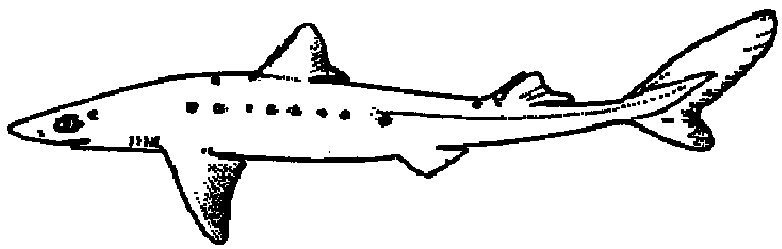
2005-2006
Spiny Dogfish Specifications,
Draft Environmental Assessment,
Regulatory Impact Review,
and
Initial Regulatory Flexibility Analysis



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in cooperation with the

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1.0 EXECUTIVE SUMMARY

Pursuant to the Magnuson Stevens Fishery Conservation and Management Act of 1976 (MSFCMA) as amended by the Sustainable Fisheries Act (SFA), the Northeast Atlantic stock of spiny dogfish (*Squalus acanthias*) is jointly managed by the Mid-Atlantic and New England Fishery Management Councils through the Federal Spiny Dogfish Fishery Management Plan (FMP). This document has been prepared in accordance with the FMP as part of the annual specification process through which the Councils recommend a commercial quota and other management measures for spiny dogfish. Additionally, the environmental impacts of the recommended management actions and the anticipated level of significance of these impacts have been addressed in accordance with the National Environmental Policy Act of 1969 (NEPA) and NAO 216-6.

Initiation of the Federal Spiny Dogfish FMP began in 1998 in response to the development and rapid expansion of a domestic commercial spiny dogfish fishery in the 1990's. At the onset of the domestic fishery, spiny dogfish population biomass was at a historic high. The rapid expansion of commercial harvest, however, quickly depleted the number of reproductively mature females in the stock. Limited by the abundance of mature females, the reproductive potential of the spiny dogfish stock had been greatly diminished, and a 1997 stock assessment classified the stock as "overfished" (SAW 17). The Federal FMP, developed in 1998 and implemented in 2000, established a recovery approach that would protect mature female spiny dogfish so that stock rebuilding could be achieved as quickly as practicable. A recovery plan was adopted that would constrain fishing mortality (F) on the female reproductive stock for 5 years at $F_{rebuild}$ (0.03), after which the maximum allowable F would be increased to 0.08. Because the commercial fishery concentrated on mature females, achieving $F_{rebuild}$ required the elimination directed harvest effort for spiny dogfish. Specifically, a bycatch quota (4.0 million pounds) was specified in the FMP, and very low trip limits (600 pounds per trip in period 1, 300 pounds per trip in period 2) were implemented through the annual specification process in order to discourage directed harvest effort while providing a small bycatch allowance. These restrictive trip limits were not implemented in state-jurisdictional waters until the current (2004) fishing year, and this inconsistency, as well as delays in the implementation of the Federal FMP are likely to have impeded the success of the stock rebuilding plan. At this time, the Northwest Atlantic spiny dogfish stock continues to be classified as overfished; however, overfishing is not occurring. Recent population projections (NEFSC 2003) suggest a time span of 15 to 20 years before the stock will have fully recovered.

Pursuant to the Federal FMP, an annual commercial spiny dogfish quota is to be specified for a fishing year that begins May 1. As such, the upcoming 2005 fishing year (FY2005) begins May 1, 2005 and ends Apr 30, 2006. The FMP further stipulates that the fishing year is to be subdivided into two semi-annual quota periods. The period from May 1-October 31 (quota period 1) is allocated 57.9% of the annual quota and the period from November 1-April 30 (quota period 2) is allocated 42.1% of the annual quota. A commercial harvest quota will be allocated to the fishery such that the appropriate fishing mortality (F) for a given year will not be exceeded. The quota recommendation will be based upon the latest stock status information, coupled with the target fishing mortality rate indicated in the FMP. For FY2004 and thereafter, the FMP stipulates that fishing mortality should be constrained between zero and a maximum of F = 0.08. Management advice provided by the most recent peer-reviewed stock assessment (37th SAW - NEFSC 2003), however, included a recommendation that total removals not exceed the amount corresponding to F=0.03 (i.e., $F_{rebuild}$). The F=0.08 maximum was based on the expectation, at the time the FMP was being developed, that mature female biomass would have recovered to 90% of the level that maximizes recruitment (SSB_{max}) by 2003. Management advice provided by the 37th SAW, on the other hand, was based on their review of a 2003 stock assessment that estimated mature female biomass at around 29% of SSB_{max}.

The most recent information on spiny dogfish stock status was presented to the Councils' Spiny Dogfish Monitoring Committee at its Sept 24, 2004 meeting. The updated information suggested no increase in mature female biomass from the previous year's estimate. As such, the Monitoring Committee recommended management measures for FY2005 that will continue to discourage the harvest of mature female spiny dogfish. Specifically, the Monitoring Committee recommended continuation of the status quo bycatch quota (4.0 million lb) and trip limits (600 pounds/trip in period 1 and 300 pounds/trip in period 2) for FY2005.

At its October 4, 2004 meeting, the Mid-Atlantic Fishery Management Council endorsed the Monitoring Committee's recommendation for a 4 million pound bycatch quota, but recommended trip limits of 1,500 pounds of male-only spiny dogfish (i.e., a prohibition on the possession of female spiny dogfish) in both quota periods. In the judgment of the majority of the Mid-Atlantic Council, the increased trip limits would accommodate the high volume demand required by the processing sector of the spiny dogfish fishery, while the prohibition on possession of female spiny dogfish would help protect that component of the stock. The New England Council, on the other hand, at its November 18, 2004 meeting, endorsed the Monitoring Committee's recommendations for both the status quo bycatch quota (4.0 million pounds) and trip limits (600/300 pounds) for FY2005.

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 alternative that has not been rejected by both Councils. None of the alternatives presented in this document were rejected by both Councils.

For FY2005, the Atlantic States Marine Fisheries Commission (ASMFC) has specified a bycatch quota and trip limits at levels consistent with the status quo (i.e., Monitoring Committee recommendations). As such, the specification of Federal quota or trip limits at any level above the status quo would have no practical relevance since the transfer of catch to dealers occurs within state jurisdictions where the ASMFC (status quo) restrictions will be in effect.

Table E-1 presents a qualitative summary of the impacts of the various management alternatives.

Alternative 1 – (Status Quo / New England Council Alternative – Preferred Alternative): Specify quota for FY2005 of 4.0 million pounds and trip limits of 600 pounds for quota period 1 and 300 pounds for quota period 2 (vessels are prohibited from landing more than the specified amount in one calendar day). As per the FMP, the quota would be divided semi-annually with quota period 1 (May 1 through October 31) being allocated 57.9% of the 4,000,000 pound quota (2,316,000 pounds), and quota period 2 (November 1 through April 30) being allocated 42.1% of the 4,000,000 pound quota (1,684,000 pounds).

This alternative was recommended by the Monitoring Committee, and endorsed by the New England Council in response to the most recent information on spiny dogfish stock status. By maintaining the incidental catch fishery, through a low bycatch quota and highly restrictive trip limits, this alternative is expected to result in positive biological impacts, and neutral economic, social, EFH, and protected resource impacts relative to the status quo.

Alternative 2 – (Mid-Atlantic Council Alternative): Specify quota for FY2004 at 4.0 million pounds and trip limits of 1,500 pounds of male only spiny dogfish for quota periods 1 and 2 (i.e., a prohibition on the possession of female spiny dogfish). 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).

Neither the direction nor the magnitude of the impacts associated with this alternative are well understood compared to the status quo. The reason for this is that impacts across the range of valued ecosystem components (VECs) are all contingent upon the extent to which male-only dogfish harvest would actually occur if this alternative were implemented. That outcome, itself, depends on the frequency of vessel encounters with marketable-size male dogfish, and the profitability associated with separating these fish from the rest of the dogfish catch. Because the recommended trip limit (1,500 pounds) under this alternative exceeds the limits set by the states (600/300 pounds), and because male dogfish have consisted of only about 3% of the dogfish landed in recent years, the most likely outcome of this alternative would be a decrease in overall landings. If this were to occur, then Alternative 2 would be associated with positive biological impacts, neutral habitat and protected resource impacts, and negative economic and social impacts relative to the status quo.

Alternative 3 – (No Action): No specified quota or trip limits for FY2005

Alternative 3 would effectively remove regulatory control over the spiny dogfish fishery for FY2005. Given that no quota is specified in Alternative 3, landings are expected to return to the levels approximately equal to those observed in the unregulated period of the fishery (about 25 million pounds). Under this alternative, fishing mortality is expected to exceed the rebuilding fishing mortality rate (0.3) as well as the fishing mortality rate necessary for maximum yield (~0.08-0.11). Fishing mortality rates in excess of 0.11 on the mature female stock are expected to result in long term decline of the resource. Compared to the status quo, Alternative 3 is expected to have negative biological impacts on spiny dogfish and non-target species taken in the spiny dogfish fishery. Additionally, the probability of negative impacts to habitat, 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 FY2005 spiny dogfish specifications. A plus sign (+) is used for a positive impact, a minus sign (-) signifies an expected negative impact, and a null sign (Ø) is used for non-directional impacts.

Proposed Federal Action		Valued ecosystem Component (VEC)				
FY2005 Spiny Dogfish Management Alternatives		Target Fishery	Non-target Species	Protected Species	Habitat (including EFH)	Socio-economic
Alt. 1	Quota: 4 million pounds Trip Limits: 600/300 pounds	+	Ø	Ø	Ø	Ø
Alt. 2	Quota: 4 million pounds Trip Limits: 1,500/1,500 pounds (male dogfish only)	Ø	Ø	Ø	Ø	-
Alt. 3	Unrestricted	-	-	-	-	+

2.0 LIST OF ACRONYMS

ACFCMA	Atlantic Coastal Fisheries Cooperative Management Act
ASMFC	Atlantic States Marine Fisheries Commission or Commission
B	Biomass
CEQ	Council on Environmental Quality
CPUE	Catch Per Unit Effort
DPS	Distinct Population Segment
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act of 1973
F	Fishing Mortality Rate
FR	Federal Register
FMP	Fishery Management Plan
GRA	Gear Restricted Area
HPTRP	Harbor Porpoise Take Reduction Plan
IRFA	Initial Regulatory Flexibility Analysis
LTPC	Long-term Potential Catch
LWTRP	Large Whale Take Reduction Plan
M	Natural Mortality Rate
MAFMC	Mid-Atlantic Fishery Management Council
MMPA	Marine Mammal Protection Act
MRFSS	Marine Recreational Fisheries Statistical Survey
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSY	Maximum Sustainable Yield
mt	metric tons
NAO	National Oceanic and Atmospheric Administration Order
NE	New England
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
OY	Optimal Yield
PBR	Potential Biological Removal
PRA	Paperwork Reduction Act
PREE	Preliminary Regulatory Economic Evaluation
RIR	Regulatory Impact Review
RSA	Research Set-Aside
SAFMC	South Atlantic Fishery Management Council
SARC	Stock Assessment Review Committee
SAV	Submerged Aquatic Vegetation
SAW	Stock Assessment Workshop
SMA	Small Business Administration
SSB	Spawning Stock Biomass
SFA	Sustainable Fisheries Act
TAL	Total Allowable Landings
TL	Total Length
VECs	Valued Ecosystem Components
VMS	Vessel Monitoring System
VPA	Virtual Population Analysis
VTR	Vessel Trip Report

3.0 LIST OF TABLES

Tables are located in sequential order at the end of the document.

4.0 INTRODUCTION AND BACKGROUND OF SPECIFICATION PROCESS

4.1 Purpose And Need For The Action

The purpose of this document is to specify Federal spiny dogfish management measures for fishing year 2005 (FY2005: May 1, 2005 - April 30, 2006). The Spiny Dogfish FMP requires that the Councils annually review and recommend management measures to ensure that the target fishing mortality rate for spiny dogfish in a given year is not exceeded. This will be year seven in the management program. Measures that can be considered for year seven 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. Pursuant to the FMP, the quota is specified for a fishing year that is subdivided into two semi-annual periods. The period from May 1-October 31 (period 1) is allocated 57.9 % of the annual quota and the period from November 1-April 30 (period 2) is allocated 42.1 % of the annual quota. In addition to the commercial quota, the Councils may also recommend trip limits, minimum or maximum fish sizes, seasons, mesh-size restrictions, and other gear restrictions.

