This is the only sei whale stock within the action area.

Sei whales occur in deep water throughout their range, typically over the continental slope or in basins situated between banks (Draft Recovery Plan, NMFS 1998a). In the northwest Atlantic, the whales travel along the eastern Canadian coast in autumn, June and July on their way to and from the Gulf of Maine and Georges Bank where they occur in winter and spring. Within the action area, the sei whale is most common on Georges Bank and into the Gulf of Maine/Bay of Fundy region during spring and summer, primarily in deeper waters. Individuals may range as far south as North Carolina. It is important to note that sei whales are known for inhabiting an area for weeks at a time then disappearing for year or even decades; this has been observed all over the world, including in the southwestern GOM in 1986. The basis for this phenomenon is not clear.

Few instances of injury or mortality of sei whales due to entanglement or vessel strikes have been recorded in U.S. waters. Entanglement is not known to impact this species in the U.S. Atlantic, possibly because sei whales typically inhabit waters further offshore than most commercial fishing operations, or perhaps entanglements do occur but are less likely to be observed. Other impacts noted above for other baleen whales may also occur. Due to the deep-water distribution of this species, interactions that do occur are less likely to be observed or reported than those involving right, humpback, and fin whales that often frequent areas within the continental shelf (Waring *et al.* 2002).

**Blue Whale**

Like the fin whale, blue whales occur worldwide and are believed to follow a similar migration pattern from northern summering grounds to more southern wintering areas (Perry *et al.* 1999). Blue whales are only occasional visitors to east coast U.S. waters. They are more commonly found in Canadian waters, particularly the Gulf of St. Lawrence where they are present for most of the year, and other areas of the North Atlantic. Compared to the other species of large whales, relatively little is known about this species.

Entanglement in fishing gear and ship strikes are believed to be the major sources of anthropogenic mortality and injury of blue whales. However, confirmed deaths or serious injuries from either are few. No recent entanglements of blue whales have been reported from the U.S. Atlantic. Other impacts noted above for other baleen whales may occur.

**Sperm Whale**

Sperm whales inhabit all ocean basins, from equatorial waters to the polar regions (Perry *et al.* 1999). In the western North Atlantic they range from Greenland to the Gulf of Mexico and the Caribbean. The sperm whales that occur in the western North Atlantic are believed to represent only a portion of the total stock (Blaylock *et al.* 1995). Total numbers of sperm whales off the USA or Canadian Atlantic coast are unknown, although eight estimates from selected regions of the habitat do exist for select time periods. The best estimate of abundance for the North Atlantic stock of sperm whales is 4,702 (CV=0.36) (Waring *et al.* 2002). The minimum population estimate for the western North Atlantic sperm whale is 3,505 (CV=0.36).

Sperm whales generally occur in waters greater than 180 meters in depth. While they may be encountered almost anywhere on the high seas, their distribution shows a preference for continental margins, sea mounts, and areas of upwelling, where food is abundant (Leatherwood and Reeves 1983). In the U.S. EEZ, sperm whales occur on the continental shelf edge, over the continental slope, and into the mid-ocean regions (Waring *et al.* 1993), and are distributed in a distinct seasonal cycle; concentrated east-northeast of Cape Hatteras in winter and shifting northward in spring when whales are found throughout the mid-Atlantic Bight. Distribution extends further northward to areas north of Georges Bank and the Northeast Channel region in summer and then south of New England in fall, back to the mid-Atlantic Bight (Waring *et al.*

2000).

Few instances of injury or mortality of sperm whales due to human impacts have been recorded in U.S. waters. Because of their generally more offshore distribution and their benthic feeding habits, sperm whales are less subject to entanglement than are right or humpback whales. Sperm whales are also struck by ships. Other impacts noted above for baleen whales may also occur.

**Loggerhead Sea Turtle**

The loggerhead turtle was listed as "threatened" under the ESA on July 28, 1978, but is considered endangered by the World Conservation Union (IUCN) and under the Convention on International Trade in Endangered Species of Flora and Fauna (CITES). Loggerhead sea turtles are found in a wide range of habitats throughout the temperate and tropical regions of the Atlantic. These include open ocean, continental shelves, bays, lagoons, and estuaries (NMFS& FWS 1995). In the management unit of this FMP they are most common on the open ocean in the northern Gulf of Maine, particularly where associated with warmer water fronts formed from the Gulf Stream. The species is also found in entrances to bays and sounds and within bays and estuaries, particularly in the Mid-Atlantic.

**Leatherback Sea Turtle**

Leatherback turtles are widely distributed throughout the oceans of the world, and are found in waters of the Atlantic, Pacific, Caribbean, and the Gulf of Mexico (Ernst and Barbour 1972). The leatherback sea turtle is the largest living turtle and ranges farther than any other sea turtle species, exhibiting broad thermal tolerances (NMFS and USFWS, 1995). In the U.S., leatherback turtles are found throughout the action area of this consultation. Located in the northeastern waters during the warmer months, this species is found in coastal waters of the continental shelf and near the Gulf Stream edge, but rarely in the inshore areas. A 1979 aerial survey of the outer Continental Shelf from Cape Hatteras, North Carolina to Cape Sable, Nova Scotia showed leatherbacks to be present throughout the area with the most numerous sightings made from the Gulf of Maine south to Long Island. This aerial survey estimated the leatherback population for the northeastern U.S. at approximately 300-600 animals (from near Nova Scotia, Canada to Cape Hatteras, North Carolina).

Anthropogenic impacts to the leatherback population are similar to those discussed above for the loggerhead sea turtle, including fishery interactions as well as intense exploitation of the eggs (Ross 1979). Eckert (1996) and Spotila *et al.* (1996) record that adult mortality has also increased significantly, particularly as a result of driftnet and longline fisheries. Fisheries known or suspected to incidentally capture leatherbacks include those deploying bottom trawls, off-bottom trawls, purse seines, bottom longlines, hook and line, gill nets, drift nets, traps, haul seines, pound nets, beach seines, and surface longlines (NMFS and USFWS 1992).

As noted, there are many human-related sources of mortality to leatherbacks; a tally of all leatherback takes anticipated annually under current biological opinions completed for the NMFS June 30, 2000, biological opinion on the pelagic longline fishery projected a potential for up to 801 leatherback takes, although this sum includes many takes expected to be nonlethal. Leatherbacks have a number of pressures on their populations, including injury or mortality in fisheries, other Federal activities (e.g., military activities, oil and gas development, etc.), degradation of nesting habitats, direct harvest of eggs, juvenile and adult turtles, the effects of ocean pollutants and debris, lethal collisions, and natural disturbances such as hurricanes (which may wipe out nesting beaches).

Estimated to number approximately 115,000 adult females globally in 1980 (Pritchard 1982) and only 34,500 by 1995 (Spotila *et al.* 1996), leatherback populations have been decimated worldwide. The status of the leatherback population in the Atlantic is difficult to assess since major nesting beaches occur over broad areas within tropical waters outside the United States. Recent information suggests that Western Atlantic populations declined from 18,800 nesting females in 1996 (Spotila *et al.* 1996) to 15,000 nesting females by 2000. It does appear that the Western Atlantic portion of the population is being subjected to mortality beyond sustainable levels, resulting in a continued decline in numbers of nesting females.

**Kemp's Ridley Sea Turtle**

The Kemp's ridley is probably the most endangered of the world's sea turtle species. The only major nesting site for ridleys is a single stretch of beach near Rancho Nuevo, Tamaulipas, Mexico (Carr 1963). Estimates of the adult population reached a low of 1,050 in 1985, but increased to 3,000 individuals in 1997. More recently the TEWG (2000) concluded that the Kemp's Ridley population appears to be in the early stages of exponential expansion. While the number of females nesting annually is estimated to be orders of magnitude less than historical levels, the mean rate of increase in the annual number of nests has accelerated over the period 1987-1999. Preliminary analyses suggest that the intermediate recovery goal of 10,000 nesting females by 2020 may be achievable (TEWG 2000).

Juvenile Kemp's ridleys inhabit northeastern US coastal waters where they forage and grow in shallow coastal during the summer months. Juvenile ridleys migrate southward with autumnal cooling and are found predominantly in shallow coastal embayments along the Gulf Coast during the late fall and winter months. Ridleys found in mid-Atlantic waters are primarily post-pelagic juveniles averaging 40 cm in carapace length, and weighing less than 20 kg (NMFS 1998). After loggerheads, they are the second most abundant sea turtle in Virginia and Maryland waters, arriving in there during May and June and then emigrating to more southerly waters from September to November (NMFS 1998). In the Chesapeake Bay, ridleys frequently forage in shallow embayments, particularly in areas supporting submerged aquatic vegetation (Lutcavage and Musick 1985; NMFS 1998). The juvenile population in Chesapeake Bay is estimated to be 211 to 1,083 turtles (NMFS 1998).

The vast majority of ridleys identified along the Atlantic Coast have been juveniles and subadults. Sources of mortality in this area include incidental takes in fishing gear, pollution and marine habitat degradation, and other man-induced and natural causes. Loss of individuals in the Atlantic, therefore, may impede recovery of the Kemp's ridley sea turtle population. Sea sampling data from the northeast otter trawl fishery and southeast shrimp and summer flounder bottom trawl fisheries has recorded takes of Kemp's ridley turtles.

**Green Sea Turtle**

Green sea turtles are more tropical in distribution than loggerheads, and are generally found in waters between the northern and southern 20°C isotherms (NMFS 1998). In the wester Atlantic region, the summer developmental habitat encompasses estuarine and coastal waters as far north as Long Island Sound, Chesapeake Bay, and the North Carolina sounds, and south throughout the tropics (NMFS 1998). Most of the individuals reported in U.S. waters are immature (NMFS 1998). There is evidence that green turtle nesting has been on the increase during the past decade. Recent population estimates for the western Atlantic area are not available. Green turtles are threatened by incidental captures in fisheries, pollution and marine habitat degradation,
destruction/disturbance of nesting beaches, and other sources of man-induced and natural mortality. Sea sampling data from the scallop dredge fishery and southeast shrimp and summer flounder bottom trawl fisheries have recorded incidental takes of green turtles

**Shortnose Sturgeon**

Shortnose sturgeon occur in large rivers along the western Atlantic coast from the St. Johns River, Florida (possibly extirpated from this system), to the Saint John River in New Brunswick, Canada. The species is anadromous in the southern portion of its range *(i.e.,* south of Chesapeake Bay), while northern populations are amphidromous (NMFS 1998). Population sizes vary across the species' range with the smallest populations occurring in the Cape Fear and Merrimack Rivers and the largest populations in the Saint John and Hudson Rivers (Dadswell 1979; NMFS 1998).

**Atlantic salmon**

The recent ESA-listing for Atlantic salmon covers the wild population of Atlantic salmon found in rivers and streams from the lower Kennebec River north to the U.S.-Canada border. Atlantic salmon are an anadromous species with spawning and juvenile rearing occurring in freshwater rivers followed by migration to the marine environment. Juvenile salmon in New England rivers typically migrate to sea in May after a two to three year period of development in freshwater streams, and remain at sea for two winters before returning to their U.S. natal rivers to spawn from mid October through early November. The numbers of returning wild Atlantic salmon within the Gulf of Maine Distinct Population Segment (DPS) are perilously small with total run sizes of approximately 150 spawners occurring in 1999 (Baum 2000). Although capture of Atlantic salmon has occurred in commercial fisheries (usually otter trawl or gillnet gear) or by

research/survey, no salmon have been reported captured in the Atlantic mackerel, squid and butterfish fisheries.

**Seabirds**

Most of the following information about seabirds is taken from the Mid-Atlantic Regional Marine Research Program (1994) and Peterson (1963). Fulmars occur as far south as Virginia in late winter and early spring. Shearwaters, storm petrels (both Leach's and Wilson's), jaegers, skuas, and some terns pass through this region in their annual migrations. Gannets and phalaropes occur in the Mid-Atlantic during winter months. Nine species of gulls breed in eastern North America and occur in shelf waters off the northeastern US. These gulls include: glaucous, Iceland, great black-backed, herring, laughing, ring-billed, Bonaparte's and Sabine's gulls, and black-legged caduceus. Royal and sandwich terns are coastal inhabitants from Chesapeake Bay south to the Gulf of Mexico. The Roseate tern is listed as endangered under the ESA, while the Least tern is considered threatened (Safina pers. comm.). In addition, the bald eagle is listed as threatened under the ESA and is a bird of aquatic ecosystems.

Like marine mammals, seabirds are vulnerable to entanglement in commercial and recreational fishing gear. The interaction has not been quantified in the recreational fishery, but impacts are not considered significant. Human activities such as coastal development, habitat degradation and destruction, and the presence of organochlorine contaminants are considered the major threats to some seabird populations.

### 4.2.2 Description of species of concern which are protected under MMPA

The following is a description of species of concern because they are protected under MMPA and, as discussed above, have had documented interactions with fishing gears used to harvest species managed under this FMP.

**Harbor porpoise**

Most of the information which follows concerning harbor porpoise was taken from the most recent stock assessment for this species (Waring *et al.* 2002). This stock is found in USA and Canadian Atlantic waters. During summer (July to September), harbor porpoises are concentrated in the northern Gulf of Maine and southern Bay of Fundy region, generally in waters less than 150 m deep, with a few sightings in the upper Bay of Fundy and on the northern edge of Georges Bank. During fall (October-December) and spring (April-June), harbor porpoises are widely dispersed from New Jersey to Maine, with lower densities farther north and south. They are seen from the coastline to deep waters (> 1800 m), although the majority of the population is found over the continental shelf. During winter (January to March), intermediate densities of harbor porpoises can be found in waters off New Jersey to North Carolina, and lower densities are found in waters off New York to New Brunswick, Canada.

Waring *et al.* (2002) reported the estimated population size of harbor porpoises in the Gulf of

Maine/Bay of Fundy region, based on four line transect sighting surveys conducted during the summers of 1991, 1992, 1995, and 1999. The population sizes were 37,500 harbor porpoises in 1991, 67,500 harbor porpoises in 1992, 74,000 harbor porpoises in 1995, and 89,700 in 1999.

Potential Biological Removal (PBR) is the product of minimum population size, one-half the maximum productivity rate, and a "recovery" factor (MMPA Sec. 3. 16 U.S.C. 1362; Wade and Angliss 1997). The minimum population size is 74,695 (CV=0.22). The maximum productivity rate is 0.04, the default value for cetaceans. The "recovery" factor, which accounts for endangered, depleted, threatened stocks, or stocks of unknown status relative to optimum sustainable population (OSP) is assumed to be 0.5 because this stock is of unknown status. PBR for the Gulf of Maine/Bay of Fundy harbor porpoise is 747.

On January 7, 1993, the National Marine Fisheries Service (NMFS) proposed listing the Gulf of Maine harbor porpoise as threatened under the Endangered Species Act (NMFS 1993). On January 5, 1999, NMFS determined the proposed listing was not warranted (NMFS 1999). On August 2, 2001, NMFS made available a review of the biological status of the Gulf of Maine/Bay of Fundy harbor porpoise population. The determination was made that listing to the Endangered
Species Act (ESA) was not warranted and this stock was removed from the ESA candidate species list (50 CFR Part 233). There are insufficient data to determine population trends for this species. The total fishery-related mortality and serious injury for this stock is not less than 10% of the calculated PBR and, therefore, cannot be considered to be insignificant and approaching zero mortality and serious injury rate. This is not a strategic stock because average annual fishery-related mortality and serious injury has not exceeded PBR for the last two years (Waring *et al.* 2002).