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 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 and makes a recommendation to the Councils' Joint Spiny Dogfish Committee with regard to 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 24, 2004 and developed recommendations based on stock conditions estimated from the latest stock status updates. Although the Spiny Dogfish FMP allows for a maximum fishing mortality rate of F = 0.08 for the upcoming fishing year, the 37th SARC recommended that total removals not exceed the amount corresponding to F=0.03 ($F_{rebuild}$). The F=0.08 maximum identified in the FMP was based on the expectation, in 1999, that mature female biomass would recover to 90% SSB_{max} by 2003. On the other hand, the management advice provided by the 37th SARC was based on their review of the 2003 stock assessment. That assessment estimated mature female biomass in 2003 at around 29% of SSB_{max}. Updated stock status information reviewed by the Monitoring Committee indicated that mature female biomass had not increased in 2004 compared to 2003 estimates. As such, the Monitoring Committee could find no biological justification for deviating from the advice of the 37th SARC. The Committee, therefore, recommended management measures for the upcoming fishing year consistent with achieving F=0.03 ($F_{rebuild}$). Specifically, the Monitoring Committee recommended continuation of the status quo bycatch quota (4.0 million pounds) and trip limits (600 pounds/trip in period 1 and 300 pounds/trip in period 2). The Committee acknowledged that the bycatch quota is not likely to be achieved if the recommended trip limits are applied in both state and Federal waters. The low trip limits are intended to allow for the retention of small amounts of incidentally captured spiny dogfish, while not significantly affecting total removals (i.e., mortality).

As per the FMP, the Joint Spiny Dogfish Committee annually reviews the Monitoring Committee's recommendations and makes an independent management recommendation to the Councils. The Joint Committee met on October 4, 2004 and recommended that for FY2005 the Councils adopt a quota of 4 million pounds (3,629 mt) and that trips limits be set at 1,500 pounds of male only spiny dogfish (i.e., a prohibition on the possession of female spiny dogfish) for the EEZ in the 2005 fishing year. The Joint Committee recommended increasing trip limits above the status quo in order to accommodate the high volume demand required by the processing sector of the spiny dogfish fishery, and recommended the prohibition on possession of female spiny dogfish in order to protect that component of the stock. The Councils received the recommendations of the both Monitoring Committee and the Joint Committee and adopted the recommendations outlined in section 5.0 below.

4.2 Management Objectives Of The Spiny Dogfish FMP

The overall goal of the FMP is to conserve spiny dogfish in order to achieve optimum yield from the resource in the western Atlantic Ocean. The specification of an annual commercial quota and trip limits meets that overall goal by accomplishing the following objectives, which were adopted into the FMP:

1. Reduce fishing mortality to ensure that overfishing does not occur.

2. Promote compatible management regulations between state and Council jurisdictions and the US and Canada.

3. Promote uniform and effective enforcement of regulations.

4. Minimize regulations while achieving the management objectives stated above.

5. Manage the spiny dogfish fishery so as to minimize the impact of the regulations on the prosecution of other fisheries, to the extent practicable.

6. Contribute to the protection of biodiversity and ecosystem structure and function.

5.0 MANAGEMENT ALTERNATIVES

5.1 Alternative 1 – (Status Quo/New England Council Alternative - Preferred Alternative)

Specify quota for FY2005 at 4.0 million pounds and trip limits of 600 pounds for quota period 1 and 300 pounds for quota period 2 (vessels are prohibited from landing more than the specified amount in one calendar day). 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).

5.2 Alternative 2 – (Mid-Atlantic Council Alternative)

Specify quota for FY2005 at 4.0 million pounds and trip limits of 1,500 pounds of male only spiny dogfish for quota periods 1 and 2 (i.e., a prohibition on the possession of female spiny dogfish). 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).

5.3 Alternative 3 - (No Action Alternative)

No specified quota or trip limits for FY2005. Alternative 4 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).

6.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT AND FISHERIES

6.1 Spiny Dogfish Stock and Fisheries

6.1.1 Spiny Dogfish Biology and Ecological Relationships

A complete description of spiny dogfish biology and ecological relationships is given in Section 2.1.3 in the FMP. A summary is provided here.

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 (e.g., herrings, Atlantic mackerel, codfishes, hakes, and squid). 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.

6.1.2 Status of the Spiny Dogfish Stock

At the onset of the domestic fishery in the early 1990's, population biomass for the Northwest Atlantic stock of spiny dogfish was at its highest estimated level (approx. 1.2 billion pounds). The rapid expansion of commercial harvest, however, quickly reduced the biomass of large, market-size (> 80cm) females in the stock (approx. 500 million pounds in 1990 to approx. 175 million pounds in 1997); while the biomass of large male dogfish remained relatively steady (approx. 60 million pounds). This asymmetrical depletion pattern was a consequence of the larger average size and, therefore, greater market value of female spiny dogfish. Because of the species' biology, market-size female dogfish represent the bulk of the reproductive stock for the population. Noting the greatly diminished reproductive potential of the spiny dogfish stock, a 1997 stock assessment characterized the stock as "overfished" (SAW 17). The Federal Spiny Dogfish FMP, which was developed in 1998 in response to the assessment results, established a recovery plan to protect mature female spiny dogfish so that stock rebuilding could be achieved as quickly as practicable. When the FMP was implemented in 2000, it specified constraining fishing mortality (F) on the female reproductive stock at 0.03 ($F_{rebuild}$) throughout the rebuilding period (through fishing year 2003), after which it was expected that it could be increased to as much as F =0.08. Because the directed commercial fishery concentrated on mature female dogfish, achieving $F_{rebuild}$ required the elimination directed harvest effort during the rebuilding period. Therefore, a bycatch quota of 4.0 million pounds was specified in the FMP, and very low trip limits (600 pounds per trip in period 1,300 pounds per trip in period 2) were implemented through the annual specification process in order to discourage directed harvest while still providing a small bycatch allowance. These restrictive trip limits were not implemented in state-jurisdictional waters until the current (2004) fishing year. This inconsistency, as well as the delayed implementation of the Federal FMP is likely to have impeded the success of the stock rebuilding plan. At this time, the Northwest Atlantic spiny dogfish stock continues to be classified as overfished; however, overfishing is not occurring. Recent population projections (NEFSC 2003), which factor in U.S. commercial harvest at $F_{rebuild}$ as well as status quo removals from all other sources (U.S. commercial discards, Canadian commercial fishery landings, U.S. recreational discards and landings) suggest a time span of 15 to 20 years before the stock will have fully recovered.

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). According to the Advisory Report that accompanied that assessment the spiny dogfish stock was overfished in 2003, however, overfishing was not occurring. The reproductively mature female component of the stock (SSB) had declined from the historic high in 1990 (~500 million pounds) to about 115 million pounds in 2003 (29% of the recommended biomass target – 400 million pounds). The low level of SSB was expected to result in low recruitment for the next several years, and recruitment estimates from 1997 to 2003 were observed to represent the seven lowest values in the entire time series. Fishing mortality in 2002 was estimated to be about 0.09. As stated above, the 37th SAW recommended that total removals (landings, discards, Canadian catch) be constrained below levels consistent with F=0.03 ($F_{rebuild}$).

At their Sept 24, 2004 meeting, updates to spiny dogfish stock status were evaluated by the Spiny Dogfish Monitoring Committee. The Committee noted no increase in mature female biomass in 2004 compared to 2003 estimates (~115 million pounds). Fishing mortality, had decreased substantially from 0.09 in 2002 to 0.04 in 2003, but was still above $F_{rebuild}$ (0.03). In response to the updated stock status information, the Monitoring Committee could find no biological justification for deviating from the advice of the 37th SARC. The Committee, therefore, recommended management measures for the 2005 fishing year consistent with achieving F=0.03 ($F_{rebuild}$). Specifically, the Spiny Dogfish Monitoring Committee recommended the continued prohibition of directed spiny dogfish fishing (targeting large females). The Monitoring Committee's specific advice on management actions for FY2005 formed the basis of Alternative 1 (Preferred Alternative) and is detailed in the Biological Impacts of Alternative 1 in Section 7.1, below.

6.1.3 Spiny Dogfish Catch

A variety of domestic and foreign interests have historically participated in the harvest of the Northwest Atlantic spiny dogfish stock. Annual harvest estimates from 1962-2003 are indicated in Table 1. These include landings from U.S. commercial and recreational sectors as well as Canadian, former USSR, and "other foreign" commercial fisheries. A thorough characterization of the historic (pre-FMP) fishery for spiny dogfish is given in Section 2.3.1 of the FMP. Since the Federal FMP was implemented in 2000, annual landings of spiny dogfish have declined considerably. In 2003, overall harvest (12.0 million pounds) was about 20% of the historic high (60.9 million pounds), which occurred in 1996 (Table 1).

6.1.3.1 Spiny Dogfish Commercial Catch

The spiny dogfish commercial catch currently comprises a combination of U.S. commercial landings and discards, as well as Canadian commercial landings. Canadian commercial discards are not currently estimated.

6.1.3.1.1 U.S. Commercial Spiny Dogfish Landings

In 2003, U.S. commercial landings (2.49 million pounds) were about 4% of the 1996 record (59.4 million pounds; Table 1). U.S. commercial harvest has historically been dominated by Massachusetts in the summer and early fall and mid-Atlantic states in the winter. Harvest patterns by state and month from 1996-2003 are given in Tables 2 and 3, respectively.

Unpublished NMFS dealer reports indicate that 3.14 million pounds of spiny dogfish valued at 444 thousand dollars were landed by U.S. commercial vessels in the 2003 fishing year (Tables 4, 5). Most of these landings (98.1%) were recorded in dealer reports at levels exceeding Federal trip limits. If all of the reported landings that exceeded the Federal trip limits are assumed to have come from state waters, then as little as 1.8% of the FY2003 landings (approx. 59,000 pounds) would have been taken from the EEZ.

Although the Federal quota for spiny dogfish has been consistently set at 4.00 million pounds since the FY2000, FY2003 was the first fishing year in which realized U.S. commercial landings came in under the quota, in this case by 21.5%. Total estimated landings include dogfish in the unclassified category. Commercial landings in FY2003 (3.14 million pounds) had declined by 34% compared to FY2002 commercial landings (4.78 million pounds). As indicated in Table 4, Massachusetts accounted for the largest share of the commercial landings (63.9 %), followed by North Carolina (13.4%), Virginia (11.4%), New Hampshire (5.6 %), Rhode Island (4.1%), and New York (1.3%). Spiny dogfish were landed in all months in FY2003 with peak landings occurring in August - October of period 1 and January of period 2 (Table 4).

6.1.3.1.2 U.S. Commercial Spiny Dogfish Discards

A method for estimating spiny dogfish discards as a function of the landings from various commercial fishing sectors (catch-based method) was developed in the latest peer-reviewed stock assessment (NEFSC 2003). Dead discards were calculated as the product of total estimated discards by gear type and assumed proportional mortality by gear type. Proportional mortalities by gear type were assumed to be 75% for gillnets, 50% for trawls, and 25% for hook gear. Following the current estimation method, dead discards from U.S. commercial fishing activity appears to have peaked at about 104 million pounds in 1991, and subsequently declined and stabilized at around 10 million pounds since 1997. In 2003, dead discards from U.S. commercial fisheries were estimated to be about 13.14 million lbs.

6.1.3.1.3 Canadian Commercial Spiny Dogfish Landings

Historic Canadian commercial landings have been low relative to landings from the U.S. commercial fishery (Table 1). In 2001, following the implementation of the FMP, Canadian commercial landings (8.3 million pounds) exceeded U.S. commercial landings

(5.1 million pounds) for the first time. Canadian commercial landings have decreased since then, and in 2003, were approximately equal to U.S. landings (Table 1).

6.1.3.2 U.S. Spiny Dogfish Recreational Catch

Estimates of the recreational catch (landings and discards) of spiny dogfish are generated from data obtained through the NMFS Marine Recreational Fishery Statistics Survey (MRFSS). Uncertainty associated with both the discard mortality and average size of recreationally caught spiny dogfish makes it necessary to report the recreational catch as a range, rather than a single estimate. Spiny dogfish are generally caught with live bait and are often mishandled by anglers. As such, the estimated recreational catch has historically included the assumption that discard mortality is 100%. The assumed discard mortality for commercially caught spiny dogfish from hook and line gear is 25%, however, and the recreational discard mortality may be closer to this estimate. Size information obtained through the MRFSS is rather poor with respect to spiny dogfish. This is due to the very small number of fish measured by MRFSS observers in a given year (e.g., N = 2 in 2000, N = 6 in 2001, N = 37 in 2002, N = 18 in 2003). In 2003, the MRFSS estimate of mean weight was 1.1 kg. The NEFSC has historically computed total catch in weight using a constant assumed weight of 5.5 pounds (2.5 kg) per fish. . Based on the range of estimated discard mortality and mean weight, estimated recreational removals (landings and dead discards) of spiny dogfish by the U.S. recreational fishery in 2003 ranged from about 348,000 pounds to 6.7 million pounds. The maximum estimate of total recreational removals (6.7 million pounds) was used to calculate fishing mortality for 2003. Total recreational removals were dominated by discards with estimated recreational landings (87,307 pounds) comprising only 1.3% of the 2003 total. As indicated in Table 6, Massachusetts accounted for the largest share of the recreational landings (48.5 %), followed by Connecticut (17.2%), New Jersey (8.1 %), New York (5.9%), North Carolina (5.9%), Virginia (4.7%), Maryland (4.5%), New Hampshire (3.0%), and Delaware (2.0%).