Recently, Gulf of Maine/Bay of Fundy harbor porpoise takes have been documented in the USA Northeast sink gillnet, mid-Atlantic coastal gillnet, and in the Canadian Bay of Fundy groundfish sink gillnet and herring weir fisheries (Waring *et al.* 2003). Recent data on incidental takes in USA fisheries are available from several sources. The only source that documented harbor porpoise bycatch is the Northeast Fisheries Science Center (NEFSC) Sea Sampling Observer Program that was initiated in 1990, and since that year, several fisheries have been covered by the program. A complete description of the fisheries covered under this program is given in Waring *et al.* (2003). There have been 452 harbor porpoise mortalities related to this fishery observed between 1990 and 2000 and one was released alive and uninjured. Estimated annual bycatch from the Northeast sink gillnet fishery during 1990-2000 was 2,900 in 1990, 2,000 in 1991, 1,200 in 1992, 1,400 in 1993, 2100 in 1994, 1400 in 1995, 1200 in 1996, 782 in 1997, 332 in 1998, 270 in 1999, and 507 in 2000 (Waring *et al.* 2002).

Annual average estimated harbor porpoise mortality and serious injury from the mid-Atlantic coastal gillnet fishery before the Take Reduction Plan (during 1995 to 1998) was 358 (CV=0.20). Because of the Take Reduction Plan to reduce takes in USA Atlantic gillnets, and the fishery management plans to manage groundfish, fishing practices changed during 1999. Subsequently, the average annual harbor porpoise mortality and serious injury in the

mid-Atlantic coastal gillnet fishery from 1999 and 2000 is only 37. The strandings and entanglement database, maintained by the New England Aquarium and the Northeast Regional Office/NMFS, reported 228 and 26 stranded harbor porpoises during 1999 and 2000, respectively. Of these, it was determined that the cause of death of 19, and 1 stranded harbor porpoises was due to gillnets in 1999 and 2000, respectively, and these animals were in areas and times that were not included in the above mortality estimate derived from observer program data. The current average harbor porpoise mortality and serious injury in this unknown fishery category from 1999 and 2000 is 10.

**Atlantic Bottlenose dolphin**

Most of the information which follows concerning Atlantic bottlenose dolphins was excerpted from the most recent stock assessment for this species (Waring *et al.* 2002). The coastal morphotype of the Atlantic bottlenose dolphin is continuously distributed along the Atlantic coast south of Long Island, around peninsula Florida and along the Gulf of Mexico coast. Within the western North Atlantic, the stock structure of coastal bottlenose dolphins is complex. Scott *et al.* (1988) hypothesized a single coastal migratory stock ranging seasonally from as far north as Long Island, NY, to as far south as central Florida. The continuous distribution of dolphins along the coast seemed to support this hypothesis. It was recognized that bottlenose dolphins were resident in some estuaries; these were considered to be separate from the coastal migratory animals. However, recent studies suggest that the single coastal migratory stock hypothesis is incorrect and that there is likely a complex mosaic of stocks.

Bottlenose dolphins are known to interact with commercial fisheries and occasionally are taken in various kinds of fishing gear including gillnets, seines, long-lines, shrimp trawls, and crab pots (Read 1994; Wang *et al.* 1994) especially in near-shore areas where dolphin densities and fishery efforts are greatest. Total estimated average annual fishery-related mortality or serious injury resulting from observed fishing trips during 1996-2000 was 233 bottlenose dolphins in the mid-Atlantic coastal gillnet fishery (Waring *et al.* 2002). An estimated 24 were taken in the shark drift gillnet fishery off the coast of Florida during 1999-2000, affecting the Central and Northern Florida management units. No estimates of mortality from observed trips are available for any of the other fisheries that interact with WNA coastal bottlenose dolphins. Therefore, the total average annual mortality estimate is considered to be a lower bound of the actual annual human-caused mortality and serious injury (Waring *et al.* 2002).

The mid-Atlantic coastal gillnet fishery is actually a combination of small-vessel fisheries that target a variety of fish species, including bluefish, croaker, spiny and smooth dogfish, kingfish, Spanish mackerel, spot, striped bass, and weakfish (Steve *et al.* 2001). These fisheries operate in different seasons targeting different species in different states throughout the range of the coastal morphotype. Most nets are set gillnets without anchors and are fished close to shore. Anchored set gillnets or drift gillnets are used in some fisheries (e.g., monkfish or dogfish). A comprehensive description of coastal gillnet gear and fishing effort in North Carolina is available in Steve *et al.* (2001). This fishery has the highest documented level of mortality of WNA coastal bottlenose dolphins; the North Carolina sink gillnet fishery is its largest component in

terms of fishing effort and observed takes. Bycatch estimates are available for the period 1996-2000 (Waring *et al.* 2002). Of 12 observed mortalities from 1995-2000, 5 occurred in sets targeting spiny or smooth dogfish and another in a set targeting "shark" species, 2 occurred in striped bass sets, 2 occurred in Spanish mackerel sets, and the remainder were in sets targeting kingfish, weakfish, or "finfish" (Rossman and Palka 2001;Waring *et al.* 2002).

The shark gillnet fishery operates in federal waters from southern Florida to southern Georgia. The fishery is defined by vessels using relatively large mesh nets (>10 inches) and net lengths typically greater than 1500 feet. The fishery primarily uses drifting nets that are set overnight, however recently it has been employing a small number of shorter duration "strike" sets that encircle targeted schools of sharks. Since 1999, the Atlantic Large Whale Take Reduction Plan restricted the activities of the fishery to waters south of 27/ 51' N latitude during the critical right whale season from 15 November – 31 March and mandated 100% observer coverage during this period. During the remainder of the year, these vessels generally operate north of Cape Canaveral, FL and there is little observer coverage of the fleet. The fishery potentially interacts with the Georgia, Northern Florida, and Central Florida management units of coastal bottlenose dolphin. During an observer program in 1993 and 1994 and limited observer coverage during summer 1998, no takes of bottlenose dolphin were observed (Trent *et al.* 1997; Carlson and Lee, 2000). However, takes resulting in mortality were observed in the central Florida management unit during 1999 and 2000. Total bycatch mortality for this management unit has been estimated for 1999 and 2000 (Garrison 2001b).

A beach seine fishery operates along northern North Carolina beaches targeting striped bass, mullet, spot, weakfish, sea trout, and bluefish. The fishery operates on the Outer Banks of North Carolina primarily in the spring (April through June) and fall (October through December). It uses two primary gear types: a "beach anchored gill net" and a "beach seine". Both systems utilize a small net anchored to the beach. The beach seine system also uses a bunt and a wash net that are attached to the beach and are in the surf (Steve *et al.* 2001). The North Carolina beach seine fishery has been observed since April 7, 1998 by the NMFS fisheries sampling program (observer program) based at the Northeast Fisheries Science Center. Through 2001, there were 101 sets observed during the winter season (Nov-Apr) and 65 sets observed during the summer season (May-Oct). There were no sets observed during the summer of 2001. A total of 2 coastal bottlenose dolphin takes were observed, 1 in May 1998 and 1 in December 2000. The beach seine observer data are currently being reviewed but estimates of mortality are not yet available (Waring *et al.* 2002).

The species is not listed as threatened or endangered under the Endangered Species Act, but because the stock is listed as depleted under the MMPA it is a strategic stock. This stock is also considered strategic under the MMPA because fishery-related mortality and serious injury exceed the PBR level. There are no rigorous results that would provide reliable information on current abundance relative to historical abundance. All prior estimates cover only part of the range of management units spatially or temporally, include the offshore morphotype, or are otherwise compromised. Population trends cannot be determined due to insufficient data. Over the past five years, estimated average annual mortality exceeded PBR in the mid-Atlantic gillnet

fisheries for the northern migratory and northern NC management units during summer and for the NC mixed management units in winter (Waring *et al.* 2002).

### 4.2.3 Past actions under ESA and MMPA

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 state and 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 (Under section 118 of the MMPA , the NMFS must publish and annually update the List of Fisheries (LOF), which places all US 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)). 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 LOF 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.

### 4.3 Port and Community Description

The Council contracted with Dr. Bonnie McCay and her associates at Rutgers University to

describe the ports and communities associated with the fisheries in Mid-Atlantic (McCay et al. 1993). The elimination of the directed spiny dogfish fishery in Federal waters since 2000 renders their findings for that fishery somewhat obsolete, however, their work is useful for comparison to historic trends. The Spiny Dogfish FMP contains details of Mcay et al. (1993) with regard to the spiny dogfish fishery. In addition to the historic description in the FMP, the ports and communities which are dependent on these species are also described below in section 5 of this EA. Landings of spiny dogfish by port in 2002 are described in section 5.3.1.2. In descending order of importance, the following ports accounted for the majority (82.2%) of spiny dogfish landings in fishing year 2002: Chatham, MA, Plymouth, MA, Provincetown, MA, Point Judith, RI, Gloucester, MA, and Harwichport, MA. One port was dependent on spiny dogfish for more than 10% of the value of it's fishery landings in FY2002- Salisbury, MA.

## 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 37th Northeast Regional Stock Assessment Workshop (NEFSC 2003). The following paragraphs are taken directly from the Advisory Report that accompanied the assessment.

**State of Stock:** The spiny dogfish stock is overfished and overfishing is not occurring. Estimated fishing mortality in 2002 (F = 0.09) exceeds the rebuilding target (F = 0.03) by a factor of 3, and is near the overfishing threshold (F = 0.11). The female spawning portion of the biomass has declined by about 75% since 1988 and is at 29% of the biomass target. Estimates of the exploitable and total biomass in 2002 are about 140,000 mt and 371,000 mt, respectively, about half of the peak level observed in 1985. Recent reductions in spawning stock biomass cannot be replaced quickly due to the reproductive biology of spiny dogfish, and the current low level of SSB is expected to result in low recruitment for the next several years. Recruitment estimates from 1997 to 2003 represent the seven lowest values in the entire series.

**Management Advice:** Given low current spawning biomass, poor recruitment and reduced pup survivorship, the SARC recommends total removals (landings, discards, Canadian catch) below those derived from the estimated rebuilding F (0.03). Targeting females should be avoided.

**Forecast:** Rebuilding of spiny dogfish populations will take at least 15 years under the most optimistic scenario. The low biomass of spawning females, high abundance of males, and the near absence of dogfish less than 50 cm will induce large oscillations in the stock regardless of management strategies. Biomass of males and immature females in the 36-70 cm range should decrease over the next decade as the small cohorts produced in the 1990s grow. Replacement of the spawning stock, i.e., accumulation of large females in the 100 cm range, could take another two decades. Forecasts of rebuilding which take into account the apparent lower survival of pups from smaller females indicate that rebuilding will not occur.

**Data and Assessment:** Spiny dogfish were last assessed in March 1998 (SAW 26). The current assessment updates the findings of the SAW 18 (June 1994) and SAW 26, and incorporates new estimates of stock biomass and fishing mortality. Estimates of means and variances of discarded catch have been included in assessment models for the first time. Since age compositions of the landings and discards are not available, the analytical models are length-based. Indices of abundance were derived from research vessel survey catch per tow. New biological data on the relationship between maternal size, and numbers and size of pups were incorporated. Natural mortality (M)was estimated to be 0.092 based on an assumed longevity of 50 years. Estimates of biomass and fishing mortality were derived from a stochastic length-based, survey swept-area method using data from the commercial fishery and NEFSC trawl surveys. Fishing mortality estimates based on the Beverton-Holt model and NEFSC spring survey data were also computed over an assumed range of sizes at entry and natural mortality rates. A size- and sex structured equilibrium life history model incorporating known biological parameters was used to estimate yield per recruit and female pups per female recruit corresponding to varying levels of F and minimum size at entry to the fishery. A stochastic, length-based projection model was developed to predict yield, population sizes and rebuilding times under alternative management scenarios. Selectivity patterns for exploited female and male dogfish were developed.

**Fishing Mortality:** F on the female exploitable stock varied between 0.1 and 0.3 between 1990 and 2000. Despite the much lower level of landings, fishing mortality rates in 2001-2002 remain high (F2001 = 0.08; F2002= 0.09), relative to the rebuilding target (0.03).

**Recruitment:** Annual pup production is low (4-9 pups per litter) and directly related to the number and size structure of spawning females. Recruitment estimates from 1997 to 2003 represent the seven lowest values in the entire series.

**Stock Biomass:** Research vessel abundance and biomass survey indices increased from the early 1970s through1992, and then declined by 33% during 1992-2002 (600,000 mt to 400,000 mt). Most of this change in overall abundance has been driven by the removal of dogfish greater than 80 cm. Swept-area estimates of the spawning (female) biomass (defined as >=80 cm fish) increased six-fold from about 50,000 mt in 1968 to295,000 mt in 1989 and have declined to about 50,000 mt in 1998 and remained relatively constant since. Owing to the high proportion of females in the landings, estimated minimum biomass of females >=80 cm has declined more sharply than the combined male-female >=80-cm biomass. Length-frequency data from both the US commercial landings and six separate research vessel survey catches indicate a pronounced and consistent decrease in average length of mature females in recent years. Changes in the overall size composition of the stock since the onset of the intensive fishery suggest marked changes in present and future reproductive potential.

**Special Comments:** The low abundance of pups in the spring survey, first noted in the SARC 26 assessment, has continued for seven consecutive years through the spring 2003 NMFS trawl survey. Declines in the abundance of dogfish less than 60 cm suggest that the estimates of low pup production are not artifacts of reduced availability to the gear. Average size of pups in the survey has declined, consistent with newly developed data on the reduced average size of pups

produced by smaller females. Spawning potential will decline as these weak year classes reach maturity. In the long term projection, which accounts for the apparent lower survival of pups from smaller females, the lower spawning potential leads to stock collapse under current fishing mortality rates.

**Response by the Spiny Dogfish Monitoring Committee:** For FY2003 and previous years, the annual quota recommended by the Monitoring Committee did not involve direct estimates of discards, nor did it take into account landings by Canada. The current method for estimating spiny dogfish fishing mortality includes this information and was established at the recent stock assessment (NEFSC 2003). The improvement in methodology makes it possible to characterize the relative importance of the various sources of removals. In 2002, U.S. commercial landings totaled about 4.8 million pounds (2195 mt); Canadian landings totaled about 7.7 million pounds (3,500 mt); and dead discards were estimated to be about 11.0 million pounds (5,000 mt). Fishing mortality in 2002 was estimated to be 0.09. Recall that management advice from the SARC (above) indicated the need to constrain fishing mortality to levels consistent with stock rebuilding (0.03) and to avoid targeting the mature female stock. In response to the updated assessment, the Spiny Dogfish Monitoring Committee recommended continued prohibition of *directed* spiny dogfish fishing (targeting large females) in Federal waters and the need for extending this approach stockwide. The Monitoring Committee's specific advice on management actions for FY2004 formed the basis of Alternative 1 and is detailed in the Biological Impacts of Alternative 1 in Section 6.1.1, below.

### 5.2 Stock Characteristics and Ecological Relationships

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

The spiny dogfish, *Squalus acanthias*, is a small coastal shark with a circumboreal distribution. In addition to being the most abundant shark in the western North Atlantic, it is also one of the most highly migratory species of the Atlantic coast (Bigelow and Schroeder 1953). Rago et al. (1994) report that their general distribution in the Northwest Atlantic is between Labrador and Florida but are most abundant from Nova Scotia to Cape Hatteras, North Carolina. Seasonal inshore-offshore movements and coastal migrations are thermally induced (Bigelow and Schroeder 1953, Jensen 1965). Generally, spiny dogfish spend summers in inshore waters and overwinter in deeper offshore waters. They are usually epibenthic, but occur throughout the water column and are found in a depth range from nearshore shallows to offshore shelf waters approaching 3,000 ft (Collette and MacPhee 2002).

Length and age at 50% maturity of spiny dogfish in the Northwest Atlantic is estimated to be 23.4 in and 6 years for males and 30.6 in and 12 years for females (Nammack et al. 1985). Litter size ranges from 2 to 15 pups (average of 6) with fecundity increasing with length (Soldat 1979). Nammack et al. (1985) reported maximum ages of in the Northwest Atlantic for males and females to be 35 and 40 years, respectively. Maximum length is estimated to be 49 inches for females and less than 36 inches for males. An estimate of M is 0.092, which was the value

assumed for spiny dogfish greater than 12 in the NEFSC 1994, 1998 and 2003 assessments.

Bowman et al. (1984) observed a high degree of variability in the diet of spiny dogfish across seasons, areas and years. They considered this to be a reflection of the species' omnivorous nature and the high degree of temporal and spatial variability of both dogfish and their prey. Their diet appears broadly related to abundance trends in some of their major prey items. Spiny dogfish are potential competitors with virtually every marine predator within the Northwest Atlantic Ocean ecosystem. These include a wide variety of predatory fish, marine mammals and seabirds.

## 5.3 Economic and Social Environment

### 5.3.1 Description of the Fisheries for Dogfish

#### 5.3.1.1 Historical Commercial Fishery

As indicated above (Section 4.3), 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 2002 Commercial Fishery

A total of 4.76 million pounds of spiny dogfish valued at $970,000 was landed commercially during FY2002 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 FY2002 with peak landings occurring in May/June and November - the months beginning each period (Table 4). Massachusetts accounted for the largest share of the landings (79.8 %), followed by Rhode Island (9.6%), New Hampshire (7.3 %), and Virginia (2.3%) (Table 4).

Landings by port for FY2002 are given in Table 6. Chatham, MA accounted for the largest share of the landings (40.7%), followed by Plymouth, MA (14.1%), Provincetown, MA (9.9%), Point Judith, RI (6.8%), Gloucester, MA (5.3%), Harwichport, MA(5.1%), Salisbury, MA (3.0%), "Unspecified", NH (2.7%), Newport, R.I. (2.6%), Portsmouth, NH (2.4%), Other Accomac, VA (1.8%), Seabrook, NH (1.4%) New Bedford, MA (1.0%) and all others (3.2%). The value of spiny dogfish landings by port relative to total landings value by port is given in Table 7.

Total spiny dogfish landings for FY2002 were fairly consistent with landings in FY2001 (5.02 million pounds), but were dramatically lower compared to previous years. Harvest levels at around 5 million pounds represent an 87.5% reduction from average landings during the height of the fishery in the 1990's (about 40 million pounds). The relative importance of gear types used to harvest spiny dogfish has changed compared to the fishery of the 1990's (Table 8). While gillnet landings comprised an average of 73.6% of total spiny dogfish landings from 1994 - 2000, gillnets contributed only 40.1% in 2002. Additionally, trawl landings were reduced from a 1994-2000 average of 16.9% of total landings to 11.4% of the total in 2002. A large increase

in proportional landings by gear occurred in the line fishery (includes longline and handline). Although FY2002 spiny dogfish landings by the line fishery (2.31 million pounds) were fairly consistent with the 1994-2000 average (2.92 million pounds), landings increased from 9.0% to 47.9 % as a proportion of total catch, making this the most important gear component of the spiny dogfish fishery in 2002 (Table 8).

*Characteristics of the directed spiny dogfish fishery*. In 2002, 94.3% of spiny dogfish landings (4.5 million pounds) came from trips yielding greater than the Federal trip limits. If the vessels that generated these landings were operating in compliance with Federal law, then these landings were likely taken in state rather than Federal waters. The total number of trips with landings over the Federal trip limits in 2002 was approximately 942. Harvest from these trips was landed mostly in Massachusetts (79%), Rhode Island (13%), and New Hampshire (6%). Average landings per trip for trips over the Federal limits were: Massachusetts (4,840 pounds), Rhode Island (3,712 pounds) and New Hampshire (3,726 pounds).

Sectors of the commercial fishery that targeted spiny dogfish in 2002 were identified by economic analysis conducted recently by the NEFSC (2003 unpubl. data). This is discussed in greater detail in the trip limit analysis section (R.I.R. Section 3.3.1) below. In the analyses, the profitability of dogfish harvest relative to total harvest on a trip-level basis determined the probability that dogfish targeting had occurred. Results indicate that directed dogfish trips by small and medium longline vessels, medium gillnet vessels, and large otter trawl vessels were responsible for 86% of the 2002 landings. Additionally, vessels with trip-level landings of spiny dogfish between 300 and 1,500 lbs were not likely targeting dogfish in 2002. On average, trips in which dogfish were targeted landed around 5,000 pounds of dogfish.

**5.3.1.3 Analysis of Human Environment/Permit Data**

According to unpublished NMFS permit file data, 2,915 vessels possessed federal spiny dogfish permits in FY2002. The distribution of these vessels by home port state is given in Table 9. Most of these vessels were from the states of Massachusetts (40.8%), Maine (11.7%), New Jersey (10.8%), New York(10.5%), Rhode Island (6.3%), Virginia (5.7%), North Carolina (5.1%) and New Hampshire(4.0%), Connecticut (1.8%), Pennsylvania (1.1%) and other states (2.2%). NMFS dealer reports indicate 180 of the 2,915 Federally permitted vessels as well as at least 75 non-federally permitted vessels contributed to overall landings (Federal: 1.43 million pounds valued at $288 thousand; non-Federal: 3.33 million pounds valued at $682 thousand; Total: 4.76 million pounds of spiny dogfish valued at $970 thousand). Among the Federally permitted vessels, most were from the states of Massachusetts (48.4%), New York (24.5%), New Hampshire (11.4%), Rhode Island (8.2%), Maine (2.7%), North Carolina (1.6%), New Jersey (1.6%), and other states (1.5%) (Table 5). Home port states for non-federally permitted vessels are incomplete with respect to vessel activity due to data confidentiality constraints.

NMFS dealer report data indicate that 248 dealers possessed spiny dogfish dealer permits in 2002. The distribution of these dealers by state is given in Table 10. Of the 248 dealers who possessed spiny dogfish dealer permits in FY2002, there were 42 dealers who reported buying

spiny dogfish (Table 10) These dealers were from the states of Massachusetts (28.6%), New York (28.6%), Rhode Island (21.4%), New Hampshire (4.8%), New Jersey (4.8%), North Carolina (4.8%), Maine (2.4%), Maryland (2.4%), and Virginia (2.4%). 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 (2003) 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 (2003) 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 (MRFSS Type A + B1) are given in Table 1. Excluding the recreational estimate for 1981, total recreational landings increased from about 150,000 pounds in 1982-83 to greater than 900,000 pounds in 1989. Since then, spiny dogfish recreational landings have fluctuated. Total landings in weight were 146,600 pounds in 1997 and reached an all time low of about 11,000 pounds in 2000. The weight of the recreational landings rose dramatically in 2002 to greater than 450,000 pounds.

The total number of spiny dogfish caught (MRFSS Type A + B1 + B2) has fluctuated with peaks in 1981 (3.6 million pounds), 1989 (3.6 million pounds), and 2001 (4.3 million pounds), and lows in 1982 (860 thousand pounds) and 1996 (720 thousand pounds). In the New England subregion (Maine-Connecticut), catches have ranged from about 290,000 pounds in 1982 to 3.3 million pounds in 2002. A peak catch of about 3.3 million pounds was caught in the Mid-Atlantic states (New York-North Carolina) in 2001, and the low occurred in 1996 (270,000 pounds). 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 relationship 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). This exercise was not repeated in NEFSC (2003). In 2001 and 2002, estimated B2 catches increased sharply such that recreational removals (recall that a 100% mortality rate is assumed for B2 catches) are were 25 % of total landings in those years.

### 5.3.2 Description of areas fished

Spiny dogfish landings in 2002 by NMFS NER statistical area are given in Table 11. Statistical areas 513, 514, 521, 537, and 539 accounted for greater than 94.6% the commercial spiny dogfish landings in 2002, with statistical area 521 comprising 46.3% of the total. Note the difference between VTR reported total landings (1.714 million pounds) and total landings from dealer reports (4.76 million pounds). This 64% difference in VTR reporting is likely a function of the relative unimportance of federally-permitted vessels in overall dogfish harvest in 2002 as well as under-reporting.

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

### 6.1 Impacts on the Environment of Alternative 1 - The Preferred Alternative

### 6.1.1 Biological Impacts of Alternative 1

If this alternative, in conjunction with the ASMFC specifications, is implemented, the management of the Northeast Atlantic spiny dogfish stock would be consistent throughout U.S. waters for the first time since the FMP was initiated. Additionally, consistent management of spiny dogfish in Federal and state waters will achieve the primary goal of the FMP, which is to protect mature female spiny dogfish so that the reproductive stock can rebuild to a level that will support directed harvest in the long term.

Based on the 2003 Spiny Dogfish Advisory Report, total yield (U.S. and Canadian) corresponding to the SARC-recommended F (0.03) in 2004, after accounting for discards, is about 6.5 million pounds (2,960mt). It is expected that harvest by the Canadian fishery in 2004 will be consistent with that in recent years (approx. 7 million pounds), and, therefore, Canada is likely to harvest all or more than 6.5 million pounds. As such, any *directed* dogfish fishery in U.S. waters (state or Federal) is likely to contribute to harvest in excess of the SARC recommended F (0.03). In the opinion of the Monitoring Committee, the retention of incidentally captured dogfish under very low trip limits would not encourage directed fishing and is not likely to constrain stock recovery. Therefore, the Spiny Dogfish Monitoring Committee recommended 600 and 300 pound trip limits in Periods 1 and 2, respectively, for the

purpose of discouraging directed fishing. In the opinion of the Committee, if this alternative is applied to both Federal and state U.S. waters, it would improve the probability of achieving the F = 0.03 target and hasten rebuilding of mature female biomass.

Impacts on species other than spiny dogfish are likely to be minimized under Alternative 1, since it represents the most restrictive of the proposed management alternatives. By eliminating directed spiny dogfish effort, Alternative 1 effectively eliminates bycatch mortality attributable to the dogfish fishery. As such, Alternative 1 is not associated with significant bycatch impacts on other species. Additionally, Alternative 1 is not expected to increase discarding mortality on spiny dogfish above current levels, and is, therefore not associated with significant discarding impacts on spiny dogfish.

### 6.1.2 Socioeconomic Impacts of Alternative 1

Changes in gross revenues associated with Alternative 1 in FY2004 were estimated by comparison to FY2002 since it is the latest *complete* fishing year. Because the specifications would remain unchanged, revenues from dogfish harvest under Alternative 1 should be equivalent to dogfish revenues from the FY2002 reference year, except for changes in market value. Note, however, that the FY2002 quota (4.00 million pounds) is 16.0% less than what was actually landed (4.76 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 FY2004 dogfish fishery is identical to that observed in FY2002, the fleet should experience a decrease in dogfish fishing opportunity equal to the decrease associated with full compliance (16.0%). If the 16.0% decrease in dogfish fishing opportunity is applied evenly to dogfish revenue for each vessel in the FY2002 fleet, and revenue from other fisheries is assumed constant, the change in gross revenue per vessel can be calculated. Based on this approach, gross revenues for Federally permitted vessels harvesting spiny dogfish are expected to decline by an average of 0.56%. Among Federally permitted vessels (N=180), 13 (7.2% of the fleet) are expected to experience a decrease in gross revenue greater than 1%, 6 (3.3% of the fleet) are expected to experience a decrease in gross revenue greater 5% and 3 (1.7% of the fleet) are expected to experience a decrease in gross revenues greater than 10%. Two of the three vessels that are estimated to incur losses of greater than 10% reported total revenue less than $3,000 for FY2002. It is important to note that the distribution of revenue loss will differ from estimated values if the market price and/or harvest levels change for dogfish or any other fishery relative to FY2002.

An analysis of average impacts on *non-federally* permitted vessels is possible if it is assumed that all such vessels (N = 72) are identified in the Federal dealer reports. This is not likely, since the “unknown” vessel categories account for 11% of total landings. Nevertheless, within the apparent non-federal fleet, 27 vessels (37.5% of the fleet) are expected to experience a decrease in gross revenue greater than 1%, 13 vessels (18.1% of the fleet) are expected to experience a decrease in gross revenue greater 5%, and 12 vessels (16.7% of the fleet) are expected to experience a decrease in gross revenues greater than 10%. Five of the twelve vessels estimated to incur losses of greater than 10% reported total revenues less than $10,000 for FY2002.

Socioeconomic impacts are likely to be felt by participants in the directed dogfish fishery in state waters as a result of the ASMFC action. The state waters sector of the dogfish fishery harvested an estimated 94.3% of total landings in 2002.

A frequency distribution of vessel length and gross registered tonnage for Federally permitted vessels that landed spiny dogfish in FY2002 is presented in Table 14. Unpublished NMFS permit file data contain vessel length and gross tonnage information for the 180 Federally permitted vessels that reported landing spiny dogfish in FY2002. The length distribution of these vessels was as follows: less than 24 ft length class: 2 vessels (1.1%); 25-49 ft length class: 129 vessels (71.7%); 50-74 ft length class: 46 vessels (25.6%); 75ft plus length class: 3 vessels (1.7%). The tonnage distribution of these vessels was as follows: Class 1: 11vessels (6.1%); Class 2: 145 vessels ( 80.6%); Class 3: 22 vessels (12.2%); Class 4: 2 vessels (1.1%) [Tonnage Class 1 = <5 Gross Registered Tons; Tonnage Class 2 = 5 - 50 Gross Registered Tons; Tonnage Class 3 = 51 - 150 Gross Registered Tons; Tonnage Class 4 = >150 Gross Registered Tons].

Gross revenue impacts expected for Alternative 1 were analyzed to determine equatability of impacts among vessel length and tonnage classes (Table 12). The distribution of impacts generally reflect the distribution of vessel size classes. Differences are attributed to the small number of vessels (13 of 180) expected to have any measurable impact.

Gross revenue impacts expected for Alternative 1 were also analyzed to determine whether the impacts would be equitable by home port state (Table 13). Overall, Massachusetts is expected to incur the greatest impact in terms of percentage of affected vessels. For example, while 49.4% of the vessels that landed spiny dogfish in FY2002 claim Massachusetts as their home port state, 69.2% of the vessels expected to have > 1% decrease were from Massachusetts, 66.7% of the vessels expected to have > 5% decrease were from Massachusetts and 66.7% 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 Monitoring Committee recommended the continuation of status quo trip limits of 600 pounds in quota period 1 and 300 pounds during quota period 2 in FY2004. These very low trip limits were recommended for the explicit purpose of eliminating the directed harvest of spiny dogfish. As indicated in the trip limit analysis below (R.I.R. Section 3.3.1), it is unlikely that significant trip-level revenue gain is associated with harvest at status quo trip limits. Continuation of these trip limits in FY2004 is, therefore, not expected to result in significant revenue loss. While the short term economic and social impacts of the status quo trip limits are negative relative to higher trip limits (Alternatives 2 and 3) or an unregulated fishery (Alternative 4), Alternative 1 rebuilds the stock fastest and thus economic and social benefits of a recovered stock will be realized more quickly.

The short-term social impacts of this alternative, in terms of employment and the impacts on local communities, should be relatively minimal as compared with the same impacts during the 2002 fishing year. While a few fisherman will experience losses that are greater than 5 percent of their gross revenues, the vast majority will experience losses that are lower than that. Over the long term, the social impacts of this alternative should be positive to the degree that the stock is

rebuilt.

### 6.1.3 EFH Impacts of Alternative 1

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 has resulted in harvest reductions in excess of 90% compared to an unregulated fishery that existed prior to FMP implementation. This reduced the potential for gear impacts to bottom habitats by eliminating the directed fishery. 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 FY2001 and continued in FY2002 with regard to the relative importance of gear types used to harvest spiny dogfish. A large increase occurred in proportional landings by the line fishery (includes longline and handline). Gear used by the line fishery is not expected to significantly impact essential fish habitat. 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 FY2004 under Alternative 1. Additionally, since the quota proposed under Alternative 1 represents the status quo, it should not result in increased fishing effort or significant impacts on EFH.

### 6.1.4 Protected Resources Impacts of Alternative 1

Alternative 1 implements the status quo for FY2004, effectively eliminating the spiny dogfish fishery in Federal Waters. This, combined with the elimination of directed dogfish fishing in state waters, due to the ASMFC action, should minimize interactions between the spiny dogfish fishery and endangered or threatened marine mammals and sea turtles. Thus far, the combination of protective measures under the Harbor Porpoise Take Reduction Plan (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 FY2004 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 FY2002, 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 FY2004 should maintain the reduced interaction between the spiny dogfish fishery and protected resources.