6.2 Non-target Species

Although an evaluation of fishery impacts on non-target species may be fairly straight-forward for most Federally-managed species, the circumstances under which spiny dogfish are harvested represents somewhat of an anomaly. This is because, at the present time, directed spiny dogfish fishing has been eliminated in both state and Federal waters. As such, the spiny dogfish is, for the most part, a non-target species, the landing of which is a byproduct of the activity of other fishery operations. Participants in these other fisheries may obtain a Federal permit that will allow them to retain and sell small amounts of incidentally captured spiny dogfish. The current bycatch allowance is 600 pounds per trip in quota period 1 (May 1 – Oct 31) and 300 pounds per trip in quota period 2 (Nov 1 – Apr 30). At the average FY2003 price of $0.14 per lb, harvesting the larger of the two periodic trip limits (600 pounds) would generate only $84.00 gross revenue. This is generally much less than the amount necessary to offset the costs of a fishing trip (NEFSC 2003 unpubl. data). Additionally, given the protracted rebuilding period estimated in the latest stock assessment (~20 years), the corresponding management advice does not allow for the development of a directed spiny dogfish fishery in the near future. To the extent that implemented harvest policy is consistent with that advice, the distribution and intensity of fishery effort is not expected to be significantly influenced by the bycatch allowance for spiny dogfish. As such, the concept of impacts on "non-target species" is not particularly appropriate for the management of this species.

Nevertheless, the deployment of certain commercial gear types tends to be associated with the retention of spiny dogfish. The catch of spiny dogfish by gear in FY2003 is given in Table 7. These data indicate that spiny dogfish landings came mostly from sink gill nets (46.3%) and bottom longlines (45.8%). Discards associated with the deployment of these gear types were derived from FY2003 vessel trip report (VTR) data and are indicated in Table 8. Spiny dogfish comprised the bulk of the discards for either gear type, 82.0% for sink gill nets, and 92.0% for bottom long lines. Other species reported to be discarded were cod (8.0%), monkfish (2.7%), skates (1.9%), and smooth dogfish (1.0%) in sink gill nets, and cod (2.8%), skates (2.4%), and haddock (1.1%) in bottom longlines (Table 8).

6.3 Endangered and Other Protected Species

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

Cetaceans

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

Sea Turtles

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

Fish

Species	Status
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered
Atlantic salmon (*Salmo salar*)	Endangered
Smalltooth sawfish (*Pristis pectinata*)	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

The status of the marine mammal populations listed above has been discussed in detail in the U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments. Initial assessments were presented in Blaylock et al. (1995) and are updated in Waring et al. (1999). The most recent information on the stock assessment of various mammals can be found at the following website:

http://www.nmfs.noaa.gov/pr/PR2/Stock_Assessment_Program/sars.html

and in the Appendix to this document. Three other useful websites on marine mammals are:

http://www.nmfs.noaa.gov/prot_res/PR3/recovery.html

http://spo.nwr.noaa.gov/mfr611/mfr611.htm

http://www.nmfs.noaa.gov/pr/species/Cetaceans/cetaceans.html

A description of the all the species which inhabit the spiny dogfish management unit and are listed above as endangered is presented in the Appendix.

The North Carolina gillnet fishery for spiny dogfish was historically important in the incidental capture of both sea turtles and Atlantic bottlenose dolphins. Management measures consistent with the Federal spiny dogfish rebuilding plan have eliminated directed fishing for spiny dogfish, including the gillnet fishery for spiny dogfish in North Carolina. Additionally, protective measures under the Harbor Porpoise Take Reduction Plan (HPTRP) in combination with Federal spiny dogfish harvest policy have been sufficient to reduce gillnet fishery interactions with harbor porpoises below PBR levels.

The dominant gear types associated with the retention of spiny dogfish (sink gill nets and bottom long lines) are used by several fisheries identified in the List of Fisheries for 2004 (69 CFR 48407). Sink gill nets are deployed in two Category I fisheries: "mid-Atlantic coastal gillnet" and "Northeast sink gillnet", while bottom long lines are deployed by a Category III fishery: "Gulf of Maine tub trawl groundfish bottom longline / hook and line". Because directed fishing for spiny dogfish has effectively been eliminated in Federal waters since FY2000 (and as of FY2004, in state waters, as well), it is unlikely that the current distribution and intensity of fishing effort by these gear types is significantly influenced by the small bycatch allowance for spiny dogfish. Additionally, the protracted rebuilding period (~20 years) estimated in the latest assessment of the spiny dogfish stock, does not allow for the development of a directed spiny dogfish fishery in the near future. As such, the harvest of spiny dogfish should not be directly associated with impacts on endangered and other protected species, and this is expected to continue for several more years. As long as a directed fishery for spiny dogfish does not exist, and the retention of spiny dogfish is a byproduct of the activity of other fisheries, interactions with protected species will continue to be analyzed under the management plans for those fisheries.

6.4 Habitat Including EFH

The affected environment for management actions proposed in this document encompasses all of the spiny dogfish EFH. Given the ubiquitous distribution of spiny dogfish (Northwest Atlantic between Labrador and Florida) this also includes EFH for most Federally managed species. A more complete description of essential fish habitat for spiny dogfish is given in Section 2.2.2 in the FMP. A summary of that description is given here.

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 37ºF and 82ºF.

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 37ºF and 82ºF.

As stated in the section 6.2, there is currently no directed fishery for spiny dogfish in either state or Federal waters. Commercial gear types currently used to harvest spiny dogfish include sink gill nets, bottom longlines, and bottom otter trawls (Table 7). Of these gear types, the bottom otter trawl is the most likely to be associated with adverse impacts to habitat since it is a bottom-tending mobile gear. The primary impact associated with this type of gear is reduction of bottom habitat complexity (Auster and Langton, 1998). Because directed fishing for spiny dogfish has effectively been eliminated in Federal waters since FY2000 (and as of FY2004, in state waters, as well), it is unlikely that the current distribution and intensity of bottom otter trawl effort is significantly influenced by the small bycatch allowance for spiny dogfish. Additionally, the protracted rebuilding period (~20 years) estimated in the latest assessment of the spiny dogfish stock, does not allow for the development of a directed spiny dogfish fishery in the near future. As such, the harvest of spiny dogfish is not directly associated with impacts on habitat, including EFH, and this is expected to continue for several more years. As long as a directed fishery for spiny dogfish does not exist, and the retention of spiny dogfish is a byproduct of the activity of other fisheries, impacts on habitat will continue to be analyzed under the management plans for those fisheries.

6.5 Fishery and Socio-economic Environment

6.5.1 Vessel Activity and Permit Information

According to unpublished NMFS permit file data, 3,025 vessels possessed federal spiny dogfish permits in 2003, while 94 of these vessels contributed to overall landings. The distribution of permitted and active vessels by home port state is given in Table 9. Most of the active vessels were from homeported in New York (42.6%), Rhode Island (19.1%), North Carolina (12.8%), and Massachusetts (11.7%), with other states comprising 13.8% of the total.

NMFS dealer report data indicate that 299 dealers possessed spiny dogfish dealer permits in FY2003, while 44 of those dealers reported buying spiny dogfish. The distribution of permitted and active dealers by state is given in Table 10. Most of the active dealers were from the states of New York (40.9%), Rhode Island (20.5%), North Carolina (13.6%), and Massachusetts (11.4%), with other states comprising 13.6% of the total.

Landings by port for FY2003 are given in Table 11. Chatham, MA accounted for the largest share of the landings (47.2%), followed by Hatteras, NC (9.5%), Other Accomac, VA (8.0%), Plymouth, MA (6.8%), Gloucester, MA (6.3%), Portsmouth, NH (4.0%), Virginia Beach/Lynnhaven, VA (3.5%), Harwichport, MA(3.2%), Little Compton, RI (2.2%), Avon, NC (2.1%), Wanchese, NC (1.8%), Seabrook, NH (1.6%), Point Judith, RI (1.4%), and all others (2.4%). The value of spiny dogfish landings by port relative to total landings value by port is given in Table 12.

6.5.2 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 McCay et al. (1993) with regard to the spiny dogfish fishery. In addition to the historic description in the FMP, the ports and communities which participated in the harvest of spiny dogfish are listed in the preceding section (6.5.1) of this EA.

7.0 ENVIRONMENTAL CONSEQUENCES – ANALYSIS OF DIRECT AND INDIRECT IMPACTS

7.1 Alternative 1 (Status Quo/New England Council Alternative - Preferred Alternative)

Specify quota for FY2005 of 4.0 million pounds and trip limits of 600 pounds for quota period 1 and 300 pounds for quota period 2 (vessels are prohibited from landing more than the specified amount in one calendar day). As per the FMP, the quota would be divided semi-annually with quota period 1 (May 1 through October 31) being allocated 57.9% of the 4,000,000 pound quota (2,316,000 pounds), and quota period 2 (November 1 through April 30) being allocated 42.1% of the 4,000,000 pound quota (1,684,000 pounds).

7.1.1 Biological Impacts of Alternative 1

Updated stock status information reviewed by the Monitoring Committee in September, 2004 indicated that the biomass of mature female spiny dogfish had not increased in 2004 compared to 2003 estimates. As such, the Monitoring Committee could find no biological justification for deviating from status quo harvest policy, which effectively eliminates directed fishing for spiny dogfish. The Committee, therefore, recommended continuation of the status quo bycatch quota (4.0 million pounds) and trip limits (600 pounds/trip in period 1 and 300 pounds/trip in period 2). The Committee acknowledged that the bycatch quota is not likely to be achieved if the recommended trip limits are applied in both state and Federal waters. The low trip limits are intended to allow for the retention of small amounts of incidentally captured spiny dogfish, while not significantly affecting total removals.

Implementation of Alternative 1, in conjunction with the ASMFC specifications for FY2005, would maintain consistent management of the Northeast Atlantic spiny dogfish stock throughout U.S. waters. This outcome is expected to 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. As such this alternative is associated with positive biological impacts.

7.1.2 Non-target Species Impacts of Alternative 1

Impacts on species other than spiny dogfish are also 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 bycatch impacts on other species. Additionally, by maintaining the status quo, Alternative 1 is not expected to increase discarding of spiny dogfish above current levels, and is, therefore, not associated with discarding impacts on spiny dogfish.

7.1.3 Impacts on Endangered Species and Other Protected Resources of Alternative 1

Alternative 1 implements the status quo for FY2005, which will maintain the elimination of the spiny dogfish fishery in Federal Waters. This action, combined with the elimination of directed dogfish fishing in state waters by the ASMFC should minimize interactions between the spiny dogfish fishery and endangered or threatened marine mammals and sea turtles. This trend should be maintained in FY2005 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. Management measures consistent with the Federal spiny dogfish rebuilding plan have eliminated directed fishing for spiny dogfish, including the gillnet fishery for spiny dogfish in North Carolina. Additionally, 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. Because no increase in the distribution or intensity of fishery effort is expected under Alternative 1, its implementation, in conjunction with the ASMFC specifications for FY2005 should maintain positive indirect benefits for endangered species and other protected resources.

7.1.4 Habitat Impacts of Alternative 1

By maintaining the status quo, which eliminates directed fishing for spiny dogfish in Federal waters, habitat impacts by commercial gear will not be directly associated with spiny dogfish harvest. This is because the bycatch allowance for spiny dogfish (600 pounds per trip in period 1 and 300 pounds per trip in period 2) is not expected to significantly affect the distribution or intensity of fishing effort. Commercial gear types currently used to harvest spiny dogfish include sink gill nets, bottom longlines, and bottom otter trawls (Table 7). Of these gear types, the bottom otter trawl is the most likely to be associated with adverse impacts to habitat since it is a bottom-tending mobile gear. The primary impact associated with this type of gear is reduction of bottom habitat complexity (Auster and Langton, 1998). In FY2003, however, this gear type was used to harvest 2.9% (90,153 pounds) of the total landings of spiny dogfish (3.14 million pounds) and 0.05% of the total bottom otter trawl landings of all species (189.67 million pounds). Because no increase in the distribution or intensity of fishery effort is expected under Alternative 1, its implementation, in conjunction with the ASMFC specifications for FY2005 should maintain positive indirect benefits on habitat, including EFH.