## 6.2 Impacts on the Environment of Alternative 2 - Mid-Atlantic Council Alternative

### 6.2.1 Biological Impacts of Alternative 2

Relative to Alternative 1, Alternative 2 would result in 900 and 1,200 pound increases in the trip limits for periods 1 and 2, respectively. The 4 million pound quota, however, is consistent with the status quo. Directed spiny dogfish fishing in U.S. waters was considered in the recent assessment (NEFSC 2003) as likely to contribute to harvest in excess of the rebuilding F (0.03). The assessment, however, did not indicate any threshold level above which significant directed fishing is likely to occur. More recently, commercial targeting of spiny dogfish was evaluated from an economic perspective (NEFSC 2003 unpubl. data). Results indicated that vessels with trip-level landings of spiny dogfish between 300 and 1,500 lbs were not likely targeting dogfish in 2002. Nevertheless, relative to the lower trip limits in Alternative 1, the 1,500 pound trip limits in Alternative 2 are probably more likely to encourage directed fishing. As such, relative to Alternative 1, Alternative 2 will have a greater risk, if only marginally so, of resulting in negative biological impacts to the stock. Additionally, to the degree to which Alternative 2 results in slightly increased levels of directed fishing for spiny dogfish, discarding of non-target species is also likely to increase. However, the level of significance associated with this potential outcome is also unknown.

### 6.2.2 Socioeconomic Impacts of Alternative 2

Gross revenue impacts as a function of the Alternative 2 quota should be the same as the impacts anticipated for Alternative 1 since the recommended quotas are identical. Such impacts are evaluated in section 6.1.2. Whether or not there would be potential increases in gross revenue associated with the larger trip limits is not known. However, for the reasons discussed in section 6.2.1, an increase from status quo trip limits upward to 1,500 pounds may not increase dogfish targeting or provide significant increases in associated economic benefits. It is not known whether stock recovery under Alternative 2 will be significantly constrained compared to Alternative 1. Therefore it is not known whether long-term socioeconomic impacts of Alternative 2 will be significantly different from those associated with the Alternative 1.

### 6.2.3 EFH Impacts of Alternative 2

For reasons discussed in section 6.1.3, the quota set by this alternative should not result in increased fishing effort. Any impacts on EFH from Alternative 2, relative to Alternative 1, are likely to be a function of the degree to which the larger trip limits induce directed fishing for spiny dogfish. As discussed in section 6.2.1, it is not known whether larger trip limits proposed by this alternative will result in the targeting of dogfish. If the larger trip limits do encourage targeting, then this alternative may elevate the probability of interactions between the spiny dogfish fishery and EFH, as compared to Alternative 1. It is not known whether the level of these impacts would be significant.

### 6.2.4 Protected Resources Impacts of Alternative 2

The impacts on protected resources from Alternative 2 are likely to be a function of the degree to which the larger trip limits induce directed fishing for dogfish. Relative to the lower trip limits in Alternative 1, the 1,500 pound trip limits in Alternative 2 are probably more likely to encourage directed fishing, for the reasons discussed in section 6.2.1. If Alternative 2 results in slightly increased levels of directed fishing for spiny dogfish, then the incidental take of non-target species is also likely to increase. As such, this action may also elevate (relative to Alternative 1) the probability of interactions between the spiny dogfish fishery and protected resources identified in Section 4.2. However, the level of significance associated with this potential outcome is unknown.

## 6.3 Impacts on the Environment of Alternative 3 - New England Council Alternative

Alternative 3 (described in Section 3.3) was recommended by the New England Fishery Management Council for FY2004. The alternative specifies a 1,500 pound trip limit for both quota periods as well as an overall quota of 4.4 million pounds. The only difference between this alternative and alternative 2 is that this one proposes a quota that is 10% higher. Such a difference falls into the realm of indistinguishability with respect to potential impacts. Therefore, the biological impacts, socioeconomic impacts, EFH impacts, and protected resources impacts of this alternative are assumed to be virtually identical to those discussed for alternative 2, in sections 6.2.1, 6.2.2, 6.2.3, and 6.2.4**.**

## 6.4 Impacts on the Environment of Alternative 4 - No Action Alternative

Alternative 4 would suspend Federal harvest restrictions on spiny dogfish. However, the ASMFC's decision to implement measures in state waters that are identical to the status-quo option described above means that even if this alternative were chosen, the dogfish fishery would be limited by the ASMFC measures and the no action alternative would not be realized. Nevertheless, the analysis below discusses the potential impacts of the no action alternative in the absence of the ASMFC action.

### 6.3.1 Biological Impacts of Alternative 4

As the no action alternative, Alternative 4 would suspend Federal harvest restrictions on spiny dogfish. The fishery, based on its historical pattern, is expected to resume targeting adult female spiny dogfish which would reduce female SSB below current levels, impede progress toward stock recovery. Under this alternative, fishing mortality is expected to rise dramatically, exceeding the target fishing mortality rate (0.03) in the short term, and leading to stock collapse in the long term. Alternative 4 is also expected to result in negative impacts for non-target species incidentally taken in the directed spiny dogfish fishery.

### 6.3.2 Socioeconomic Impacts of Alternative 4

Given that no quota is specified in Alternative 4, 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 landings compared to the status quo (4.0 million pounds) and a 425% increase in landings compared to actual FY2002 landings (4.76 million pounds). Although the short-term social and economic benefits of an unregulated fishery would be much greater than those associated with Alternatives 1 through 3, fishing mortality is expected to rise above the threshold level that allows the stock to replace itself such that 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 4

The suspension of Federal harvest restrictions is expected to increase fishing effort and result in shifts in effort by gear type. This could result in greatly increased use of bottom-tending gear and the probability of fishing gear impacts to EFH relative to Alternative 1.

### 6.3.4 Protected Resources Impacts of Alternative 4

Because Alternative 4 would allow the resumption of the spiny dogfish fishery to its previous (unregulated) levels in FY2004, the corresponding increase in fishing effort brought about by this action would greatly elevate (relative to the status quo) the probability of negative interactions between the spiny dogfish fishery and protected resources identified in Section 4.2.

## 6.5 Cumulative Impacts

Cumulative impacts 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)." Consistent with NEPA, the MSFCMA, as currently amended by the SFA, requires that management actions be taken only after consideration of impacts to the biological, physical, economic, and social dimensions of the human environment. Additionally, the SFA promotes long-term positive impacts on the environment through enumerated management criteria in the National Standards. Under this regulatory regime, the cumulative impacts of past, present, and future Federal fishery management actions should generally be positive, to the degree to which they achieve their intended long-term goals.

Cumulative impacts to the physical and biological dimensions of the environment may also come from non-fishing activities. Non-fishing activities, in this sense, relate to habitat loss from human interaction and alteration or natural disturbances. These activities are widespread and can have localized impacts to habitat such as accretion of sediments from at-sea disposal areas, oil and mineral resource exploration, and significant storm events. A database which could facilitate documentation regarding cumulative impacts of non-fishing activities on the physical and biological habitat covered by the spiny dogfish management unit is not available at this time.

The development of a habitat and effect database would accelerate the review process and outline areas of increased disturbance. Inter-agency coordination would also prove beneficial. Given our current, relatively limited, understanding of the nature and extent of all of the various non-fishing activities that could possibly impinge on the spiny dogfish resource, it is not possible to state with any certainty how such activities might have in the past, or will in the future, affect that resource, either quantitatively or qualitatively.

This section analyzes and discusses the significance of the cumulative impacts of the preferred alternative. Consideration is given to the relative probability that this alternative will achieve the management objectives of the FMP through biological/ecological, socioeconomic, and legal review by experts on Council staff and NMFS. In addition, this section specifically considers the preferred management alternative in the context of the cumulative impacts of past, present and reasonably foreseeable future actions.

### 6.5.1 Impacts of Past and Present Actions

Past and present management actions in the spiny dogfish fishery have had a positive cumulative impact on the biological and physical environment. The FMP was intended to eliminate the directed dogfish directed fishery, and thereby reduce mortality rates and allow the female spawning stock biomass to rebound to sustainable levels. Delayed implementation of the FMP followed by development of the Canadian dogfish fishery and inconsistent harvest policy in state waters prevented the initial recovery plan from succeeding in the manner that had been envisioned. At the 2003 stock assessment (NEFSC 2003), the biomass of mature females was reported to be about 128 million pounds or 32% of the initial target. Nevertheless, the establishment of the FMP and subsequent annual specifications have greatly reduced dogfish harvest. Average commercial landings dropped from around 45 million pounds in the mid-1990's to below 5 million pounds since FY2000 (an 89% decline; Table 1). The latest stock assessment attributes stabilization of the mature female stock to the initiation of Federal harvest restrictions (NEFSC 2003). Therefore, although the rebuilding goals in the FMP have not been fully achieved, at this time, Federal action has resulted in positive, direct impacts on the spiny dogfish stock. Indirect positive impacts have also been realized through reductions in fishing effort including decreased EFH disturbance by bottom-tending gear (see sections 5.3.1.2 and 6.1.3). Interactions between the directed spiny dogfish fishery and protected species have dropped to below-target levels (For example, see Section 6.1.4). And the dramatic reduction in the landings of dogfish in recent years has led to a reduction in the amount of bycatch in the dogfish fishery, especially as compared to that which took place before the implementation of the FMP when the directed dogfish fishery was quite large. With respect to the cumulative impacts of past and present actions on the socioeconomic environment, fishermen and processors have lost revenue as compared with the profits that were realized in the pre-FMP fishery because fewer fish are being sold and exported overseas. The diminution of the market for dogfish has had a negative impact on the economy and employment in those states and ports where dogfish were historically landed at high levels.

### 6.5.2 Impact of Future Actions

It is reasonable to expect that future management actions by Federal fisheries agencies with regard to spiny dogfish or any other management unit will continue to be consistent with the SFA. As such, it is expected that these actions will be designed to comply with the management criteria specified in the National Standards in order to ensure long-term positive impacts on the biological, physical, and to the human environment. More specifically, Amendment 1 to the FMP is currently being formulated by the Councils. It is intended to hasten the rebuilding of the spiny dogfish stock through the implementation of further controls on harvest, and as such it is expected to contribute to positive cumulative impacts on the biological, physical, and human environment.

### 6.5.3 Cumulative Impacts of Proposed Action

The preferred alternative is the most restrictive of the proposed alternatives. It will likely have the most positive direct and indirect impacts on the physical and biological environment (including EFH and protected resources) since it will maintain a low quota in order to achieve sustainability. Thus, the proposed action will complement past, present, and likely future management measures, all of which either have or are expected to have further positive cumulative impacts on the physical and biological environment. The proposed action is also associated with the greatest direct, negative short-term socioeconomic cost (see section 6.1.1, 6.1.2, 6.1.3, and 6.1.4). This cost, however, is not considered significant because it is consistent with the Federal status quo for the last four years (FY2000 - FY2003), and the vast majority of spiny dogfish revenue comes from harvest that occurs in state waters (see Section 5.3.1.2). Furthermore, any socioeconomic costs incurred by virtue of past, present, and near-term future management measures will likely be outweighed over the long term when dogfish stocks rebound to the point where a directed fishery is considered to be a sustainable enterprise. The preferred alternative should also maintain the reduction in bycatch that has taken place as a result of past and current management actions, and which is expected to continue under future management actions. For another perspective on the relative impacts of the various alternatives, including the preferred alternative, please see Table E-1, which lists the impacts of those alternatives across five environmental dimensions—biological, economic, social, protected resources, and EFH.

Given the importance of the dogfish harvest in state jurisdictional waters in recent years, the incremental impact of proposed Federal management actions must be considered in the context of anticipated state fishery activity. Thus far, divergent state water harvest policy has been implicated by the Spiny Dogfish Monitoring Committee and the ASMFC Spiny Dogfish Technical Committee as a constraint on spiny dogfish stock recovery. For FY2004, the ASMFC has specified reducing their overall quota and trip limits to levels consistent with the preferred alternative in this document. Diminished harvest activity in state waters as a result of the ASMFC action is expected to produce positive impacts to the spiny dogfish stock, essential fish habitat, and protected resources and negative short-term impacts to the socioeconomic sector. Given that an estimated 94.3% of spiny dogfish harvest in 2002 came from state waters, the

relative importance of spiny dogfish harvest in the EEZ is low.

Another cumulative impact that needs to be considered is Canadian fishing effort. As noted earlier, Canadian landings of dogfish have risen in recent years and currently outstrip U.S. landings. If the trend for Canada continues in the future, Canadian landings alone will exceed the SARC-recommended F (0.03) in 2004. As such, any *directed* dogfish fishery in U.S. waters (state or Federal) is likely to contribute to harvest in excess of the SARC recommended F (0.03).

Based on the foregoing, the proposed action is not expected to result in cumulative adverse impacts that could have a substantial effect on dogfish stocks or the other environmental dimensions of the human environment.

**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.

Prior to implementation of the FMP, the primary gears utilized to harvest spiny dogfish were 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). Important changes took place in FY2001 and continued in FY2002 with regard to the relative importance of gear types used to harvest spiny dogfish. A large increase occurred in proportional landings by the line fishery (includes longline and handline). Gear used by the line fishery is not expected to significantly impact essential fish habitat. 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 FY2004 under Alternative 1.

The stock rebuilding objectives established in the spiny dogfish FMP have resulted in fishing effort reductions of about 90% compared to the historic unregulated fishery. This large reduction in effort is expected to have produced a corresponding reduction in gear impacts to bottom habitats. As such, the management alternatives proposed in this document that promote stock rebuilding by maintaining reductions in fishing effort (e.g., Alternatives 1 - 3) are also expected to indirectly benefit EFH by maintaining the reductions in disturbance to bottom

habitats.

## 8.0 Coastal Zone Management Act

The Council determined that this action is consistent to the maximum extent practicable with the enforceable provisions of the approved coastal management programs of Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, and Florida. This determination was submitted for review by the responsible state agencies on February 2, 2004, under section 307 of the Coastal Zone Management Act.

## 9.0 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.

## 10.0 List of preparers

This framework document was prepared by the following members of the MAFMC staff: Dr. Christopher M. Moore, James L. Armstrong and Richard J. Seagraves. In preparing this annual specifications analysis the Mid-Atlantic Fishery Management Council consulted with the NMFS NERO, the NEFSC, New England Fishery Management Council, and the ASMFC.

## 11.0 List of Acronyms

| | |
|---|---|
| **ASMFC** | Atlantic States Marine Fisheries Commission |
| **EA** | Environmental Assessment |
| **EEZ** | Exclusive Economic Zone |
| **EFH** | Essential Fish Habitat |
| **EIS** | Environmental Impact Statement |
| **F** | Fishing Mortality Rate |
| **FR** | Federal Register |
| **FMP** | Fishery Management Plan |
| **IRFA** | Initial Regulatory Flexibility Analysis |
| **MAFMC** | Mid-Atlantic Fishery Management Council |
| **MRFSS** | Marine Recreational Fisheries Statistical Survey |
| **MSY** | Maximum Sustainable Yield |
| **mt** | metric tons |
| **NAO** | National Oceanic and Atmospheric Administration Order |
| **NEFMC** | New England Fishery Management Council |
| **NEFSC** | Northeast Fisheries Science Center |

| | |
|---|---|
| **NEPA** | National Environmental Policy Act |
| **NMFS** | National Marine Fisheries Service |
| **NOAA** | National Oceanic and Atmospheric Administration |
| **PRA** | Paperwork Reduction Act |
| **RIR** | Regulatory Impact Review |
| **SARC** | Stock Assessment Review Committee |
| **SAW** | Stock Assessment Workshop |
| **SSB** | Spawning Stock Biomass |
| **SFA** | Sustainable Fisheries Act |
| **VTR** | Vessel Trip Report |

## 12.0 Glossary

**Amendment.** A formal change to a fishery management plan (FMP). The Council prepares amendments and submits them to the Secretary of Commerce for review and approval. The Council may also change FMPs through a "framework adjustment framework adjustment " (see below).

**$B_{MSY}$.** Long term average exploitable biomass that would be achieved if fishing at a constant rate equal to $F_{MSY}$. For most stocks, $B_{MSY}$ is about ½ of the carrying capacity. Overfishing definition control rules usually call for action when biomass is below ¼ or ½ $B_{MSY}$, depending on the species.

**$B_{target}$.** A desirable biomass to maintain fishery stocks. This is usually synonymous with $B_{MSY}$ or its proxy.

**$B_{threshold}$.** 1) A limit reference point for biomass that defines an unacceptably low biomass i.e., puts a stock at high risk (recruitment failure, depensation, collapse, reduced long term yields, etc). 2) A biomass threshold that the SFA requires for defining when a stock is overfished. A stock is overfished if its biomass is below $B_{threshold}$. A determination of overfished triggers the SFA requirement for a rebuilding plan to achieve $B_{target}$ as soon as possible, usually not to exceed 10 years except certain requirements are met. $B_{threshold}$ is also known as $B_{minimum}$, or $B_{min}$.

**Bycatch**. Fish that are harvested in a fishery, but which are not sold or kept for personal use. This includes economic discards and regulatory discards. The fish that are being targeted may be bycatch if they are not retained.

**Commission.** Atlantic States Marine Fisheries Commission.

**Committee.** The Monitoring Committee, made up of staff representatives of the Mid-Atlantic, New England, and South Atlantic Fishery Management Councils, the Commission, the Northeast Regional Office of NMFS, the Northeast Fisheries Center, and the Southeast Fisheries Center. The MAFMC Executive Director or his designee chairs the Committee.

**Control rule.** A pre-determined method for determining rates based on the relationship of current stock biomass to a biomass target. The biomass threshold ($B_{threshold}$ or $B_{min}$) defines a minimum biomass below which a stock is considered .

**Environmental Impact Statement.** An analysis of the expected impacts of a fishery management plan (or some other proposed Federal action) on the environment and on people, initially prepared as a "Draft" (DEIS) for public comment. After an initial EIS is prepared for a plan, subsequent analyses are called "Supplemental." The Final EIS is referred to as the Final Supplemental Environmental Impact Statement (FSEIS).

**Exclusive Economic Zone.** For the purposes of the Magnuson-Stevens Fishery Conservation and Management Act, the area from the seaward boundary of each of the coastal states to 200 nautical miles from the baseline.

**Fishing effort.** The amount of time and fishing power used to harvest fish. Fishing power is a function of gear size, boat size, and horsepower.

**Fishing mortality rate.** The part of the total mortality rate (which also includes natural mortality) applying to a fish population that is caused by man's harvesting. Fishing mortality is usually expressed as an instantaneous rate (F), and can range from 0 for no fishing to very high values such as 1.5 or 2.0. The corresponding annual fishing mortality rate (A) is easily computed but not frequently used. Values of A that would correspond to the F values of 1.5 and 2.0 would be 78% and 86%, meaning that there would be only 22% and 14% of the fish alive (without any natural mortality) at the end of the year that were alive at the beginning of the year. Fishing mortality rates are estimated using a variety of techniques, depending on the available data for a species or stock.

**$F_{max}$.** A calculated instantaneous fishing mortality rate that is defined as "the rate of fishing mortality for a given method of fishing that maximizes the harvest in weight taken from a single year class of fish over its entire life span".

**$F_{MSY}$.** A fishing mortality rate that would produce MSY when the stock biomass is sufficient for producing MSY on a continuing basis.

**Framework adjustments.** Adjustments within a range of measures previously specified in a fishery management plan (FMP). A change usually can be made more quickly and easily by a framework adjustment than through an amendment. For plans developed by the Mid-Atlantic Council, the procedure requires at least two Council meetings including at least one public hearing and an evaluation of environmental impacts not already analyzed as part of the FMP.

**$F_{target}$.** The target fishing mortality rate, equal to the annual F determined from the selected rebuilding schedule for overfished resources (i.e., summer flounder) and Council selected fishing mortality level for non-overfished resources (i.e., surfclams). Overfishing occurs when the overfishing target is exceeded.

**$F_{threshold.}$** 1) The maximum fishing mortality rate allowed on a stock and used to define overfishing for status determination. 2) The maximum fishing mortality rate allowed for a given biomass as defined by a control rule.

**Landings.** The portion of the catch that is harvested for personal use or sold.

**Metric ton.** A unit of weight equal to 1,000 kilograms (1 kg = 2.2 lb.). A metric ton is equivalent to 2,205 lb. A thousand metric tons is equivalent to 2.2 million lb.

**MSY.** Maximum sustainable yield. The largest long-term average yield (catch) that can be taken from a stock under prevailing ecological and environmental conditions.

**Overfished.** An overfished stock is one whose size is sufficiently small that a change in management practices is required in order to achieve an appropriate level and rate of rebuilding.

**Overfishing.** Overfishing occurs whenever a stock or stock complex is subjected to a rate or level of fishing mortality that jeopardizes the capacity of a stock or stock complex to produce MSY on a continuing basis.

**Party/Charter boat.** Any vessel which carries passengers for hire to engage in fishing.

**Recruitment.** The addition of fish to the fishable population due to migration or to growth. Recruits are usually fish from one year class that have just grown large enough to be retained by the fishing gear.

**Spawning Stock Biomass.** The total weight of all sexually mature fish in the population. This quantity depends on year class abundance, the exploitation pattern, the rate of growth, fishing and natural mortality rates, the onset of sexual maturity and environmental conditions.

**Stock.** A grouping of a species usually based on genetic relationship, geographic distribution and movement patterns. A region may have more than one stock of a species (for example, Gulf of Maine cod and Georges Bank cod).

**Total length.** The straight-line distance from the tip of the snout to the end of the tail while the fish is lying on its side.

**Yield per recruit.** The theoretical yield that would be obtained from a group of fish of one age if they were harvested according to a certain exploitation pattern over the life span of the fish. From this type of analysis, certain critical fishing mortality rates are estimated that are used as biological reference points for management, such as $F_{max}$ and $F_{0.1}$.

## 13.0 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 that have resulted in fishing effort reductions in excess of 90% compared to an unregulated fishery. These 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 FY2004.

***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 4.2 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 sixth 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 or not occur at all. The proposed measures are intended to rebuild the spiny dogfish resource to sustainable harvest levels. 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 6.1 of the EA, the proposed quota and trip limits were developed to ensure that the F = 0.03 target is achieved. The proposed trip limits represent a continuation of the trip limits established for fishing year 2003 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 Councils recommended identical 1,500 pound trip limits for FY2004, however, the New England Council recommended is 10% larger (4.4 million pounds) than that recommended by the Mid-Atlantic Council (4.0 million pounds). In addition, state managers (the ASMFC) recently specified management measures for FY2004 that are equivalent to the Federal FY2003 status quo (trip limits of 600 ad 300 pounds in periods 1 and 2, respectively and quota of 4.0 million pounds). The Councils' recommended trip limits were intended to accommodate requirements by the processing sector for higher volumes of dogfish, while the Commission specifications prioritized stock-rebuilding. Because spiny dogfish are landed in state waters where state restrictions will apply, the Commission specifications will, by default, prevail, and management of spiny dogfish should be consistent throughout the U.S. Atlantic coast. Although the various management approaches reflect some disagreement, Federal and state managers generally acknowledge that directed fishing, which targets mature female spiny dogfish, should be curtailed during the stock-rebuilding process. Rebuilding as estimated at the most recent stock assessment could take at least 20 years. Except for Alternative 4 (No Action), the management measures proposed in this document agree in that they are intended to prevent overfishing of the spiny dogfish resource and rebuild it to sustainable levels. Although there is continuing controversy over the setting of dogfish specifications, the effects of this action are not expected to be highly controversial, especially in light of the action on the part of the ASFMC.

**FONSI Statement**

Having reviewed the environmental assessment and the available information relating to the proposed 2004 annual specifications for Spiny Dogfish, I have determined that there will be no significant adverse environmental impacts, including cumulative impacts, 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.

### 2.1 Executive Order 12898: Environmental Justice in Minority and Low-Income Populations and Indian Tribes

This Executive Order provides that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. " EO 12898 directs each Federal agency to analyze the environmental effects, including human health, economic, and social effects of Federal actions, including effects on minority populations, low-income populations, and Indian tribes, when such analysis is required by NEPA. Agencies are further directed to "identify potential effects and mitigation measures in consultation with affected communities, and improve the accessibility of meetings, crucial documents, and notices."

The proposed actions are not expected to affect participation in the spiny dogfish fishery. Since the proposed action represents no change relative to the current level of participation in these fisheries, no negative economic or social effects are anticipated as a result (see section 6.0). Therefore, the proposed action under the preferred alternatives are not expected to cause disproportionately high and adverse human health, environmental or economic effects on minority populations, low-income populations, or Indian tribes.

### 2.2 Section 515 Information Quality Determination

#### Utility of Information Product

Explain how the information product meets the standards for **utility**:

A. Is the information helpful, beneficial or serviceable to the intended user?

The proposed rule informs the public that NOAA Fisheries is intending to implement new regulations or revise existing ones. It requests the public to submit written comments on the content of the proposed rule including its preamble and regulatory text. It will help those in the spiny dogfish fishery understand how the fishery will operate under the proposed specifications. The proposed rule adheres to the tenet of using "plain language" in drafting regulatory text.

This action proposes 2004/2005 specifications for spiny dogfish. Landings information was updated through 2002 for use in developing new specifications and regulations. This action was developed as a result of a multi-stage process that involved a review and opportunity to comment by affected members of the public.

B. Is the data or information product an improvement over previously available information? Is it more current or detailed? Is it more useful or accessible to the public? Has it been improved based on comments from or interactions with customers?

This proposed rule is the standard vehicle used to disseminate on regulatory proposals under consideration by NOAA Fisheries. It is not intended to improve existing information since it presents new regulatory proposals to the affected public to consider. If implemented these proposals may be revised in line with substantive public comment subject to prevailing legal requirements, thereby improving the utility of the information.

C. What media are used in the dissemination of the information? Printed publications? CD-ROM? Internet? Is the product made available in a standard data format? Does it use consistent attribute naming and unit conventions to ensure that the information is accessible to a broad range of users with a variety of operating systems and data needs?

The Federal Register notice that announces the proposed rule and EA/RIR/IRFA will be made available in printed publication and on the Internet websites for the Northeast Regional Office and GPO.

**Integrity of Information Product**

With respect to integrity, if information is confidential, it is safeguarded pursuant to the Privacy Act and Titles 13, 15, and 22 of the U.S. Code (confidentiality of census, business and financial information). Furthermore, confidential information is also safeguarded under the 'Confidentiality of Information' provisions of the Magnuson-Stevens Fishery Conservation and Management Act; NOAA Administrative Order 216-100 - Protection of Confidential Fisheries Statistics; 50 CFR 229.11, Confidentiality of information collected under the Marine Mammal Protection Act. Therefore, the information being disseminated in this EA meets the standard of integrity under the Data Quality Act.

**Objectivity of Information Product**

(1) Indicate which of the following categories of information products apply for this product:

- ☐ Original Data
- ☐ Synthesized Products
- ☐ Interpreted Products
- ☐ Hydrometeorological, Hazardous Chemical Spill, and Space Weather Warnings, Forecasts, and Advisories
- ☐ Experimental Products
- Y Natural Resource Plans
- ☐ Corporate and General Information

(2) Describe how this information product meets the applicable objectivity standards.

The information is accurate, clear, complete, and presented in an unbiased manner. Much of the information is synthesized and interpreted from scientific peer-reviewed stock assessments, economic data, and NOAA Fisheries databases. All data meet the NOAA Information Quality Guidelines for objectivity pursuant to P.L. 106-554 (the Data Quality Act).

What published standard(s) governs the creation of the Natural Resource Plan? Does the Plan adhere to the published standards? (See the NOAA Sec. 515 Information Quality Guidelines, Section II(F) for links to the published standards for the Plans disseminated by NOAA.)

In preparing a EA/RIR/IRFA, the responsible Regional Fishery Management Council(s) (Council) must comply with the requirements of the Magnuson-Stevens Act, the National Environmental Policy Act, the Regulatory Flexibility Act, the Administrative Procedures Act, the Paperwork Reduction Act, the Coastal Zone Management Act, the Endangered Species Act, the Marine Mammal Protection Act, and Executive Orders 12612 (Federalism), 12630 (Property Rights), 12866 (Regulatory Planning), and 13158 (Marine Protected Areas).

Was the Plan developed using the best information available? Please explain.

The Magnuson-Stevens Act National Standard 2 states that the FMP's conservation and management measures shall be based upon the best scientific information available. The conservation and management measures being proposed are based upon the best scientific information available. Fishery data collected from the industry by NOAA Fisheries was utilized in the development of the proposed rule and EA/RIR/IRFA, and reviewed publicly at Council meetings. Much, if not all, of the available scientific literature on the biology and ecology of spiny dogfish was utilized in the development of the EA.

Have clear distinctions been drawn between policy choices and the supporting science upon which they are based? Have all supporting materials, information, data and analyses used within the Plan been properly referenced to ensure transparency?

> The policy choices (i.e., management measures) being proposed are supported by the available scientific information. The management measures proposed are designed to meet the conservation goals and objectives of the FMP, and prevent overfishing, while maintaining sustainable levels of fishing effort for spiny dogfish to ensure a minimal impact on fishing communities.
>
> The supporting materials and analyses used to develop the measures in the proposed rule are contained in the EA/RIR/IRFA; the various sections of the EA/RIR/IRFA that contain the analyses and information are referenced in the proposed rule.

Describe the review process of the Plan by technically qualified individuals to ensure that the Plan is valid, complete, unbiased, objective and relevant. For example, internal review by staff who were not involved in the development of the Plan to formal, independent, external peer review. The level of review should be commensurate with the importance of the Plan and the constraints imposed by legally enforceable deadlines.

> The review process involves the responsible Councils, the Northeast Fisheries Science Center (Center), the Northeast Regional Office, and NOAA Fisheries Headquarters. The Center's technical review is conducted by senior level scientists with specialities in population dynamics, stock assessment methods, demersal resources, population biology, economics, and the social sciences. Review by staff at the Regional Office are conducted by those with expertise in fisheries management and policy, habitat conservation, protected species, and compliance with the applicable law. Final approval of the EA/RIR/IRFA and clearance of the proposed rule is conducted by staff at NOAA Fisheries Headquarters, the Department of Commerce, and the U.S. Office of Management and Budget.

## 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 $0.97 million in fishing year 2002 (FY2002: May 1, 2002 - Apr 30, 2003). 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 entitlements, 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 FY2004 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. Alternatives 1 - 3 are more likely than Alterative 4 (No Action) to result in seasonal or permanent reductions in employment. However, with landings of less than $1 million in 2002, the value of the processing sector would have to expand the value of landings by a factor of 100 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 Alternatives 1 - 3 on the harvesting and processing sectors would result in an annual effect on the economy that is not significant under E.O. 12866.

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 this species is not available, it was assumed that the price for this species was determined 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 (Preferred Alternative)**

Alternative 1 includes a commercial quota of 4,000,000 pounds for FY2004. 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 rebuilding F (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 (FY2003) 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 0.76 million pounds is expected if the Alternative 1 quota (4,000,000 pounds) is adopted. This is because the quota was exceeded by 0.76 million pounds in FY2002 (FY2002 landings = 4.76 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 - Mid-Atlantic Council Alternative**

Alternative 2 (the Mid-Atlantic Council Alternative) includes a commercial quota of 4,000,000 pounds for FY2004. 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 1,500 pounds for both quota periods are recommended. The quota under this alternative is based on Monitoring Committee recommendations, while the trip limit is intended satisfy harvester and processor demand for higher volumes of spiny dogfish.