7.1.5 Fishery and Socioeconomic Impacts of Alternative 1

Because, under Alternative 1, the specifications would remain unchanged, revenues associated with dogfish harvest should be equivalent to the status quo, disregarding changes in market value. Note, however, that the FY2003 quota (4.00 million pounds) is 27.0% more than what was actually landed (3.14 million pounds). As such, if the entire quota is harvested, total revenues from dogfish harvest could potentially exceed status quo levels. Alternative 1, however, would also maintain status quo trip limits (600 pounds in quota period 1 and 300 pounds during quota period 2). These trip limits were recommended in order to eliminate the directed spiny dogfish fishery by minimizing the economic incentive associated with harvesting the species. If the realized harvest in FY2003 failed to achieve the specified quota due to an absence of economic interest in the fishery, then the FY2005 quota may be not be reached either. Whatever the directionality of the economic impacts may be, they are not expected to be significant under this alternative. In the longer term, Alternative 1, when compared to the other alternatives for FY2005, is associated with speedier stock recovery, which should more quickly bring about the economic and social benefits of a sustainable directed fishery.

7.2 Alternative 2 - Mid-Atlantic Council Alternative

Specify quota for FY2004 at 4.0 million pounds and trip limits of 1,500 pounds of male only spiny dogfish for quota periods 1 and 2 (i.e., a prohibition on the possession of female spiny dogfish). 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).

7.2.1 Biological Impacts of Alternative 2

Because the ASMFC established status quo trip limits for the upcoming fishing year (600 pounds in period 1 and 300 pounds in period 2), the recommended trip limit (1,500 pounds) under Alternative 2 could not be landed. As such, if this alternative is implemented, the only effective deviation from status quo harvest policy would be a prohibition on the possession of female spiny dogfish in the EEZ. Any biological impacts associated with this restriction are contingent upon socio-economic choices made by vessel operators. If the retention of spiny dogfish captured in the EEZ were to decrease, generally, then fishing mortality would also likely decrease and Alternative 2 would be associated with positive biological impacts. On the other hand, if directed fishing for male dogfish in the EEZ were to develop, then dogfish bycatch mortality, most importantly, the bycatch mortality of mature female, may increase and Alternative 2 would be associated with negative biological impacts. This latter scenario is probably less likely given the low trip limits, and generally smaller size (lower marketability) of male spiny dogfish. An additional contributing factor is the relative unimportance of spiny dogfish harvest in the EEZ. As stated in section 6.1.3.1, an estimated 1.8% of the total U.S. commercial landings were taken from the EEZ in FY2003. Given the minimal potential for deviation from status quo conditions, Alternative 2 is not expected to generate significant biological impacts.

7.2.2 Non-target Species Impacts of Alternative 2

For reasons discussed in the preceding section (7.2.1), Alternative 2 represents minimal deviation from the status quo conditions. As such, changes in the distribution or intensity of fishing effort are not expected to occur if this alternative is implemented. Therefore, no significant impacts on habitat, including EFH are likely to result from Alternative 2, relative to the status quo.

7.2.3 Habitat Impacts of Alternative 2

As stated in section 7.2.1, Alternative 2 represents minimal deviation from the status quo conditions. As such, changes in the distribution or intensity of fishing effort are not expected to occur if this alternative is implemented. Therefore, no significant impacts on habitat, including EFH are likely to result from Alternative 2, relative to the status quo.

7.2.4 Protected Resources Impacts of Alternative 2

As stated in section 7.2.1, Alternative 2 represents minimal deviation from the status quo conditions. As such, changes in the distribution or intensity of fishing effort are not expected to occur if this alternative is implemented. Therefore, no significant impacts on habitat, including EFH are likely to result from Alternative 2, relative to the status quo.

7.2.5 Fishery and Socioeconomic Impacts of Alternative 2

No gross revenue impacts are anticipated as a function of the Alternative 2 quota relative to the status quo / Alternative 1, since the recommended quotas are identical. Additionally, the potential for increases in revenue from the larger trip limit allowance is precluded by the implementation of status quo trip limits by the ASMFC. This leaves the male-only possession restriction as the only potential source of revenue impacts under Alternative 2. The likelihood of a directed male-only spiny dogfish fishery developing in the EEZ is low since the larger maximum size of female spiny dogfish makes them more generally marketable. As such, it likely that retention of spiny dogfish in the EEZ will decrease under Alternative 2. This would represent a slight loss given that an estimated 1.8% of the total FY2003 spiny dogfish landings came from the EEZ (see section 6.2). As such, it is unlikely that this alternative will produce significant revenue impacts.

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

Alternative 3 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 could not be fully exercised.

7.3.1 Biological Impacts of Alternative 3

Under Alternative 3, 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 exceed the rebuilding fishing mortality rate (0.3) as well as the fishing mortality rate necessary for maximum yield (~0.08-0.11). Fishing mortality rates in excess of 0.11 on the mature female stock are expected to result in long term decline of the resource. Alternative 3 is also expected to result in negative impacts for non-target species incidentally taken in the directed spiny dogfish fishery.

7.3.2 Habitat Impacts of Alternative 3

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 (e.g., bottom otter trawls) and the probability of fishing gear impacts to EFH relative to the status quo/Alternative 1. These impacts would likely be concentrated in areas of the EEZ where the historic spiny dogfish fishery occurred. As indicated in Section 2.3.1 of the FMP, spiny dogfish fishery activity was widespread along the Atlantic Coast; however, specific locations in the EEZ could not be characterized from available fishery data.

7.3.3 Protected Resources Impacts of Alternative 3

Because Alternative 3 would allow the resumption of the spiny dogfish fishery to its previous (unregulated) levels in FY2005, 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 6.3.

7.3.4 Fishery and Socioeconomic Impacts of Alternative 3

Given that no quota is specified in Alternative 3, landings are expected to return to the levels approximately equal to those observed in the unregulated period of the fishery (about 25 million pounds). This would constitute a 525% increase in landings compared to the status quo (4.0 million pounds) and a 696% increase in landings compared to actual FY2003 landings (3.14 million pounds). Although the short-term social and economic benefits of an unregulated fishery would be much greater than those associated with Alternatives 1 and 2, fishing mortality is expected to rise above the threshold level that allows the stock to replace itself 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.

7.4 Cumulative Impacts

7.4.1 Introduction; Definition of Cumulative Effects

This section analyzes and discusses the significance of the cumulative impacts of the proposed alternatives. 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. To the degree to which this regulatory regime is complied with, the cumulative impacts of past, present, and future Federal fishery management actions on the spiny dogfish stock should generally be positive. This specifications package serves to analyze and discuss the significance to the human environment of impacts that may result from the various Federal management measures proposed herein. Consideration is given to the relative probability that each 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 Cumulative Impacts Section specifically considers the proposed management alternatives in the context of the cumulative impacts of past, present and reasonably foreseeable future actions. The analysis is generally qualitative in nature because of the limitations of determining effects over the large geographic areas under consideration.

Temporal and Geographic Scope of the Cumulative Impacts Analysis In terms of past actions for fisheries, habitat and socioeconomic impacts, the temporal scope of this analysis is primarily focused on actions that have taken place since the early 1990s, when the directed U.S. spiny dogfish commercial fishery began its rapid expansion. For endangered and other protected species, the context is largely focused on the 1980s and 1990s, when NMFS began generating stock assessments for marine mammals and turtles that inhabit waters of the U.S. EEZ. In terms of future actions, the analysis considers the period between the effective date for these specifications (May 1, 2005) and the year by which the stock is currently expected to be fully recovered (2025).

The geographic scope of the analysis of impacts to fish species and habitat for this action is the range of the fisheries in the Western Atlantic Ocean, as described in the Affected Environment and Environmental Consequences sections of the document (Sections 6.0 and 7.0). For endangered and protected species the geographic range is the total range of each species (Appendix). The geographic range for socioeconomic impacts is defined as those fishing communities bordering the range of the commercial spiny dogfish fishery (Sections 6.5.1 and 6.5.2) from the U.S.-Canada border to, and including, North Carolina.

Non-Fishing Activities Cumulative impacts from non-fishing activities such as pollution, loss of coastal wetlands, marine transportation, and marine mining pose a risk to the spiny dogfish resource. These impacts are most likely to occur indirectly through habitat degradation. As indicated in the FMP, EFH for both juvenile and adult spiny dogfish is widespread, and includes generally all continental shelf waters from the Gulf of Maine to Cape Canaveral, Florida. Additionally, no habitat areas of particular concern (HAPC) have been identified to date for spiny dogfish. Nevertheless, the potential for adverse impacts to spiny dogfish and spiny dogfish EFH should coincide with wherever human induced disturbances are occurring. Activities of concern may include chemical pollutants, sewage, changes in water temperature, salinity and dissolved oxygen, suspended sediment and activities that involve dredging and the disposal of dredged material. Non-fishing activities generally tend to be concentrated in nearshore areas. Wherever these activities co-occur, they are likely to work synergistically to decrease habitat quality and may indirectly constrain population recovery. The degree to which this is occurring is currently unknown and/or unquantifiable.

7.4.2 Target Fishery Impacts

The Federal spiny dogfish FMP eliminated directed fishing for spiny dogfish in Federal water, greatly reducing fishing mortality and halting the decline in female spawning stock biomass. Following the initiation of Federal management of spiny dogfish, increased activity by the Canadian dogfish fishery and inconsistent harvest policy in state waters constrained the Federal recovery plan from succeeding in the manner that had been originally envisioned. Recovery to 90% of SSB_{max} was expected by the 2004 fishing year, however, the 2004 update to the status of the stock indicated that biomass is currently about 30% of SSB_{max}. Recent population projections suggest a time span of 15 to 20 years before the stock will fully recover. These projections include the assumption that status quo levels of discarding and recreational removals will be maintained (proportionally) throughout the rebuilding period. Nevertheless, as a result of past actions (implementation of the Federal FMP and, more recently, extension of the rebuilding plan into state waters), fishing mortality on mature female dogfish dropped from around 0.30 in 1998 to about 0.04 in 2003. Therefore, although the rebuilding goals in the Federal FMP have not been fully achieved, the additive effects of past management actions have directly benefited the spiny dogfish stock. This effect is expected to continue as the stock recovers.

7.4.3 Non-target Species Impacts

The establishment of the Federal spiny dogfish FMP, which eliminated the directed spiny dogfish fishery in Federal waters, is associated with positive indirect impacts on non-target species. At the present time the spiny dogfish is itself a non-target species, the landing of which is a byproduct of the activity of other fishery operations. At present, participants in these other fisheries may obtain a Federal permit that will allow them to retain and sell small amounts of incidentally captured spiny dogfish. The current bycatch allowance is 600 pounds per trip in quota period 1 (May 1 – Oct 31) and 300 pounds per trip in quota period 2 (Nov 1 – Apr 30) which is applied throughout U.S. waters (state and Federal). There are no known plans to investigate methods to decrease spiny dogfish bycatch in other fisheries. Given the protracted rebuilding period estimated in the latest stock assessment (~20 years), the corresponding management advice does not allow for the development of a directed spiny dogfish fishery in the near future. To the extent that harvest policy consistent with that advice is implemented, a directed fishery for spiny dogfish is not likely to return in the near future. As such, positive indirect impacts on non-target species as a result of spiny dogfish harvest policy are expected to continue for several years.

7.4.4 Endangered and Other Protected Species Impacts

The North Carolina gillnet fishery for spiny dogfish was historically important in the incidental capture of both sea turtles and Atlantic bottlenose dolphins. Management measures consistent with the Federal spiny dogfish rebuilding plan, have eliminated of directed fishing for spiny dogfish, including the gillnet fishery for spiny dogfish in North Carolina. Additionally, protective measures under the Harbor Porpoise Take Reduction Plan (HPTRP) in combination with Federal spiny dogfish harvest policy have been sufficient to reduce the fishery interactions with harbor porpoises below PBR levels. The impacts of these past management actions can be characterized as indirect and positive in that they have potentially reduced mortality for these species that was previously associated with the spiny dogfish fishery. The dominant gear types currently associated with the retention of spiny dogfish (sink gill nets and bottom long lines) are used by several fisheries identified in the List of Fisheries for 2004 (69 CFR 48407). Sink gill nets are deployed in two Category I fisheries: "mid-Atlantic coastal gillnet" and "Northeast sink gillnet", while bottom long lines are deployed by a Category III fishery: "Gulf of Maine tub trawl groundfish bottom longline / hook and line". Because directed fishing for spiny dogfish has effectively been eliminated in Federal waters since FY2000 (and as of FY2004, in state waters, as well), it is unlikely that the current distribution and intensity of fishing effort by these gear types is significantly influenced by the small bycatch allowance for spiny dogfish. Additionally, the protracted rebuilding period (~20 years) estimated in the latest assessment of the spiny dogfish stock, does not allow for the development of a directed spiny dogfish fishery in the near future. As such, positive indirect impacts on endangered and other protected species as a result of spiny dogfish harvest policy are expected to continue for several more years.