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 2 proposes the status quo quota, a decrease of 0.76 million pounds is expected if the Alternative 2 quota (4,000,000 pounds) is adopted. This is because the quota was exceeded by 0.76 million pounds in FY2002 (FY2002 landings = 4.76 million pounds).

*Prices*

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

*Consumer Surplus*

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

*Harvest Costs*

No changes to harvest costs are expected as a result of Alternative 2 for spiny dogfish.

*Producer surplus*

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

*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 identified.

**Alternative 3 - New England Council Alternative**

Alternative 3 (the New England Council alternative) includes a commercial quota of 4.4 million pounds for FY2004. The quota is to be divided semi-annually with quota period 1 (May 1 through October 31) being allocated 2,547,600 pounds (57.9% of the quota), and quota period 2 (November 1 through April 30) being allocated 1,852,400 pounds (42.1% of the quota). In addition, trip limits of 1,500 pounds for both quota periods are recommended. The quota under this alternative is based on the 2003 ASMFC quota, while the trip limit is intended satisfy harvester and processor demand for higher volumes of spiny dogfish.

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 3 proposes a 10% increase above the status quo quota, a decrease of 0.36 million pounds is expected if the Alternative 3 quota (4,400,000 pounds) is adopted. This is because the quota was exceeded by 0.76 million pounds in FY2002 (FY2002 landings = 4.76 million pounds).

*Prices*

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

*Consumer Surplus*

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

*Harvest Costs*

No changes to harvest costs are expected as a result of Alternative 3 for spiny dogfish.

*Producer surplus*

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

*Enforcement Costs*

The Alternative 3 measures are not expected to change enforcement costs.

*Distributive Effects*

There are no changes to the quota allocation process for spiny dogfish under Alternative 3. As such, no distributional effects are identified.

**Alternative 4 - No Action Alternative**

Alternative 4 (the no-action alternative) would effectively remove regulatory control over the spiny dogfish fishery for FY2004. 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 4 is adopted. This is the difference between harvest in the last complete fishing year (FY2002; 4.76 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 4, the price for this species could decrease.

*Consumer Surplus*

Given the potential decrease in spiny dogfish prices under Alternative 4, consumer surplus associated with this fishery may increase.

*Harvest Costs*

Since a directed fishery is expected to resume under Alternative 4, 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 4.

*Producer surplus*

Given the potential decrease in spiny dogfish prices under Alternative 4, producer surplus associated with this fishery may increase.

*Enforcement Costs*

In the absence of regulated harvest under the Alternative 4 measures, enforcement costs are expected to decrease.

*Distributive Effects*

There is no quota allocation process for spiny dogfish under Alternative 4. 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 (FY2002) 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 FY2002 landings. This comparison will allow for the evaluation of the potential fishing opportunities associated with each alternative in FY2004 versus the fishing opportunities that occurred in FY2002.

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 FY2002 quota. Alternative 4 may be expected to have the opposite impact due to the removal of regulatory control.

No changes in the competitive nature of these fisheries is expected to occur under Alternatives 1 - 3. 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 4, 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- 3. Under Alternative 4, 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 2004 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 6.4 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 2004 relative to 2002.

| Feature | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| Landings | -1 | -1 | -1 | +1 |
| Prices | +1 | +1 | +1 | -1 |
| Consumer Surplus | -1 | -1 | -1 | +1 |
| Harvest Costs | 0 | 0 | 0 | +1 |
| Producer Surplus | -1 | -1 | -1 | +1 |
| Enforcement Costs | 0 | 0 | 0 | -1 |
| Distributive Impacts | 0 | 0 | 0 | +1 |
| "-1" denotes a reduction relative FY2002; "0" denotes no change relative FY2002; and "+1" denotes an increase relative to FY2002. | | | | |

## 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 record keeping requirements contained in any of the alternatives considered for this action. There are 2,915 vessels permitted in the dogfish fishery; 255 vessels landed dogfish in 2002, the last full fishing year for which data are 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 FY2004 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 (FY2002). The NMFS Northeast dealer report database indicated that a total of 255 vessels landed 4.76 million pounds of spiny dogfish in FY2002. 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 FY2002. 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 FY2002 regardless of their permit status. However, any of the 2,915 vessels which possessed spiny dogfish permits in 2002 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 FY2002. As noted above, FY2002 was chosen because it is the last complete fishing year for which vessel level data are available. Data from FY2003 were not used in this analysis because the year is not complete and these data are not available at the vessel level . As such, FY2002 landing data by vessel were used as a proxy for FY2003. The second step was to sum the revenues from spiny dogfish landings and all species in total by vessel for FY2002 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 FY2004, it was assumed that the distribution by vessel of spiny dogfish landings in FY2004 would be the same as was observed in FY2002. In other words, it was assumed that the 255 vessels which landed spiny dogfish in FY2002 will land spiny dogfish in FY2004 in the same relative proportions as was observed in FY2002. The percent reduction in landings by vessel represented by each of the proposed actions for FY2004 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.

### 3.1.2 Description of Fishing Year 2002 and Effects of Quota Overages

As noted in earlier sections, a total of 4.76 million pounds of spiny dogfish was landed during the FY2002 based on unpublished NMFS dealer reports. The quota specification for FY2002 was 4.0 million pounds. Thus, the annual quota specification for the FY2002 was exceeded by 0.76 million pounds or 19 %.

## 3.2 Description of Proposed Alternatives

### 3.2.1 Alternative 1 (Preferred Alternative)

Alternative 1 includes a commercial quota of 4,000,000 pounds for FY2004. 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 rebuilding F (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 (FY2003) for the commercial spiny dogfish fishery.

### 3.2.2 Alternative 2 - Mid-Atlantic Council Alternative

Alternative 2 (the Mid-Atlantic Council Alternative) includes a commercial quota of 4,000,000 pounds for FY2004. 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 1,500 pounds for both quota periods are recommended. The quota under this alternative is based on Monitoring Committee recommendations, while the trip limit is intended satisfy processor demand for higher volumes of spiny dogfish.

### 3.2.3 Alternative 3 - New England Council Alternative

Alternative 3 (the New England Council alternative) includes a commercial quota of 4.4 million pounds for FY2004. The quota is to be divided semi-annually with quota period 1 (May 1 through October 31) being allocated 2,547,600 pounds (57.9% of the quota), and quota period 2 (November 1 through April 30) being allocated 1,852,400 pounds (42.1% of the quota). In addition, trip limits of 1,500 pounds for both quota periods are recommended. The quota under this alternative is based on the 2003 ASMFC quota, while the trip limit is intended satisfy processor demand for higher volumes of spiny dogfish.

### 3.2.4 Alternative 4 - No Action Alternative

Alternative 4 (the no-action alternative) would effectively remove regulatory control over the spiny dogfish fishery for FY2004. 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.

The Spiny Dogfish FMP stipulates a target fishing mortality rate of F = 0.03 for years 2-5 and F = 0.08 in fishing year 2004 (FY2004: May 2004 - April 2005) and thereafter. Management advice from the most recent stock assessment (NEFSC 2003), however, indicated that fishing mortality should not exceed the rebuilding F (0.03) given current spawning biomass, continued poor recruitment, and reduced pup survivorship. Directed harvest corresponding to F = 0.03 for 2004 is approximately 6.5 million pounds. The Spiny Dogfish Monitoring Committee concluded

that because Canadian landings of spiny dogfish in 2004 will likely exceed 6.5 million pounds, additional mortality from directed U.S. landings of spiny dogfish in 2004 will result in exceeding F = 0.03. As such, the Monitoring Committee recommended that suspension of directed fishing for spiny dogfish in Federal waters continue in FY2004, and that status quo bycatch trip limits (600 pounds in Period 1 and 300 pounds in Period 2) be applied. The Monitoring Committee also recommended a cap on bycatch landings consistent with the status quo (FY2003) quota of 4 million pounds.

### 3.3.1 Trip Limit Analysis

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 Mid-Atlantic and New England Fishery Management Council Alternatives (Alternatives 2 and 3) would increase the trip limit for spiny dogfish to 1,500 lbs in FY2004 relative to the status quo. Consideration is given here as to whether the increased trip limit may encourage directed fishing for dogfish. The following information from the Northeast observer data base and the Northeast dealer weighout data base may be of use in making this determination.

Table's 16 through 18 indicate average commercial fishing trip costs per day by ton class for the gears that commonly catch spiny dogfish. The estimates were derived from Northeast observer surveys collected aboard longline, gillnet, and otter trawl vessels in 2002. These gear types landed approximately 98% of the spiny dogfish in 2002 according to Northeast dealer weighout data. Average trip costs per day ranged from approximately $276 for small gillnet vessels to $891 for large otter trawl vessels. Although it is not likely that these costs were derived from a representative sample of all vessels landing spiny dogfish (observer stratification up to this point has primarily been based upon marine mammal encounters), the sample sizes seem to be large enough to provide reasonable representation.

One way of examining if the increased trip limit will encourage targeting of spiny dogfish is to compare potential spiny dogfish gross revenues at 1,500 lbs per trip to daily operating costs. If a vessel owner is able to earn enough revenue at 1,500 lbs per trip to cover daily operating costs,

directed spiny dogfish trips may occur (however, in the long-run fixed costs would also need to be considered). According to Northeast dealer weighout data the average ex-vessel price for spiny dogfish in 2002 was 20 cents/lb. Assuming this price remains stable (it has for the past 5 years), the proposed 1,500 lb trip limit would equate to $300/trip. If this level of gross revenues is compared to the daily operating costs in Table's 16 through 18, the only gear types estimated to earn a profit at 1,500 lbs per trip would be small gillnet vessels ($24) and small otter trawl vessels ($37). The remaining vessels would not earn enough to cover their daily fishing costs. Although the precision of the observer cost estimates has not been verified, there could be additional operating cost items (such as lumping fees, consignment fees, packing fees, and estimated gear damage) that vessel owners would consider when deciding whether or not to make a fishing trip. Thus, even if the observer cost data estimates in Table's 16 to 18 are high, given additional cost items not collected on the survey, it appears that it would be difficult for vessels directing on spiny dogfish to earn a profit with a 1,500 lb trip limit.

Further information contained in the Northeast dealer data base shows that vessels with trip-level landings of spiny dogfish between 300 and 1,500 lbs were not likely targeting dogfish in 2002 (Table 19). The last section of Table 19 shows the average percent of revenue per trip derived from dogfish for three trip limit categories (<301 lbs, 301-1,500 lbs, and >1,500 lbs). The average percent of dogfish revenue to total revenue per trip (i.e., total revenue includes dogfish revenue and revenue from the component catch) was 10% or less on trips that landed less than 301 lbs of spiny dogfish for all gears except handlines (handlines are not a concern, however, since this gear sector landed less than 1% of total dogfish landings). Thus, it's unlikely that vessels are targeting dogfish when constrained to a 300 lb trip limit. This was one of the objectives of the FMP - to eliminate the directed fishery. A 300 lb trip limit has done just that. However, since the state of Massachusetts has allowed vessels to land up to 7,000 lbs of spiny dogfish per trip, it is possible to examine the proportion of revenue derived from spiny dogfish on trips that landed more than 300 lbs of dogfish. The second to the last column in Table 19 shows the average percent of dogfish revenue to total revenue per trip for trips that landed between 301 and 1,500 lbs of spiny dogfish in 2002. If handlines are ignored, all of the averages fall under 22 % except for medium longline vessels. Medium longline vessels landed less than 1% of the total spiny dogfish landings in 2002, however, so this is not likely to be a profitable sector. Although the averages in the 301-1,500 lb category are higher than in the <300 lb category, they do not seem to be high enough (below 22%) to indicate that vessels that were able to land up to 1,500 lbs were targeting dogfish. In contrast, the percentages were much higher for some gear sectors in the >1,500 lb category, in particular, small and medium longline vessels (97% and 99%, respectively), medium gillnet vessels (76%), and large otter trawl vessels (52%). These gear sectors averaged over 5,000 lbs of spiny dogfish per trip and were responsible for 86% of the landings in 2002. Thus, the threshold level of landings that would induce targeting behavior is likely to be considerably larger than even 1,500 lbs of spiny dogfish. The operating cost data obtained from the observer data base appear to validate this conclusion. As such, an increase in the trip limit for spiny dogfish from 300 lbs to 1,500 lbs is not likely to induce targeting and thus the fishery should remain a bycatch only fishery.

### 3.3.2 Alternative 1 - Preferred Alternative

Changes in gross revenues associated with Alternative 1 in FY2004 were estimated by comparison to FY2002 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 FY2002 reference year outside of changes in market value. Note, however, that the FY2002 quota (4.00 million pounds) is 16.0% less than what was actually landed (4.76 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 FY2004 dogfish fishery is identical to that observed in FY2002, the fleet should experience a decrease in dogfish fishing opportunity equal to the decrease associated with full compliance (16.0%). If the 16.0% decrease in dogfish fishing opportunity is applied evenly to dogfish revenue for each vessel in the FY2002 fleet, and revenue from other fisheries is assumed constant, the change in gross revenue per vessel can be calculated. Based on this approach, gross revenues for Federally permitted vessels harvesting spiny dogfish are expected to decline by an average of 0.56%. Among Federally permitted vessels (N=180), 13 (7.2% of the fleet) are expected to experience a decrease in gross revenue greater than 1%, 6 (3.3% of the fleet) are expected to experience a decrease in gross revenue greater 5% and 3 (1.7% of the fleet) are expected to experience a decrease in gross revenues greater than 10%. Two of the three vessels that are estimated to incur losses of greater than 10% reported total revenue less than $3,000 for FY2002. It is important to note that the distribution of revenue loss will differ from estimated values if the market price and/or harvest levels change for dogfish or any other fishery relative to FY2002.

An analysis of average impacts on *non-federally* permitted vessels is possible if it is assumed that all such vessels (N = 72) are identified in the Federal dealer reports. This is not likely, since the "unknown" vessel categories account for 11% of total landings. Nevertheless, within the apparent non-federal fleet, 27 vessels (37.5% of the fleet) are expected to experience a decrease in gross revenue greater than 1%, 13 vessels (18.1% of the fleet) are expected to experience a decrease in gross revenue greater 5% and 12 vessels (16.7% of the fleet) are expected to experience a decrease in gross revenues greater than 10%. Five of the twelve vessels estimated to incur losses of greater than 10% reported total revenues less than $10,000 for FY2002. Recent ASMFC actions specify quota and trip limits in state waters in FY2004 at levels consistent with Alternative 1/status quo (4 million pound quota; 600/300 pound trip limits). Socioeconomic impacts are likely to be felt by participants in the directed dogfish fishery in state waters as a result of the ASMFC action. The state waters sector of the dogfish fishery harvested an estimated 94.3% of total landings in 2002.

Aside from the quota of 4.0 million pounds, the Monitoring Committee recommended the continuation of status quo trip limits of 600 pounds in quota period 1 and 300 pounds during quota period 2 in FY2004. These very low trip limits were recommended for the explicit purpose of eliminating the directed harvest of spiny dogfish. As indicated in the trip limit analysis above (R.I.R. Section 3.3.1), it is unlikely that significant trip-level revenue gain is

associated with harvest at status quo trip limits. Continuation of these trip limits in FY2004 is, therefore, not expected to result in significant revenue loss. While the short term economic and social impacts of the status quo trip limits are negative relative to higher trip limits (Alternatives 2 and 3) or an unregulated fishery (Alternative 4), Alternative 1 rebuilds the stock fastest and thus economic and social benefits of a recovered stock will be achieved more quickly.

### 3.3.3 Alternative 2 - Mid-Atlantic Council Alternative

Changes in gross revenues anticipated for Alternative 2 in FY2004 are characterized by comparison to FY2002 since it is the latest *complete* fishing year. Gross revenue impacts as a function of the Alternative 2 quota should be similar to impacts anticipated for Alternative 1 since the recommended quotas are identical. In general, these impacts are expected to take the form of slight decreases in estimated gross revenue as a result of assumed compliance with the quota (actual harvest in FY2002 = 4.76 million pounds; Alternative 2 quota = 4.0 million pounds; a 16% decrease). If a 16.0% decrease in dogfish fishing opportunity is applied evenly to dogfish revenue for each vessel in the FY2002 fleet, and revenue from other fisheries is assumed constant, the change in gross revenue per vessel can be calculated. Details associated with these impacts, are given in Section 6.1.2.