7.4.5 Habitat Impacts

Commercial gear types historically used to harvest spiny dogfish include sink gill nets, bottom longlines, and bottom otter trawls. Of these gear types, the bottom otter trawl is the most likely to be associated with adverse impacts to habitat since it is a bottom-tending mobile gear. The primary impact associated with this type of gear is reduction of bottom habitat complexity (Auster and Langton, 1998). Prior to the implementation of the Federal Spiny dogfish FMP, bottom otter trawls were an important component of the directed fishery, for example, harvesting as much as 30% of the annual landings in 1999. In FY2003, however, bottom otter trawls contributed less than 3% of the total commercial landings (Table 7). More importantly, as stated throughout this document, directed fishing for spiny dogfish has effectively been eliminated in Federal waters since FY2000, and as of FY2004, in state waters, as well. As such, it is unlikely that the current distribution and intensity of bottom otter trawl effort is significantly influenced by the small bycatch allowance for spiny dogfish. Additionally, the protracted rebuilding period (~20 years) estimated in the latest assessment of the spiny dogfish stock, does not allow for the development of a directed spiny dogfish fishery in the near future. Therefore, positive indirect impacts by the spiny dogfish fishery on habitat, including EFH is expected to continue for several more years.

7.4.6 Fishery and Socioeconomic Impacts

As a result of the implementation of the spiny dogfish FMP, indirect negative effects have been incurred by the socioeconomic sector of the environment through loss of revenue to fishermen and decreased export revenue to wholesalers. These negative indirect effects are expected to be ameliorated as recovery of the spiny dogfish stock proceeds. Under the proposed alternative, the specifications would remain unchanged; therefore, revenues associated with dogfish harvest should not change in the near term relative to the status quo, disregarding changes in market value. Nevertheless, a sustainable directed fishery is not expected to occur for several more years given the protracted rebuilding period (~20 years) estimated in the latest assessment of the spiny dogfish stock.

7.4.7 Summary/Conclusions

Alternative 1 (Status Quo / Preferred Alternative) is the most restrictive of the proposed alternatives and while it may have the most positive indirect impacts on the physical and biological environment, it is also associated with the greatest direct short-term socioeconomic cost. This cost however is not considered significant since it is consistent with the Federal status quo for the last four fishing years (FY2000 - FY2003) and since the vast majority of spiny dogfish revenue comes from harvest that occurs in state waters.

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. Prior to FY2004, divergent state water harvest policy constrained the Federal spiny dogfish stock recovery plan. For both FY2004, and FY2005, however, the ASMFC specified reducing their overall quota and trip limits to levels consistent with Alternative 1 in this document. In that context, the recent ASMFC actions are consistent with the original management approach in Federal waters and should accelerate achievement of Federal FMP objectives. 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 98.1% of spiny dogfish harvest in FY2003 came from state waters, the relative importance of spiny dogfish harvest in the EEZ is low. As such, additive impacts of the Federal actions proposed in this document are not considered significant.

8.0 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). Currently bottom otter trawls are relatively unimportant in the harvest of spiny dogfish. Dominant gear types are sink gillnets (46.3% of FY2003 landings) and bottom longlines (45.8% of FY2003 landings). Gear used by the gillnet and bottom longline fisheries are not expected to significantly impact essential fish habitat.

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 1,2) are also expected to indirectly benefit EFH by maintaining the reductions in disturbance to bottom habitats.

9.0 APPLICABLE LAWS

9.1 Magnuson-Stevens Fishery Conservation and Management Act (MSA)

The proposed specifications for the spiny dogfish fishery implement the requirements of the Spiny Dogfish FMP, which established the specification process and its related requirements. The Spiny Dogfish FMP was found to be in compliance with the National Standards and other required provisions of the MSFCMA. Nothing related to the proposed specifications for the 2005 fishing year changes this determination.

9.2 NEPA

9.2.1 Finding of No Significant Environmental Impact (FONSI)

NOAA Administrative Order 216-6 provides guidance for the determination of significance of the impacts resulting from the management measures contained in fishery management plans, their amendments, and framework adjustments. The nine criteria to be considered are addressed below:

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

The proposed 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 currently utilized to harvest spiny dogfish are gillnets and bottom longlines which are not expected to produce damage to bottom habitats. This is expected to be maintained under the proposed action. As such, the proposed action is not expected to have negative impacts on EFH.

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 FY2005.

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 7.0 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 seventh 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 6.1.2 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 2004 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 quotas for FY2005; however, the Mid-Atlantic Council recommended larger trip limits (1,500 pounds) than the New England Council (600/300 pounds). In addition, state managers (the ASMFC) recently specified management measures for FY2005 that are equivalent to the Federal FY2004 status quo (trip limits of 600 ad 300 pounds in periods 1 and 2, respectively and quota of 4.0 million pounds). The mid-Atlantic Council's recommended trip limit were intended to accommodate requirements by the processing sector for higher volumes of dogfish, while the New England Council and 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 3 (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 some 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 2005 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____

9.3 Marine Mammal Protection Act

The MAFMC has reviewed the impacts of the 2005 spiny dogfish specifications on marine mammals and has concluded that the management actions proposed are consistent with the provisions of the MMPA, and will not alter existing measures to protect the species likely to inhabit the spiny dogfish management unit. For further information on the potential impacts of the fishery and the proposed management action on marine mammals, see Section 7.1 of this document.

9.4 Endangered Species Act

Section 7 of the Endangered Species Act requires federal agencies conducting, authorizing or funding activities that affect threatened or endangered species to ensure that those effects do not jeopardize the continued existence of listed species. The MAFMC has concluded, using information available at this writing, that the proposed spiny dogfish specifications is not likely to jeopardize any ESA-listed species or alter or modify any critical habitat, based on the discussion of impacts in this document (Section 7.1).

9.5 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 December 2, 2004, under section 307 of the Coastal Zone Management Act.

9.6 Administrative Procedures Act

The Council is not requesting relief from the requirements of the APA for notice and comment rulemaking.

9.7 Data Quality Act

Pursuant to NOAA Fisheries guidelines implementing Section 515 of Public Law 106-554 (Data Quality Act), all information products released to the public must first undergo a Pre-Dissemination Review to ensure and maximize the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by Federal agencies. The following section addresses these requirements.

Utility

Utility means that disseminated information is useful to its intended users. “Useful” means that the content of the information is helpful, beneficial, or serviceable to its intended users, or that the information supports the usefulness of other disseminated information by making it more accessible or easier to read, see, understand, obtain or use. The intended users of the information contained in this document are participants in the spiny dogfish fishery and other interested parties and members of the general public. The information contained in this document may be useful to owners of vessels holding a spiny dogfish permit as well as spiny dogfish dealers and processors since it serves to notify these individuals of any potential changes to management measures for the fishery. This information will enable these individuals to adjust their fishing practices and make appropriate business decisions based on the new management measures and corresponding regulations.

The information being provided in this specifications package concerning the status of the spiny dogfish fishery is updated based on landings and effort information through the 2003 fishing year (May 1, 2003 – April 30, 2004). Information presented in this document is intended to support the proposed specifications for the 2005 fishing year, which have been developed through a multi-stage process involving all interested members of the public. Consequently, the information pertaining to management measures contained in this document has been improved based on comments from the public, fishing industry, members of the Council, and NOAA Fisheries.

The media being used in the dissemination of the information contained in this document will be contained in a Federal Register notice announcing the proposed and final rules for this action. This information will be made available through printed publication and on the Internet website for the Northeast Regional Office (NERO) of NOAA Fisheries.

Integrity

Integrity refers to security – the protection of information from unauthorized access or revision, to ensure that the information is not compromised through corruption or falsification. Prior to dissemination, NOAA information, independent of the intended mechanism for distribution, is safeguarded from improper access, modification, or destruction, to a degree commensurate with the risk and magnitude of harm that could result from the loss, misuse, or unauthorized access to or modification of such information.

Objectivity
Objective information is presented in an accurate, clear, complete, and unbiased manner, and in proper context. The substance of the information is accurate, reliable, and unbiased; in the scientific, financial, or statistical context, original and supporting data are generated and the analytical results are developed using sound, commonly-accepted scientific and research methods. "Accurate" means that information is within an acceptable degree of imprecision or error appropriate to the particular kind of information at issue and otherwise meets commonly accepted scientific, financial, and statistical standards.

Several sources of data were used in the development of this document, including the analysis of potential impacts. These data sources include, but are not limited to: landings data from vessel trip reports, landings data from individual voice reports, information from resource trawl surveys, data from the dealer weighout purchase reports, and ex-vessel price information. Although there are some limitations to the data used in the analysis of impacts of management measures and in the description of the affected environment, these data are considered to be the best available.

The policy choices (i.e., management measures) proposed in this specifications package are supported by the best available scientific information. Qualitative discussion is provided in cases where quantitative information was unavailable, utilizing appropriate references as necessary.

The review process for any action under an FMP involves the Northeast Regional Office (NERO) of NOAA Fisheries, the Northeast Fisheries Science Center (Center), and NOAA Fisheries Headquarters (Headquarters). The Council review process involves public meetings at which affected stakeholders have the opportunity to provide comments on the proposed changes to the FMP. Reviews by staff at NERO are conducted by those with expertise in fisheries management and policy, habitat conservation, protected species, and compliance with the applicable law. The Center's technical review is conducted by senior-level scientists with specialties in population dynamics, stock assessment methodology, fishery resources, population biology, and the social sciences.

Final approval of this specification package and clearance of the proposed and final rules is conducted by staff at NOAA Fisheries Headquarters, the Department of Commerce, and the U.S. Office of Management and Budget. This review process is standard for any action under an FMP, and provides input from individuals having various expertise who may not have been directly involved in the development of the proposed action. Thus, the review process for any FMP modification, including the herring specifications for the 2005 (and possibly 2006) fishing year, is performed by technically-qualified individuals to ensure the action is valid, complete, unbiased, objective, and relevant.

9.8 Paperwork Reduction Act

The proposed contains no new or additional collection-of-information requirements.

9.9 Impacts Relative to Federalism/E.O. 13132

The Executive Order on Federalism established nine fundamental federalism principles to which Executive agencies must adhere in formulating and implementing policies having federalism implications. The E.O. also lists a series of policy making criteria to which agencies must adhere when formulating and implementing policies that have federalism implications. However, no federalism issues or implications have been identified relative to the proposed action.

The proposed action does not contain policies with federalism implications sufficient to warrant preparation of an assessment under E.O. 13132. The affected States have been closely involved in the development of the proposed specifications through their involvement in the Regional Fishery Management Council process (i.e., all affected states are represented as voting members on at least one Council). The proposed specifications were developed with the full participation and cooperation of the state representatives of the Mid-Atlantic Council and the New England Council. No comments were received from any state officials relative to any federalism implications of the proposed specifications.

9.10 Environmental Justice/E.O. 12898

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. E.O. 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 7.0). 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.

9.11 Regulatory Flexibility Act/E.O. 12866

9.11.1 Regulatory Impact Review and Initial Regulatory Flexibility Analysis (IRFA)

This section provides the analysis and conclusions to address the requirements of Executive Order 12866 and the Regulatory Flexibility Act (RFA). Since many of the requirements of these mandates duplicate those required under the Magnuson-Stevens Act and NEPA, this section contains references to other sections of this document. The following sections provide the basis for concluding that the proposed action is not significant under E.O. 12866 and will not have a significant economic impact on a substantial number of small entities under the RFA.

9.11.2 Description of Management Objectives

The goals and objectives of the management plan for the Atlantic herring resource are stated in Section 1.1.3 of the spiny dogfish FMP. The proposed action is consistent with, and does not modify those goals and objectives.

9.11.3 Description of the Fishery

Section 2.3 of the spiny dogfish FMP contains a detailed description of the historic spiny dogfish fishery. Updated fishery activity is given in Section 6.5 of this document.

9.11.4 Statement of the Problem

The purpose and need for this action is identified in Section 4.1 of this document. The spiny dogfish FMP requires that the Councils and the Regional Administrator annually review the best available stock and fishery data when developing specifications for the upcoming fishing year.