Aside from the overall quota of 4.0 million pounds, the Mid-Atlantic Council recommended trip limits of 1,500 pounds in both quota periods for FY2004. The magnitude of increases in gross revenue associated with the larger trip limits is not known. Recent trip limit analyses (Section 3.3.1 above) suggested that trip-level profitability associated with landing spiny dogfish was marginal when 1,500 or fewer pounds of spiny dogfish were retained. As such, an increase from status quo trip limits upward to 1,500 pounds may not be not expected to increase dogfish targeting or provide significant increases in associated economic benefits. This analysis, however, did not consider the potential for changes in state harvest policy. Recent ASMFC actions specify quota and trip limits in state waters in FY2004 at levels consistent with Alternative 1/status quo (4 million pound quota; 600/300 pound trip limits). Socioeconomic impacts are likely to be felt by participants in the directed dogfish fishery in state waters as a result of the ASMFC action. The state waters sector of the dogfish fishery harvested an estimated 94.3% of total landings in 2002. Independent of the ASMFC specifications, Alternative 2 is associated with positive short-term socioeconomic impacts relative to the status quo. However, maximization of long-term socioeconomic benefits is likely to be a function of the speed at which stock recovery occurs, that is, how much time it will take before directed fishing can resume. It is not known whether stock recovery under Alternative 2 will be significantly constrained compared to the status quo. Therefore it is not known whether long-term socioeconomic impacts of Alternative 2 will be significantly different from those associated with the status quo.

### 3.3.4 Alternative 3 - New England Council Alternative

Changes in gross revenues anticipated for Alternative 3 in FY2004 were estimated by comparison to FY2002 since it is the latest *complete* fishing year. The Alternative 3 quota (4.4 million pounds) is 7.5% less than what was actually landed in FY2002 (4.76 million pounds). Therefore, a reduction in dogfish revenues is expected despite the fact that Alternative 3 would increase the quota above the status quo (4.0 million pounds). Assuming participation in the FY2004 dogfish fishery is identical to that observed in FY2002, the fleet should experience a decrease in dogfish fishing opportunity equal to the decrease associated with full compliance (7.5%). If the 7.5% decrease in dogfish fishing opportunity is applied evenly to dogfish revenue for each vessel in the FY2002 fleet, and revenue from other fisheries is assumed constant, the change in gross revenue per vessel can be calculated. Based on this approach, gross revenues for Federally permitted vessels harvesting spiny dogfish are expected to decline by an average of 0.26%. Among Federally permitted vessels (N=180), 9 (5% of the fleet) are expected to experience a decrease in gross revenue greater than 1%, 3 (1.7% of the fleet) are expected to experience a decrease in gross revenue greater 5% and 0 are expected to experience a decrease in gross revenues greater than 10%. It is important to note that the distribution of revenue loss will differ from estimated values if the market price and/or harvest levels for dogfish or any other fishery change relative to FY2002.

An analysis of average impacts on *non-federally* permitted vessels is possible if it is assumed that all such vessels (N = 72) are identified in the Federal dealer reports. This is not likely, since the "unknown" vessel categories account for 11% of total landings. Nevertheless, within the apparent non-federal fleet, there are 24 vessels (33.3% of the fleet) that are expected to experience a decrease in gross revenue greater than 1%, 12 vessels (16.7% of the fleet) that are expected to experience a decrease in gross revenue greater 5% and 0 vessels that are expected to experience a decrease in gross revenues greater than 10%. Recent ASMFC actions specify quota and trip limits in state waters in FY2004 at levels consistent with Alternative 1/status quo (4 million pound quota; 600/300 pound trip limits). Socioeconomic impacts are likely to be felt by participants in the directed dogfish fishery in state waters as a result of the ASMFC action. The state waters sector of the dogfish fishery harvested an estimated 94.3% of total landings in 2002.

### 3.3.5 Alternative 4 - No Action Alternative

Given that no quota is specified in Alternative 4, landings are expected to return to the levels approximately equal to those observed in the late 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 425% increase in fishing opportunity compared to actual FY2002 landings (4.76 million pounds). Although the short-term social and economic benefits of an unregulated fishery would be much greater than those associated with Alternatives 1 through 3, fishing mortality is expected to rise above the threshold level that allows the stock to replace itself ($F_{REP} = 0.11$) such that 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. Recent ASMFC actions specified

spiny dogfish quota and trip limits in state jurisdictional waters for FY2004 at levels consistent with status quo/Alternative 1 Federal management measures (4 million pound quota; 600/300 pound trip limits). Nevertheless, implementation of the ASFMC specifications is not guaranteed. Independent of the ASMFC specifications, Alternative 4 is associated with negative long-term socioeconomic impacts since it would eventually lead to stock collapse and elimination of the dogfish fishery.

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**TABLES**

Table 1. Landings of spiny dogfish (lbs) in the Northwest Atlantic Ocean for calendar years 1962 to 2002.

| Year | US Comm | US Rec | US Total | Canada | USSR | Other Foreign | Total (NW Atl.Stock) |
|---|---|---|---|---|---|---|---|
| 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 | 1,075,845 | - | 1,075,845 | 19,841 | 414,465 | 22,046 | 1,532,197 |
| 1966 | 1,274,259 | - | 1,274,259 | 85,979 | 20,698,989 | - | 22,059,228 |
| 1967 | 612,879 | - | 612,879 | - | 5,370,406 | - | 5,983,284 |
| 1968 | 348,327 | - | 348,327 | - | 9,709,058 | - | 10,057,385 |
| 1969 | 249,120 | - | 249,120 | - | 19,460,004 | 800,270 | 20,509,394 |
| 1970 | 233,688 | - | 233,688 | 41,887 | 10,855,450 | 1,578,494 | 12,709,519 |
| 1971 | 160,936 | - | 160,936 | 8,818 | 23,814,089 | 1,684,314 | 25,668,158 |
| 1972 | 152,117 | - | 152,117 | 6,614 | 51,371,589 | 1,518,969 | 53,049,290 |
| 1973 | 196,209 | - | 196,209 | 44,092 | 31,347,207 | 10,083,84 | 41,671,349 |
| 1974 | 279,984 | - | 279,984 | 79,366 | 45,070,842 | 8,970,517 | 54,400,710 |
| 1975 | 324,076 | - | 324,076 | 2,205 | 49,230,923 | 423,283 | 49,980,487 |
| 1976 | 1,212,530 | - | 1,212,530 | 6,614 | 36,774,933 | 235,892 | 38,229,969 |
| 1977 | 2,052,483 | - | 2,052,483 | 2,205 | 15,304,333 | 566,582 | 17,925,603 |
| 1978 | 1,825,409 | - | 1,825,409 | 185,186 | 1,272,054 | 99,207 | 3,381,856 |
| 1979 | 10,478,464 | - | 10,478,464 | 2,934,323 | 231,483 | 180,777 | 13,825,047 |
| 1980 | 9,005,791 | - | 9,005,791 | 1,477,082 | 773,815 | 546,741 | 11,803,428 |
| 1981 | 15,134,579 | 3,291,468 | 18,426,047 | 1,243,394 | 1,137,574 | 1,009,707 | 21,816,722 |
| 1982 | 11,929,091 | 154,322 | 12,083,413 | 2,100,984 | 59,524 | 742,950 | 14,986,871 |
| 1983 | 10,795,926 | 147,708 | 10,943,634 | - | 791,451 | 231,483 | 11,966,569 |
| 1984 | 9,810,470 | 200,619 | 10,011,089 | 8,818 | 641,539 | 220,460 | 10,881,906 |
| 1985 | 8,880,129 | 196,209 | 9,076,338 | 28,660 | 1,529,992 | 701,063 | 11,336,053 |
| 1986 | 6,058,241 | 401,237 | 6,459,478 | 46,297 | 471,784 | 339,508 | 7,317,067 |
| 1987 | 5,959,034 | 674,608 | 6,633,641 | 617,288 | 255,734 | 50,706 | 7,557,369 |
| 1988 | 6,845,283 | 791,451 | 7,636,734 | - | 1,265,440 | 160,936 | 9,063,111 |
| 1989 | 9,903,063 | 921,523 | 10,824,586 | 365,964 | 372,577 | 191,800 | 11,754,927 |
| 1990 | 32,475,963 | 394,623 | 32,870,586 | 2,901,254 | 844,362 | 22,046 | 36,638,247 |
| 1991 | 29,050,014 | 288,803 | 29,338,817 | 643,743 | 480,603 | 35,274 | 30,498,436 |
| 1992 | 37,165,147 | 473,989 | 37,639,136 | 1,827,613 | 57,320 | 90,389 | 39,614,457 |
| 1993 | 45,509,558 | 264,552 | 45,774,110 | 3,110,691 | - | 59,524 | 48,944,325 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1994 | 41,446,480 | 339,508 | 41,785,988 | 4,010,167 | - | 4,409 | 45,800,565 |
| 1995 | 50,068,671 | 141,094 | 50,209,765 | 2,089,961 | - | 30,864 | 52,330,590 |
| 1996 | 59,003,948 | 56,881 | 59,060,829 | 917,114 | - | 520,286 | 60,498,228 |
| 1997 | 44,817,406 | 146,295 | 44,963,701 | 983,252 | - | 471,784 | 46,418,737 |
| 1998 | 47,193,900 | 133,513 | 47,327,413 | 2,378,763 | - | 1,338,192 | 51,044,368 |
| 1999 | 33,396,430 | 119,378 | 33,515,808 | 5,438,748 | - | 1,221,348 | 40,175,904 |
| 2000 | 20,785,422 | 11,237 | 20,796,659 | 5,901,714 | - | 1,089,072 | 27,787,445 |
| 2001 | 4,988,635 | 61,760 | 5,050,395 | 8,278,273 | - | 665,789 | 13,994,457 |
| 2002 | 4,813,556 | 450,852 | | 6,613,800 | - | - | 11,878,208 |

Source: unpublished NMFS Dealer Reports, South Atlantic General Canvass, MRFSS data, and SAW-37.

Table 2. Commercial landings (lbs) of spiny dogfish by state from 1996 through 2002.

| State | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|
| Maine | 905 | 449 | 274 | 35 | 8 | 0 | 1 |
| New Hampshire | 1,080 | 1,009 | 1,893 | 1,238 | 2,334 | 536 | 349 |
| Massachusetts | 26,807 | 21,663 | 24,911 | 14,915 | 5,762 | 3,912 | 3,799 |
| Rhode Island | 1,050 | 906 | 1,643 | 1,262 | 305 | 332 | 438 |
| Connecticut | 706 | 347 | 267 | 88 | 30 | 12 | 0 |
| New York | 1,063 | 408 | 1,385 | 1,220 | 1,587 | 53 | 43 |
| New Jersey | 4,621 | 3,931 | 6,268 | 3,783 | 5,220 | 17 | 1 |
| Delaware | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| Maryland | 7,150 | 4,227 | 2,398 | 2,127 | 450 | 0 | 2 |
| Virginia | 2,412 | 4,269 | 3,189 | 5,009 | 1,543 | 125 | 181 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| North Carolina | 13,211 | 7,608 | 4,962 | 3,719 | 3,546 | 0 | 0 |
| Total | 59,004 | 44,817 | 47,194 | 33,396 | 20,785 | 4,989 | 4,814 |

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

Table 3. Commercial landings (1000's lbs) of spiny dogfish by state and month, calendar years 1996-2002 combined.

| State | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maine | 21 | 0 | 14 | 17 | 42 | 304 | 900 | 267 | 79 | 10 | 4 | 12 |
| New Hampshire | 68 | 46 | 30 | 82 | 103 | 933 | 1,672 | 1,998 | 1,184 | 912 | 1,173 | 239 |
| Massachusetts | 415 | 261 | 300 | 825 | 6,801 | 18,769 | 21,186 | 17,660 | 13,307 | 12,316 | 8,407 | 1,656 |
| Rhode Island | 464 | 155 | 78 | 336 | 329 | 1,116 | 351 | 640 | 842 | 883 | 363 | 402 |
| Connecticut | 146 | 31 | 86 | 131 | 95 | 252 | 114 | 39 | 127 | 210 | 143 | 76 |
| New York | 649 | 573 | 825 | 166 | 235 | 308 | 129 | 97 | 70 | 400 | 1,003 | 1,316 |
| New Jersey | 3,094 | 3,024 | 2,914 | 2,959 | 666 | 86 | 40 | 75 | 150 | 3,012 | 5,079 | 2,743 |
| Delaware | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| Maryland | 4,376 | 2,322 | 5,220 | 2,807 | 36 | 208 | 34 | 0 | 0 | 2 | 393 | 956 |
| Virginia | 5,722 | 3,906 | 2,450 | 1,456 | 557 | 31 | 12 | 5 | 2 | 9 | 455 | 2,314 |
| North Carolina | 8,260 | 10,854 | 7,624 | 792 | 8 | 12 | 1 | 4 | 1 | 1 | 418 | 5,073 |
| NE Total | 1,114 | 494 | 508 | 1,391 | 7,369 | 21,374 | 24,223 | 20,605 | 15,538 | 14,332 | 10,091 | 2,384 |
| MA Total | 22,101 | 20,680 | 19,033 | 8,180 | 1,502 | 645 | 217 | 182 | 223 | 3,423 | 7,347 | 12,402 |
| GrandTotal | 23,215 | 21,174 | 19,541 | 9,571 | 8,872 | 22,020 | 24,439 | 20,787 | 15,762 | 17,755 | 17,438 | 14,787 |

Source: Unpublished NMFS Dealer Weighout and North Carolina

Table 4. Commercial spiny dogfish landings (lbs) for fishing year 2002 (Period I: May through Oct 2002; Period II: Nov 2002 through April 2003) .

| | Period I | | Period II | | Total FY2002 | |
|---|---|---|---|---|---|---|
| State | Landings | Percent of total | Landings | Percent of total | Landings | Percent of total |
| Massachusetts | 2,668,492 | 87.5% | 1,130,324 | 66.1% | 3,798,816 | 79.8% |
| Rhode Island | 239,423 | 7.8% | 215,431 | 12.6% | 454,854 | 9.6% |
| New Hampshire | 8,772 | 0.3% | 340,013 | 19.9% | 348,785 | 7.3% |
| Virginia | 100,068 | 3.3% | 7,161 | 0.4% | 107,229 | 2.3% |
| Other | 34,601 | 1.1% | 17,434 | 1.0% | 52,035 | 1.1% |
| Total | 3,051,356 | 100.0% | 1,710,363 | 100.0% | 4,761,719 | 100.0% |

| | Period I | | | | | | |
|---|---|---|---|---|---|---|---|
| Month | May | June | July | August | September | October | Total |
| Total Landings | 1,071,963 | 1,963,654 | 6,470 | 6,173 | 2,083 | 1,013 | 3,051,356 |
| Percent of Total | 35.1% | 64.4% | 0.2% | 0.2% | 0.1% | 0.0% | 100.0% |
| | Period II | | | | | | |
| Month | November | December | January | February | March | April | Total |
| Total Landings | 1,600,686 | 88,736 | 13,868 | 177 | 29 | 6,867 | 1,710,363 |
| Percent of Total | 93.6% | 5.2% | 0.8% | 0.0% | 0.0% | 0.4% | 100.0% |

Source: unpublished NMFS Dealer Weighout data.

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 1996-2002.

| 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 |
| 2002 | 988 | 0.21 | 2002 | 970 | 0.20 |

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

Table 6. Commercial landings (pounds) and value (dollars ) of spiny dogfish by port for fishing year 2002.

| Port | Landings | Pct of Total | Value | Pct of Total |
|---|---|---|---|---|
| CHATHAM, MA | 1,937,132 | 40.7% | 389,333 | 40.1% |
| PLYMOUTH, MA | 670,080 | 14.1% | 134,292 | 13.8% |
| PROVINCETOWN, MA | 469,815 | 9.9% | 93,812 | 9.7% |
| POINT JUDITH, RI | 324,276 | 6.8% | 57,232 | 5.9% |
| GLOUCESTER, MA | 254,454 | 5.3% | 47,673 | 4.9% |
| HARWICHPORT, MA | 244,745 | 5.1% | 48,949 | 5.0% |
| SALISBURY, MA | 143,405 | 3.0% | 28,681 | 3.0% |
| NEW HAMPSHIRE, NH | 129,000 | 2.7% | 39,000 | 4.0% |
| NEWPORT, RI | 125,519 | 2.6% | 20,532 | 2.1% |
| PORTSMOUTH, NH | 114,600 | 2.4% | 22,920 | 2.4% |
| OTHER ACCOMAC, VA | 84,750 | 1.8% | 27,511 | 2.8% |
| SEABROOK, NH | 65,158 | 1.4% | 14,980 | 1.5% |
| NEW BEDFORD, MA | 47,524 | 1.0% | 9,415 | 1.0% |
| ALL OTHERS | 151,211 | 3.2% | 35,408 | 3.7% |
| TOTAL | 4,761,669 | 100.0% | 969,738 | 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 FY2002.

| Port | Total Value ($) | Dogfish Value ($) | Pct Dogfish |
|---|---|---|---|
| Unspecified, NH | 41,073 | 39,000 | 95.0% |
| Salisbury, MA | 30,512 | 28,681 | 94.0% |
| Plymouth, MA | 1,675,352 | 134,292 | 8.0% |
| Chatham, MA | 6,385,199 | 389,333 | 6.1% |
| Harwichport, MA | 1,038,176 | 48,949 | 4.7% |
| Provincetown, MA | 2,276,391 | 93,812 | 4.1% |

Source: Unpublished NMFS Dealer Reports

Table 8. Commercial spiny dogfish landings (pounds) by gear category

| Calendar Year | Gillnet | | Bottom Trawl | | Line | | Other | | Grand Total |
|---|---|---|---|---|---|---|---|---|---|
| | Landings | Pct of Total | Landings | Pct of Total | Landings | Pct of Total | Landings | Pct of Total | |
| 1994 | 23,867,242 | 76.0% | 6,231,356 | 19.8% | 1,040,258 | 3.3% | 280,355 | 0.9% | 31,419,211 |
| 1995 | 30,730,059 | 76.3% | 5,687,349 | 14.1% | 3,314,973 | 8.2% | 546,260 | 1.4% | 40,278,641 |
| 1996 | 36,118,489 | 78.9% | 6,576,477 | 14.4% | 2,909,396 | 6.4% | 188,851 | 0.4% | 45,793,213 |
| 1997 | 33,543,589 | 84.0% | 3,835,713 | 9.6% | 2,447,119 | 6.1% | 120,924 | 0.3% | 39,947,345 |
| 1998 | 35,637,667 | 79.5% | 5,829,029 | 13.0% | 3,264,930 | 7.3% | 107,002 | 0.2% | 44,838,628 |
| 1999 | 23,581,300 | 73.1% | 4,632,603 | 14.4% | 3,522,748 | 10.9% | 519,322 | 1.6% | 32,255,973 |
| 2000 | 9,500,157 | 47.3% | 6,626,154 | 33.0% | 3,935,757 | 19.6% | 21,589 | 0.1% | 20,083,657 |
| 2001 | 1,649,660 | 33.1% | 491,617 | 9.9% | 2,825,154 | 56.7% | 16,832 | 0.3% | 4,983,263 |
| 2002 | 1,959,703 | 40.6% | 549,588 | 11.4% | 2,309,431 | 47.9% | 6,360 | 0.1% | 4,825,082 |

Source: Unpublished NMFS Dealer Reports

Table 9. Federally permitted dogfish vessel activity by home port state in FY2002. Active vessels are defined as vessels reported to have landed spiny dogfish in FY2002.

| State | Permitted Vessels | Pct of Total | State | Active Vessels | Pct of Total |
|---|---|---|---|---|---|
| MA | 1188 | 40.8% | MA | 89 | 49.4% |
| ME | 341 | 11.7% | ME | 5 | 2.8% |
| NJ | 315 | 10.8% | NJ | 3 | 1.7% |
| NY | 307 | 10.5% | NY | 42 | 23.3% |
| RI | 183 | 6.3% | RI | 14 | 7.8% |
| VA | 165 | 5.7% | VA | - | - |
| NC | 150 | 5.1% | NC | 3 | 1.7% |
| NH | 116 | 4.0% | NH | 21 | 11.7% |
| CT | 53 | 1.8% | Other | 3 | 1.7% |
| PA | 33 | 1.1% | | | |
| MD | 22 | 0.8% | | | |
| DE | 18 | 0.6% | | | |
| FL | 12 | 0.4% | | | |
| Other | 12 | 0.4% | | | |
| Total | 2915 | 100.0% | | 180 | 100% |

Source: Unpublished NMFS Permit Data

Table 10. Federally permitted spiny dogfish dealers by state in FY2002. Active dealers are defined as dealers who reported having bought spiny dogfish in FY2002.

| State | Permitted Dealers | Pct of Total | State | Active Dealers | Pct of Total |
|---|---|---|---|---|---|
| MA | 64 | 25.8% | MA | 12 | 28.6% |
| NY | 53 | 21.4% | NY | 12 | 28.6% |
| NJ | 29 | 11.7% | NJ | - | - |
| RI | 25 | 10.1% | RI | 9 | 21.4% |
| NC | 24 | 9.7% | Other | 9 | 4.8% |
| VA | 19 | 7.7% | | | |
| ME | 14 | 5.6% | | | |
| NH | 7 | 2.8% | | | |
| CT | 4 | 1.6% | | | |
| MD | 3 | 1.2% | | | |
| Other | 6 | 2.4% | | | |
| Total | 248 | 100.0% | Total | 42 | 100.0% |

Source: Unpublished NMFS Permit Data

Table 11. Landings of spiny dogfish by NMFS statistical area for FY2002.

| Statistical Area | Landings | Pct of Total |
|---|---|---|
| 521 | 794,452 | 46.34% |
| 514 | 315,492 | 18.40% |
| 539 | 289,165 | 16.87% |
| 513 | 168,498 | 9.83% |
| 537 | 53,533 | 3.12% |
| Other | 93,273 | 5.44% |
| Total | 1,714,413 | 100.00% |

Source: NMFS unpublished VTR data.

Table 12. Distribution of vessel lengths and gross registered tonnages for vessels that landed spiny dogfish in FY2002. Additionally, distribution of impacts of Alternative 1 on per vessel total revenue by length and gross tonnage class.

| Length Class | Vessels | Pct of fleet | 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 | 2 | 1.1% | 7.7% | 16.7% | 33.3% |
| 25-49 | 129 | 71.7% | 76.9% | 66.7% | 66.7% |
| 50-74 | 46 | 25.6% | 15.4% | 16.7% | 0.0% |
| 75-99 | 3 | 1.7% | 0.0% | 0.0% | 0.0% |
| N | 180 | 100.0% | 13 | 6 | 3 |

| Tonnage Class * | Vessels | Pct of fleet | 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 | 11 | 6.1% | 15.4% | 33.3% | 33.3% |
| 2 | 145 | 80.6% | 76.9% | 50.0% | 66.7% |
| 3 | 22 | 12.2% | 7.7% | 16.7% | 0.0% |
| 4 | 2 | 1.1% | 0.0% | 0.0% | 0.0% |
| N | 180 | 100.0% | 13 | 6 | 3 |

* 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 impact of Alternative 1 on per vessel total revenue by home port state.

| | Overall | | 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 | |
|---|---|---|---|---|---|---|---|---|
| State | Vessels | Pct | Vessels | Pct | Vessels | Pct | Vessels | Pct |
| MA | 89 | 49.44% | 9 | 69.23% | 4 | 66.67% | 2 | 66.67% |
| NY | 42 | 23.33% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |
| NH | 21 | 11.67% | 1 | 7.69% | 0 | 0.00% | 0 | 0.00% |
| RI | 14 | 7.78% | 1 | 7.69% | 1 | 16.67% | 0 | 0.00% |
| ME | 5 | 2.78% | 2 | 15.38% | 1 | 16.67% | 1 | 33.33% |
| NC | 3 | 1.67% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |
| NJ | 3 | 1.67% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |
| MD | 1 | 0.56% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |
| PA | 1 | 0.56% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |
| VA | 1 | 0.56% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |
| Total | 180 | 100.0% | 13 | 100.0% | 6 | 100.0% | 3 | 100.0% |

Source: Unpublished NMFS permit and dealer weighout data.

Table 14. Distribution of vessel lengths and gross registered tonnages for vessels that landed spiny dogfish in FY2002. Additionally, distribution of impacts of Alternative 3 on per vessel total revenue by length and gross tonnage class.

| Length Class | Vessels | Pct of fleet | 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 | 2 | 1.1% | 11.1% | 33.3% | 0.0% |
| 25-49 | 129 | 71.7% | 77.8% | 66.7% | 0.0% |
| 50-74 | 46 | 25.6% | 11.1% | 0.0% | 0.0% |
| 75-99 | 3 | 1.7% | 0.0% | 0.0% | 0.0% |
| N | 180 | 100.0% | 9 | 3 | 0 |

| Tonnage Class * | Vessels | Pct of fleet | 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 | 11 | 6.1% | 22.2% | 33.3% | 33.3% |
| 2 | 145 | 80.6% | 66.7% | 66.7% | 66.7% |
| 3 | 22 | 12.2% | 11.1% | 0.0% | 0.0% |
| 4 | 2 | 1.1% | 0.0% | 0.0% | 0.0% |
| N | 180 | 100.0% | 9 | 3 | 0 |

* 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 15. Expected impact of Alternative 3 on per vessel total revenue by home port state.

| | Overall | | 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 | |
|---|---|---|---|---|---|---|---|---|
| State | Vessels | Pct | Vessels | Pct | Vessels | Pct | Vessels | Pct |
| MA | 89 | 49.44% | 6 | 66.67% | 2 | 66.67% | 0 | 0 |
| NY | 42 | 23.33% | 0 | 0.00% | 0 | 0.00% | 0 | 0 |
| NH | 21 | 11.67% | 1 | 11.11% | 0 | 0.00% | 0 | 0 |
| RI | 14 | 7.78% | 1 | 11.11% | 0 | 0.00% | 0 | 0 |
| ME | 5 | 2.78% | 1 | 11.11% | 1 | 33.33% | 0 | 0 |
| NC | 3 | 1.67% | 0 | 0.00% | 0 | 0.00% | 0 | 0 |
| NJ | 3 | 1.67% | 0 | 0.00% | 0 | 0.00% | 0 | 0 |
| MD | 1 | 0.56% | 0 | 0.00% | 0 | 0.00% | 0 | 0 |
| PA | 1 | 0.56% | 0 | 0.00% | 0 | 0.00% | 0 | 0 |
| VA | 1 | 0.56% | 0 | 0.00% | 0 | 0.00% | 0 | 0 |
| Total | 180 | 100.0% | 9 | 100.0% | 3 | 100.0% | 0 | 0 |

Source: Unpublished NMFS permit and dealer weighout data.

Table 16. Longline Average Trip Costs per Day in 2002

| | Small (ton class 1) | Medium (ton class 2) | Large (ton class 3 and 4) |
|---|---|---|---|
| | | Dollars | |
| Fuel | . | 77.11 | . |
| Oil | . | 31.25 | . |
| Ice | . | 39.6 | . |
| Food/Water | . | 19.33 | . |
| Bait | . | 156 | . |
| Supplies | . | 80 | . |
| Crew Wages | . | 102 | . |
| Total | . | 505.29 | . |

Source: Northeast Observer Data Base (N=9 observations)

Table 17. Gillnet Average Trip Costs per Day in 2002

| | Small (ton class 1) | Medium (ton class 2) | Large (ton class 3 and 4) |
|---|---|---|---|
| | | Dollars | |
| Fuel | 52.17 | 66.21 | . |
| Oil | 11.59 | 21.22 | . |
| Ice | 25.7 | 44.9 | . |
| Food/Water | 23.62 | 35.24 | . |
| Bait | 0 | 0 | . |
| Supplies | 19.96 | 28.33 | . |
| Crew Wages | 142.8 | 150.96 | . |
| Total | 275.84 | 346.86 | . |

Source: Northeast Observer Data Base (N=570 for small, N=129 for medium)

Table 18. Otter Trawl Average Trip Costs per Day in 2002

| | Small (ton class 1) | Medium (ton class 2) | Large (ton class 3 and 4) |
|---|---|---|---|
| | | Dollars | |
| Fuel | 91.65 | 213.9 | 298.1 |
| Oil | 13.93 | 14.39 | 19.04 |
| Ice | 28.5 | 42.48 | 67.65 |
| Food/Water | 22.78 | 44.65 | 66.58 |
| Bait | 0 | 0 | 0 |
| Supplies | 35.07 | 60.05 | 102.86 |
| Crew Wages | 71.4 | 167.28 | 336.6 |
| Total | 263.33 | 542.75 | 890.83 |

Source: Northeast Observer Data Base (N=189 for small, N=110 for medium, N=129 for large)

Crew wages are based on a measure of the opportunity cost of labor - derived by assuming an

8 hour work day and an average hourly wage for shoreside occupations of $12.75. The wage rate value is assumed to include captain payments and was obtained from the Bureau of Labor Statistics National Compensation Survey: Occupational Wages in the New England Census Division, 2000.

Table 19. Spiny Dogfish Trips, Landings, and Revenue Statistics by Trip Limit Categories for Calendar Year 2002

| | % of Total Trips | | | % of Total Dogfish Landings | | | Avg Dogfish Landings Per | | | Avg % of Dogfish Revenue to Revenue per Trip | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <301 lbs | 301-1,500 lbs | >1,500 lbs | <301 | 301-1,500 lbs | >1,500 lbs | <301 | 301-1,500 lbs | >1,500 lbs | <301 | 301-1,500 lbs | >1,500 lbs |
| **Longline** | | | | | | | | | | | | |
| Small | . | . | 1 | . | . | 3 | . | . | 5,647 | . | . | 97 |
| | . | <1 | 18 | . | <1 | 50 | . | 1,011 | 6,119 | . | 98 | 99 |
| **Gillnet** | | | | | | | | | | | | |
| Small | 2 | 1 | <1 | <1 | <1 | <1 | 94 | 814 | 2,194 | 10 | 21 | 31 |
| | 13 | 15 | 11 | 1 | 4 | 25 | 176 | 642 | 5,065 | 7 | 19 | 76 |
| Large | . | <1 | <1 | . | <1 | 1 | . | 860 | 4,533 | . | 1 | 91 |
| **Otter** | | | | | | | | | | | | |
| Small | 1 | <1 | <1 | <1 | <1 | <1 | 112 | 716 | 3,946 | 9 | 11 | 34 |
| | 15 | 3 | <1 | <1 | <1 | <1 | 112 | 668 | 2,406 | 4 | 20 | 82 |
| Large | 7 | 3 | 3 | <1 | <1 | 8 | 106 | 608 | 6,707 | 2 | 8 | 52 |
| **Handline** | | | | | | | | | | | | |
| Small | <1 | <1 | . | <1 | <1 | . | 102 | 1,200 | . | 51 | 100 | . |
| | <1 | <1 | . | <1 | <1 | . | 166 | 662 | . | 40 | 64 | . |
| **Other** | | | | | | | | | | | | |
| | <1 | . | . | <1 | . | . | 401 | . | . | 9 | . | . |
| Total | 40 | 25 | 35 | 4 | 8 | 88 | | | | | | |

Source: Northeast Dealer Weighout Data Base