9.11.5 Description of the Alternatives

Alternative 1 – (Status Quo/New England Council Alternative - Preferred Alternative)

Specify quota for FY2005 at 4.0 million pounds and trip limits of 600 pounds for quota period 1 and 300 pounds for quota period 2 (vessels are prohibited from landing more than the specified amount in one calendar day). 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).

Alternative 2 – (Mid-Atlantic Council Alternative)

Specify quota for FY2005 at 4.0 million pounds and trip limits of 1,500 pounds of male only spiny dogfish for quota periods 1 and 2 (i.e., a prohibition on the possession of female spiny dogfish). 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).

Alternative 3 - (No Action Alternative)
No specified quota or trip limits for FY2005. Alternative 4 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).

9.11.6 Economic Analysis

The economic impacts of the proposed actions are discussed in Section 7.0 of this document. In general, no economic impacts are expected because the proposed actions that are consistent with the goals of the FMP (Alternatives 1, 2) should maintain the status quo. The economic impacts of Alternative 3 are discussed in Section 7.3.5 of this document.

9.11.7 Determination of Significance under E.O. 12866

NMFS Guidelines provide criteria to be used to evaluate whether a proposed action is significant. A significant regulatory action means any regulatory action that is likely to result in a rule that may:

1. Have an annual effect on the economy of $100 million or more, or adversely effect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local or tribal governments or communities.

The proposed action will not have an effect on the economy in excess of $100 million. The proposed action is not expected to have any adverse impacts on the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local or tribal governments or communities.

2. Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency.

The proposed action will not create a serious inconsistency with 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 fishery in the EEZ.

3. Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof.

The proposed action will not materially alter the budgetary impact of entitlements, grants, user fees or loan programs, or the rights and obligations of their participants.

4. Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

The proposed action does not raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in E.O. 12866.

9.11.8 Initial Regulatory Flexibility Analysis

The following sections contain analyses of the effect of the proposed action on small entities. Under Section 603(b) of the RFA, each initial regulatory flexibility analysis is required to address:

1. Reasons why the agency is considering the action,
2. The objectives and legal basis for the proposed rule,
3. The kind and number of small entities to which the proposed rule will apply,
4. The projected reporting, record-keeping and other compliance requirements of the proposed rule, and
5. All Federal rules that may duplicate, overlap or conflict with the proposed rule.

9.11.9 Reasons for Considering the Action

The purpose and need for this action is identified in Section 4.1 of this document. The spiny dogfish FMP requires that the Council and the Regional Administrator annually review the best available stock and fishery data when developing specifications for the upcoming fishing year.

9.11.10 Objectives and Legal Basis for the Action

The objective of the proposed action is to implement specifications for the 2005 spiny dogfish fishery, as required under the regulations implementing the spiny dogfish FMP, which are provided in 65 CFR 1557.

9.11.11 Description and Number of Small Entities to Which the Rule Applies

All of the potentially affected businesses are considered small entities under the standards described in NOAA Fisheries guidelines because they have gross receipts that do not exceed $3.5 million annually. A discussion of vessel activity during the 2003 fishing year is given in Section 6.5.1 of this document.

9.11.12 Recordkeeping and Reporting Requirements

The proposed action does not introduce any new reporting, recordkeeping, or other compliance requirements.

9.11.13 Duplication, Overlap, or Conflict with Other Federal Rules

The proposed action does not duplicate, overlap or conflict with any other Federal rules.

9.11.14 Economic Impacts on Small Entities

Section 7.0 of this document contains the economic analysis of the alternatives that were considered during the specification process.

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11.0 LIST OF AGENCIES AND PERSONS CONSULTED

This document was prepared by the Mid-Atlantic Fishery Management Council in consultation with the National Marine Fisheries Service and the New England Fishery Management Council.

Members of the Spiny Dogfish Monitoring Committee include:

James Armstrong, MAFMC Staff, Monitoring Committee Chair
Paul Rago, NEFSC Population Dynamics Branch
Eric Dolin, NMFS NERO
Chris Batsavage, North Carolina DMF
Jim Casey, Maryland DNR
Chris Hickman, North Carolina ex-officio industry advisor
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Jack Musick, Virginia Institute of Marine Sciences
Paul Parker, Massachusetts ex-officio industry advisor
Christopher Powell, Rhode Island DFW

Members of the Joint Spiny Dogfish Committee include:

Red Munden (Chair) MAFMC
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Bruce Freeman MAFMC
Dave Goethel NEFMC
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John W. Pappalardo NEFMC
James A. Ruhle, Sr. MAFMC
John C. Williamson NEFMC

In addition, the following organizations/agencies were consulted during the development of the spiny dogfish specifications, either through direct communication/correspondence and/or participation in Council public meetings:

NOAA Fisheries, National Marine Fisheries Service, Northeast Regional Office, Gloucester MA
Northeast Fisheries Science Center, Woods Hole MA
Atlantic States Marine Fisheries Commission
The Ocean Conservancy

Letters were also sent to the potentially-affected States for the purposes of reviewing the consistency of the proposed action relative to each State's Coastal Zone Management Program (see Section 7.7 of this document for a list of States that were contacted).

APPENDIX

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. 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 (Waring et al. 2002).

The north Atlantic right whale has the highest risk of extinction among all of the large whales in the world's oceans. The scarcity of right whales is the result of an 800-year history of whaling that continued into the 1960s (Klumov 1962). Historical records indicate that right whales were subject to commercial whaling in the North Atlantic as early as 1059. Between the 11th and 17th centuries, an estimated 25,000-40,000 right whales may have been harvested. The size of the western north Atlantic right whale population at the termination of whaling is unknown, but the stock was recognized as seriously depleted as early as 1750. However, right whales continued to be taken in shore-based operations or opportunistically by whalers in search of other species as late as the 1920's. 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; Waring et al. 2002).

Right whales appear to prefer shallow coastal waters, but their distribution is also strongly correlated to the distribution of their prey (zooplankton). In both the northern and southern hemispheres, right whales are observed in the lower latitudes and more coastal waters during winter where calving takes place, and then tend to migrate to higher latitudes during the summer. The distribution of right whales in summer and fall in both hemispheres appears linked to the distribution of their principal zooplankton prey (Winn et al. 1986). They generally occur in Northwest Atlantic waters west of the Gulf Stream and are most commonly associated with cooler waters (21º C). They are not found in the Caribbean and have been recorded only rarely in the Gulf of Mexico.

Right whales feed on zooplankton through the water column, and in shallow waters may feed near the bottom. In the Gulf of Maine they have been observed feeding on zooplankton, primarily copepods, by skimming at or below the water's surface with open mouths (NMFS 1991b; Kenney et al. 1986; Murison and Gaskin 1989; and Mayo and Marx 1990). Research suggests that right whales must locate and exploit extremely dense patches of zooplankton to feed efficiently (Waring et al. 2000). New England waters include important foraging habitat for right whales and at least some portion of the North Atlantic right whale population is present in these waters throughout most months of the year. They are most abundant in Cape Cod Bay between February and April

(Hamilton and Mayo 1990; Schevill et al. 1986; Watkins and Schevill 1982) and in the Great South Channel in May and June (Payne et al. 1990) where they have been observed feeding predominantly on copepods, largely of the genera Calanus and Pseudocalanus (Waring et al. 2002). Right whales also frequent Stellwagen Bank and Jeffrey's Ledge, as well as Canadian waters including the Bay of Fundy and Browns and Baccaro Banks, in the spring and summer months. Mid-Atlantic waters are used as a migratory pathway from the spring and summer feeding/nursery areas to the winter calving grounds off the coast of Georgia and Florida.

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. In 1993, Canada's Department of Fisheries declared two conservation areas for right whales; one in the Grand Manan Basin in the lower Bay of Fundy, and a second in Roseway Basin between Browns and Baccaro Banks (Canadian Recovery Plan for the North Atlantic Right Whale 2000).

The northern right whale was listed as endangered throughout its 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 PBR.

The western North Atlantic population of right whales was estimated to be 291 individuals in 1998 (Waring et al. 2002). The current population growth rate of 2.5% as reported by Knowlton et al. (1994) suggests the stock may be showing signs of slow recovery. The best available information makes it reasonable to conclude that the current death rate exceeds the birth rate in the western North Atlantic right whale population. The nearly complete reproductive failure in this population from 1993 to 1995 and again in 1998 and 1999 suggests that this pattern has continued for almost a decade, though the 2000/2001 season appears the most promising in the past 5 years, in terms of calves born. Because no population can sustain a high death rate and low birth rate indefinitely, this combination places the North Atlantic right whale population at high risk of extinction. Coupled with an increasing calving interval, the relatively large number of young right whales (0-4 years) and adults that are killed, by human-related factors, the likelihood of extinction is high. The recent increase in births gives rise to optimism, however these young animals must be provided with protection so that they can mature and contribute to future generations in order to be a factor in stabilizing of the population.

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 its 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 Jeffrey's 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).

Various papers (Barlow & Clapham 1997; Clapham et al. 1999) summarized information gathered from a catalogue of photographs of 643 individuals from the western North Atlantic population of humpback whales. These photographs identified reproductively mature western North Atlantic humpbacks wintering in tropical breeding grounds in the Antilles, primarily on Silver and Navidad Banks, north of the Dominican Republic. The primary winter range also includes the Virgin Islands and Puerto Rico (Waring et al. 2002). In general, it is believed that calving and copulation take place on the winter range. Calves are born from December through March and are about 4 meters at birth. Sexually mature females give birth approximately every 2 to 3 years. Sexual maturity is reached between 4 and 6 years of age for females and between 7 and 15 years for males. Size at maturity is about 12 meters.

Humpback whales use the mid-Atlantic as a migratory pathway, but it may also be an important feeding area for juveniles. Since 1989, observations of juvenile humpbacks in the mid-Atlantic have been increasing during the winter months, peaking January through March (Swingle et al. 1993). Biologists speculate that non-reproductive animals may be establishing a winter feeding range in the mid-Atlantic since they are not participating in reproductive behavior in the Caribbean. Swingle et al. (1993) identified a shift in distribution of juvenile humpback whales in the nearshore waters of Virginia, primarily in winter months. Those whales using this mid-Atlantic area that have been identified were found to be residents of the GOM and Atlantic Canada (Gulf of St. Lawrence and Newfoundland) feeding groups, suggesting a mixing of different feeding stocks in the mid-Atlantic region. A shift in distribution may be related to winter prey availability. Studies conducted by the Virginia Marine Science Museum indicate that these whales are feeding on, among other things, bay anchovies and menhaden. In concert with the increase in mid-Atlantic whale sightings, strandings of humpback whales have increased between New Jersey and Florida since 1985. Strandings were most frequent during September through April in North Carolina and Virginia waters, and were composed primarily of juvenile humpback whales of no more than 11 meters in length (Wiley et al. 1995). Six of 18 humpbacks for which the cause of mortality was determined were killed by vessel strikes. An additional humpback had scars and bone fractures indicative of a previous vessel strike that may have contributed to the whale's mortality. Sixty percent of those mortalities that were closely investigated showed signs of entanglement or vessel collision.

New information has recently become available on the status and trends of the humpback whale population in the North Atlantic. Although current and maximum net productivity rates are unknown at this time, the population is apparently increasing. It has not yet been determined whether this increase is uniform across all six feeding stocks (Waring et al. 2002). For example, the overall rate of increase has been estimated at 9.0% (CV=0.25) by Katona and Beard (1990), while a 6.5% rate was reported for the Gulf of Maine by Barlow and Clapham (1997) using data through 1991. The rate reported by Barlow and Clapham (1997) may roughly approximate the rate of increase for the portion of the population within the action area.

Estimating abundance for the Gulf of Maine stock has proved problematic. Three approaches have been investigated: mark-recapture estimates, minimum population size, and line-transect estimates. Most of the mark recapture estimates were affected by heterogeneity of sampling, which was heavily focused on the southwestern Gulf of Maine. However, an estimate of 652 (CV=0.29) derived from the more extensive and representative YONAH sampling in 1992 and 1993 was probably less subject to this bias. The second approach uses photo-identification data to establish the minimum number of humpback whales known to be alive in a particular year, 1997. By determining the number of identified individuals seen either in that year, or in both a previous and subsequent year, it is possible to determine that at least 497 humpbacks were alive in 1997. This figure is also likely to be negatively biased, again because of heterogeneity of sampling. A similar calculation for 1992 (which would correspond to the YONAH estimate for the Gulf of Maine) yields a figure of 501 whales (Waring et al. 2002).

In the third approach, data were used from a 28 July to 31 August 1999 line-transect sighting survey conducted by a ship and airplane covering waters from Georges Bank to the mouth of the Gulf of St. Lawrence. Total track line length was 8,212 km. However, in light of the information on stock identity of Scotian Shelf humpback whales noted above, only the portions of the survey covering the Gulf of Maine were used; surveys blocks along the eastern coast of Nova Scotia were excluded. Shipboard data were analyzed using the modified direct duplicate method (Palka 1995) that accounts for school size bias and g(0), the probability of detecting a group on the track line. Aerial data were not corrected for g(0) (Palka 2000). These surveys yielded an estimate of 816 humpbacks (CV = 0.45). However, given that the rate of exchange between the Gulf of Maine and both the Scotian Shelf and mid-Atlantic region is not zero, this estimate is likely to be somewhat conservative. Accordingly, inclusion of data from 25% of the

Scotian Shelf survey area (to reflect the match rate of 25% between the Scotian Shelf and the Gulf of Maine) gives an estimate of 902 whales (CV=0.41). Since the mark-recapture figures for abundance and minimum population size given above falls above the lower bound of the CV of the line transect estimate, and given the known exchange between the Gulf of Maine and the Scotian Shelf, we have chosen to use the latter as the best estimate of abundance for Gulf of Maine humpback whales (Waring et al. 2002).

The minimum population estimate is the lower limit of the two-tailed 60% confidence interval of the lognormally distributed best abundance estimate. This is equivalent to the 20th percentile of the log-normal distribution as specified by Wade and Angliss (1997). The best estimate of abundance for Gulf of Maine humpback whales is 902 (CV=0.41). The minimum population estimate for this stock is 647 (Waring et al. 2002).

As detailed below, current data suggest that the Gulf of Maine humpback whale stock is steadily increasing in size. This is consistent with an estimated average trend of 3.2% (SE=0.005) in the North Atlantic population overall for the period 1979–1993 (Stevick et al. 2001), although there are no other feeding-area-specific estimates. Barlow and Clapham (1997) applied an interbirth interval model to photographic mark-recapture data and estimated the population growth rate of the Gulf of Maine humpback whale stock at 6.5% (CV=0.012). Maximum net productivity is unknown for this population, although a theoretical maximum for any humpback population can be calculated using known values for biological parameters (Brandão et al. 2000, Clapham et al. 2001b). For the Gulf of Maine, data supplied by Barlow and Clapham (1997) and Clapham et al. (1995) gives values of 0.96 for survival rate, 6y as mean age at first parturition, 0.5 as the proportion of females, and 0.42 for annual pregnancy rate. From this, a maximum population growth rate of 0.072 is obtained according to the method described by Brandão et al. (2000). This suggests that the observed rate of 6.5% (Barlow and Clapham 1997) was close to the maximum for this stock. Clapham et al. (2001a) updated the Barlow and Clapham (1997) analysis using data from the period 1992 to 2000. The estimate was either 0% (for a calf survival rate of 0.51) or 4.0% (for a calf survival rate of 0.875). Although confidence limits are not available (because maturation parameters could not be estimated), both estimates of population growth rate are outside the 95% confidence intervals of the previous estimate of 6.5% for the period 1979 to 1991 (Barlow and Clapham 1997). It is unclear whether this apparent decline is an artifact resulting from a shift in distribution; indeed, such a shift occurred during exactly the period (1992-95) in which survival rates declined. It is possible that this shift resulted in calves born in those years imprinting on (and thus subsequently returning to) areas other than those in which intensive sampling occurs. If the decline is a real phenomenon it may be related to known high mortality among young-of-the-year whales in the waters of the U.S. mid-Atlantic states. However, calf survival appears to have increased since 1996, presumably accompanied by an increase in population growth. In light of the uncertainty accompanying the more recent estimate of population growth rate for the Gulf of Maine, for purposes of this assessment the maximum net productivity rate was assumed to be the default value for cetaceans of 0.04 (Barlow et al. 1995). Current and maximum net productivity rates are unknown for the North Atlantic population overall (Waring et al. 2002). As noted above, Stevick et al.

(2001) calculated an average population growth rate of 3.2% (SE=0.005) for the period 1979–1993.

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 647 . The maximum productivity rate is the default value of 0.04. 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 0.10 because this stock is listed as an endangered species under the ESA. PBR for the Gulf of Maine humpback whale stock is 1.3 whales (Waring et al. 2002).

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. Several whales have apparently been entangled on more than one occasion. These estimates are based on sightings of free-swimming animals that initially survive the encounter. Because some whales may drown immediately, the actual number of interactions may be higher. In addition, the actual number of species-gear interactions is contingent on the intensity of observations from aerial and ship surveys.

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). This average is derived from two components: 1) incidental fishery interaction records, 2.8 (USA waters, 2.2; Canadian waters, 0.6); and 2) records of vessel collisions, 0.2 (USA waters, 0.2; Canadian waters, 0). There were additional humpback mortalities and serious injuries that occurred in the southeastern and mid-Atlantic states that could not be confirmed as involving members of the Gulf of Maine stock (Waring et al. 2002). These records represent an additional minimum annual average of 1.6 human-caused mortalities and serious injuries to humpbacks over the time period, of which 1.0 per year are attributable to incidental fishery interactions and 0.6 per year are attributable to vessel collisions (Waring et al. 2002).

As with right whales, human impacts (vessel collisions and entanglements) are factors which may be slowing recovery of the humpback whale population. There is an average of four to six entanglements of humpback whales a year in waters of the southern Gulf of Maine and additional reports of vessel-collision scars (unpublished data, Center for Coastal Studies). Of 20 dead humpback whales (principally in the mid-Atlantic, where decomposition did not preclude examination for human impacts), Wiley et al. (1995) reported that 6 (30%) had major injuries possibly attributable to ship strikes, and 5 (25%) had injuries consistent with possible entanglement in fishing gear. One whale displayed scars that may have been caused by both ship strike and entanglement. Thus, 60% of the whale carcasses which were suitable for examination showed signs that anthropogenic factors may have contributed to, or been responsible for, their death. Wiley et al. (1995) further reported that all stranded animals were sexually immature, suggesting a winter or migratory segregation and/or that juvenile animals are more susceptible to human impacts.

An updated analysis of humpback whale mortalities from the mid-Atlantic states region has recently been produced by Barco et al. (2001). Between 1990 and 2000, there were 52 known humpback whale mortalities in the waters of the U.S. mid-Atlantic states (summarized by Barco et al. 2001). Length data from 48 of these whales (18 females, 22 males and 8 of unknown sex) suggested that 39 (81.2%) were first-year animals, 7 (14.6%) were immature and 2 (4.2%) were adults. However, sighting histories of 5 of the dead whales indicate that some were small for their age, and histories of live whales further indicate that the population contains a greater percentage of mature animals than is suggested by the stranded sample. In their study of entanglement rates estimated from caudal peduncle scars, Robbins and Mattila (2001) found that males were more likely to be entangled than females. The scarring data also suggested that yearlings were more likely than other age classes to be involved in entanglements. Finally, female humpbacks showing evidence of prior entanglements produced significantly fewer calves, suggesting that entanglement may significantly impact reproductive success. Humpback whale entanglements also occur in relatively high numbers in Canadian waters. Reports of collisions with fixed fishing gear set for groundfish around Newfoundland averaged 365 annually from 1979 to 1987 (range 174-813). An average of 50 humpback whale entanglements (range 26-66) were reported annually between 1979 and 1988, and 12 of 66 humpback whales that were entangled in 1988 died (Lien et al. 1988). Volgenau et al. (1995) also summarized existing data and concluded that in Newfoundland and Labrador, cod traps caused the most entanglements and entanglement mortalities (21%) of humpbacks between 1979 and 1992. They also reported that gillnets are the gear that has been the primary cause of entanglements and entanglement mortalities (20%) of humpbacks in the Gulf of Maine between 1975 and 1990.

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). Fin whales spend the summer feeding in the relatively high latitudes of both hemispheres, particularly along the cold eastern boundary currents in the North Atlantic and North Pacific Oceans and in Antarctic waters (IWC 1992). Most migrate seasonally from relatively high-latitude Arctic and Antarctic feeding areas in the summer to relatively low-latitude breeding and calving areas in the winter (Perry et al. 1999).

As in the case of right and humpback whales, fin whale populations were heavily affected by commercial whaling. However, commercial exploitation of fin whales occurred much later than for right and humpback whales. Although some fin whales were taken as early as the 17th century by the Japanese using a fairly primitive open-water netting technique

(Perry et al. 1999) and were hunted occasionally by sailing vessel whalers in the 19th century (Mitchell and Reeves 1983), wide-scale commercial exploitation of fin whales did not occur until the 20th century when the use of steam power and harpoon- gun technology made exploitation of this faster, more offshore species feasible. In the southern hemisphere, over 700,000 fin whales were landed in the 20th century. More than 48,000 fin whales were taken in the North Atlantic between 1860 and 1970 (Perry et al. 1999). Fisheries existed off of Newfoundland, Nova Scotia, Norway, Iceland, the Faroe Islands, Svalbard (Spitsbergen), the islands of the British coasts, Spain and Portugal. Fin whales were rarely taken in U.S. waters, except when they ventured near the shores of Provincetown, MA, during the late 1800's (Perry et al. 1999).

Various estimates have been provided to describe the current status of fin whales in western North Atlantic waters. Based on the catch history and trends in Catch per Unit Effort, an estimate of 3,590 to 6,300 fin whales was obtained for the entire western North Atlantic (Perry et al. 1999). Hain et al. (1992) estimated that about 5,000 fin whales inhabit the Northeastern United States continental shelf waters. The latest (Waring et al. 2002) SAR gives a best estimate of abundance for fin whales of 2,814 (CV = 0.21). The minimum population estimate for the western North Atlantic fin whale is 2,362. This is currently an underestimate, as too little is known about population structure, and the estimate is derived from surveys over a limited portion of the western North Atlantic. There is also not enough information to estimate population trends.

In the North Atlantic today, fin whales are widespread and occur from the Gulf of Mexico and Mediterranean Sea northward to the edges of the arctic pack ice (Waring et al. 2002). A number of researchers have suggested the existence of fin whale subpopulations in the North Atlantic. Mizroch et al. (1984) suggested that local depletions resulting from commercial overharvesting supported the existence of North Atlantic fin whale subpopulations. Others have used genetics information to provide support for the belief that there are several subpopulations of fin whales in the North Atlantic and Mediterranean (Bérubé et al. 1998). In 1976, the IWC's Scientific Committee proposed seven stocks for North Atlantic fin whales. These are: (1) North Norway; (2) West Norway-Faroe Islands; (3) British Isles-Spain and Portugal; (4) East Greenland-Iceland; (5) West Greenland; (6) Newfoundland-Labrador; and (7) Nova Scotia (Perry et al. 1999). However, it is uncertain whether these stock boundaries define biologically isolated units (Waring et al. 2002). The NMFS has designated one stock of fin whale for U.S. waters of the North Atlantic where the species is commonly found from Cape Hatteras northward.

During 1978-1982 aerial surveys, fin whales accounted for 24% of all cetaceans and 46% of all large cetaceans sighted over the continental shelf between Cape Hatteras and Nova Scotia (Waring et al. 1998). Underwater listening systems have also demonstrated that the fin whale is the most acoustically common whale species heard in the North Atlantic (Clark 1995). The single most important area for this species appeared to be from the Great South Channel, along the 50 meter isobath past Cape Cod, over Stellwagen Bank, and past Cape Ann to Jeffrey's Ledge (Hain et al. 1992).

Despite our broad knowledge of fin whales, less is known about their life history as compared to right and humpback whales. Age at sexual maturity for both sexes ranges from 5-15 years. Physical maturity is reached at 20-30 years. Conception occurs during a 5 month winter period in either hemisphere. After a 12 month gestation, a single calf is born. The calf is weaned between 6 and 11 months after birth. The mean calving interval is 2.7 years, with a range of between 2 and 3 years (Agler et al. 1993). Like right and humpback whales, fin whales are believed to use northwestern North Atlantic waters primarily for feeding and migrate to more southern waters for calving. However, the overall pattern of fin whale movement consists of a less obvious north-south pattern of migration than that of right and humpback whales. Based on acoustic recordings from hydrophone arrays, Clark (1995) reported a general pattern of fin whale movements in the fall from the Labrador/Newfoundland region, south past Bermuda, and into the West Indies. However, evidence regarding where the majority of fin whales winter, calve, and mate is still scarce. Some populations seem to move with the seasons (e.g., one moving south in winter to occupy the summer range of another), but there is much structuring in fin whale populations that what animals of different sex and age class do is not at all clear. Neonate strandings along the U.S. mid-Atlantic coast from October through January suggest the possibility of an offshore calving area.

The overall distribution of fin whales may be based on prey availability. This species preys opportunistically on both invertebrates and fish. The predominant prey of fin whales varies greatly in different geographical areas depending on what is locally available. In the western North Atlantic fin whales feed on a variety of small schooling fish (i.e., herring, capelin, sand lance) as well as squid and planktonic crustaceans. As with humpback whales, fin whales feed by filtering large volumes of water for their prey through their baleen plates. Photo identification studies in western North Atlantic feeding areas, particularly in Massachusetts Bay, have shown a high rate of annual return by fin whales, both within years and between years (Seipt et al. 1990).

As discussed above, fin whales were the focus of commercial whaling, primarily in the 20th century. The IWC did not begin to manage commercial whaling of fin whales in the North Atlantic until 1976. In 1987, fin whales were given total protection in the North Atlantic with the exception of a subsistence whaling hunt for Greenland. The IWC set a catch limit of 19 whales for the years 1995-1997 in West Greenland. All other fin whale stocks had a zero catch limit for these same years. However, Iceland reported a catch of 136 whales in the 1988/89 and 1989/90 seasons, and has since ceased reporting fin whale kills to the IWC (Perry et al. 1999). In total, there have been 239 reported kills of fin whales from the North Atlantic from 1988 to 1995.

The major known sources of anthropogenic mortality and injury of fin whales include ship strikes and entanglement in commercial fishing gear. However, many of the reports of mortality cannot be attributed to a particular source. Of 18 fin whale mortality records collected between 1991 and 1995, four were associated with vessel interactions, although the proximal cause of mortality was not known. The following injury/mortality events are those reported from 1996 to the present for which source was determined. These numbers should be viewed as absolute minimum numbers; the total number of mortalities

and injuries cannot be estimated but is believed to be higher since it is unlikely that all carcasses will be observed. In general, known mortalities of fin whales are less than those recorded for right and humpback whales. This may be due in part to the more offshore distribution of fin whales where they are either less likely to encounter entangling gear, or are less likely to be noticed when gear entanglements or vessel strikes do occur. 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. The fin whale was listed as endangered throughout its 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. Waring et al. 2002 present a more recent estimate of 2,814 (CV=0.21) fin whales based on aerial and shipboard surveys of the area from Georges Bank to the mouth of the Gulf of S. Lawrence in 1999.

Sei Whale

Sei whales are a widespread species in the world’s temperate, subpolar and subtropical and even tropical marine waters. However, they appear to be more restricted to temperate waters than other balaenopterids (Perry et al. 1999). The IWC recognized three stocks in the North Atlantic based on past whaling operations as opposed to biological information: (1) Nova Scotia; (2) Iceland Denmark Strait; (3) Northeast Atlantic (Donovan 1991 in Perry et al. 1999). 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. 2002). This is the only sei whale stock within the action area.

Sei whales became the target of modern commercial whalers primarily in the late 19th and early 20th century after stocks of other whales, including right, humpback, fin and blues, had already been depleted. Sei whales were taken in large numbers by Norway and Scotland from the beginning of modern whaling. More than 700 sei whales were killed off of Norway in 1885, alone. Small numbers were also taken off of Spain, Portugal and in the Strait of Gibraltar beginning in the 1920’s, and by Norwegian and Danish whalers off of West Greenland from the 1920’s to 1950’s (Perry et al. 1999). In the western North Atlantic, sei whales were originally hunted off of Norway and Iceland, but from 1967-1972, sei whales were also taken off of Nova Scotia (Perry et al. 1999). A total of 825 sei whales were taken on the Scotian Shelf between 1966-1972, and an additional 16 were taken from the same area during the same time by a shore based Newfoundland whaling station (Perry et al. 1999). The species continued to be exploited in Iceland until 1986 even though measures to stop whaling of sei whales in other areas had been put into place in the 1970’s (Perry et al. 1999). There is no estimate for the abundance of sei whales prior to commercial whaling. Based on whaling records, approximately14,295 sei whales were taken in the entire North Atlantic from 1885 to 1984 (Perry et al. 1999).

Sei whales winter in warm temperate or subtropical waters and summer in more northern latitudes. In the northern Atlantic, most births occur in November and December when the whales are on the wintering grounds. Conception is believed to occur in December and January. Gestation lasts for 12 months and the calf is weaned at 6-9 months when the whales are on the summer feeding grounds. Sei whales reach sexual maturity at 5-15 years of age. The calving interval is believed to be 2-3 years (Perry et al. 1999).

Sei whales occur in deep water throughout their range, typically over the continental slope or in basins situated between banks. 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.

Although sei whales may prey upon small schooling fish and squid in the action area, available information suggests that calanoid copepods and euphausiids are the primary prey of this species. There are occasional influxes of sei whales further into Gulf of Maine waters, presumably in conjunction with years of high copepod abundance inshore. Sei whales are occasionally seen feeding in association with right whales in the southern Gulf of Maine and in the Bay of Fundy. However, there is no evidence to demonstrate interspecific competition between these species for food resources. There is very little information on natural mortality factors for sei whales. Possible causes of natural mortality, particularly for young, old or otherwise compromised individuals are shark attacks, killer whale attacks, and endoparasitic helminths. Baleen loss has been observed in California sei whales, presumably as a result of an unknown disease (Perry et al. 1999).

There are insufficient data to determine trends of the sei whale population. Because there are no abundance estimates within the last 10 years, a minimum population estimate cannot be determined for NMFS management purposes (Waring et al. 2002). Abundance surveys are problematic not only because this species is difficult to distinguish from the fin whale but more significant is that too little is known of the sei whale's distribution, population structure and patterns of movement; thus survey design and data interpretation are very difficult.

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. A small number of ship strikes of this species have been recorded. The most recent documented incident occurred in 1994 when a carcass was brought in on the bow of a container ship in Charlestown, Massachusetts. 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). Three subspecies have been identified: Balaenoptera musculus musculus, B.m. intermedia, and B.m. brevicauda (Waring et al. 2002). Only B. musculus occurs in the northern hemisphere. Blue whales range in the North Atlantic extends from the subtropics to Baffin Bay and the Greenland Sea . The IWC currently recognizes these whales as one stock (Perry et al. 1999).

Blue whales were intensively hunted in all of the world's oceans from the turn of the century to the mid-1960's. Blue whales were occasionally hunted by sailing vessel whalers in the 19th century. However, development of steam-powered vessels and deck-mounted harpoon guns in the late 19th century made it possible to exploit them on an industrial scale. Blue whale populations declined worldwide as the new technology spread and began to receive widespread use (Perry et al. 1999). Subsequently, the whaling industry shifted effort away from declining blue whale stocks and targeted other large species, such as fin whales, and then resumed hunting for blue whales when the species appeared to be more abundant (Perry et al. 1999). The result was a cyclical rise and fall, leading to severe depletion of blue whale stocks worldwide (Perry et al. 1999). In the North Atlantic, Norway shifted operations to fin whales as early as 1882 due to the scarcity of blue whales (Perry et al. 1999). In all, at least 11,000 blue whales were taken in the North Atlantic from the late 19th century through the mid-20th century. Blue whales were given complete protection in the North Atlantic in 1955 under the International Convention for the Regulation of Whaling. However, Iceland continued to hunt blue whales until 1960. There are no good estimates of the pre-exploitation size of the western North Atlantic blue whale stock but it is widely believed that this stock was severely depleted by the time legal protection was introduced in 1955 (Perry et al. 1999). Mitchell (1974) suggested that the stock numbered in the very low hundreds during the late 1960's through early 1970's (Perry et al. 1999). Photo-identification studies of blue whales in the Gulf of St. Lawrence from 1979 to 1995 identified 320 individual whales. The NMFS recognizes a minimum population estimate of 308 blue whales for the western North Atlantic (Waring et al. 2002).

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. It is assumed that blue whale distribution is governed largely by food requirements. In the Gulf of St.

Lawrence, blue whales appear to predominantly feed on Thysanoessa raschii and Meganytiphanes norvegica. In the eastern North Atlantic, T. inermis and M. norvegica appear to be the predominant prey.

Compared to the other species of large whales, relatively little is known about this species. Sexual maturity is believed to occur in both sexes at 5-15 years of age. Gestation lasts 10-12 months and calves nurse for 6-7 months. The average calving interval is estimated to be 2-3 years. Birth and mating both take place in the winter season, but the location of wintering areas is speculative (Perry et al. 1999). In 1992 the U.S. Navy and contractors conducted an extensive blue whale acoustic survey of the North Atlantic and found concentrations of blue whales on the Grand Banks and west of the British Isles. One whale was tracked for 43 days during which time it traveled 1,400 nautical miles around the general area of Bermuda (Perry et al. 1999).

There is limited information on the factors affecting natural mortality of blue whales in the North Atlantic. Ice entrapment is known to kill and seriously injure some blue whales, particularly along the southwest coast of Newfoundland, during late winter and early spring. Habitat degradation has been suggested as possibly affecting blue whales such as in the St. Lawrence River and the Gulf of St. Lawrence where habitat has been degraded by acoustic and chemical pollution. However, there is no data to confirm that blue whales have been affected by such habitat changes (Perry et al. 1999).

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. In 1987, concurrent with an unusual influx of blue whales into the Gulf of Maine, one report was received from a whale watch boat that spotted a blue whale in the southern Gulf of Maine entangled in gear described as probable lobster pot gear. A second animal found in the Gulf of St. Lawrence apparently died from the effects of an entanglement. In March 1998, a juvenile male blue whale was carried into Rhode Island waters on the bow of a tanker. The cause of death was determined to be due to a ship strike, although not necessarily caused by the tanker on which it was observed, and the strike may have occurred outside the U.S. EEZ (Waring et al. 2002). 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 present in the Gulf of

Mexico are considered by some researchers to be endemic, and represent a separate stock from whales in other portions of the North Atlantic. However, NMFS currently uses the IWC stock structure guidance which recognizes one stock for the entire North Atlantic (Waring et al. 2002).

The International Whaling Commission estimates that nearly a quarter-million sperm whales were killed worldwide in whaling activities between 1800 and 1900 (IWC 1971). However, estimates of the number of sperm whales taken during this time are difficult to quantify since sperm whale catches from the early 19th century through the early 20th century were calculated on barrels of oil produced per whale rather than the actual number of whales caught (Perry et al. 1999). With the advent of modern whaling the larger rorqual whales were targeted. However as their numbers decreased, greater attention was paid to smaller rorquals and sperm whales. From 1910 to 1982 there were nearly 700,000 sperm whales killed worldwide from whaling activities (Clarke 1954). Whale catches for the southern hemisphere is 394,000 (including revised Soviet figures). Sperm whales were hunted in America from the 17th century through the early 20th century. In the North Atlantic, hunting occurred off of Iceland, Norway, the Faroe Islands, coastal Britain, West Greenland, Nova Scotia, Newfoundland/Labrador, New England, the Azores, Madeira, Spain, and Spanish Morocco (Waring et al. 1998). Some whales were also taken off the U.S. Mid-Atlantic coast (Reeves and Mitchell 1988; Perry et al. 1999), and in the northern Gulf of Mexico (Perry et al. 1999). There are no catch estimates available for the number of sperm whales caught during U.S. operations (Perry et al. 1999). Recorded North Atlantic sperm whale catch numbers for Canada and Norway from 1904 to 1972 total 1,995. All killing of sperm whales was banned by the IWC in 1988. However, at the 2000 meetings of the IWC, Japan indicated it would include the take of sperm whales in its scientific research whaling operations. Although this action was disapproved of by the IWC, Japan has reported the take of 5 sperm whales from the North Pacific as a result of this research.

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). Sperm whales in both hemispheres migrate to higher latitudes in the summer for feeding and return to lower latitude waters in the winter where mating and calving occur. Mature males typically range to much higher latitudes than mature females and immature animals but return to the lower latitudes in the winter to breed (Perry et al. 1999). Waring et al. (2002) suggest sperm whale distribution is closely correlated with the Gulf Stream edge. Like swordfish, which feed on similar prey, sperm whales migrate to higher latitudes during summer months, when they are concentrated east and northeast of Cape Hatteras. In the U.S. EEZ, sperm whales occur on the continental shelf edge, over the continental slope, and into the mid-ocean regions , 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. 2002).

Sperm whale distribution may be linked to their social structure as well as distribution of their prey (Waring et al. 2002). Sperm whale populations are organized into two types of groupings: breeding schools and bachelor schools. Older males are often solitary (Best 1979). Breeding schools consist of females of all ages, calves and juvenile males. In the Northern Hemisphere, mature females ovulate April through August. During this season one or more large mature bulls temporarily join each breeding school. A single calf is born after a 15-month gestation. A mature female will produce a calf every 4-6 years. Females attain sexual maturity at a mean age of nine years, while males have a prolonged puberty and attain sexual maturity at about age 20 (Waring et al. 2002). Bachelor schools consist of maturing males who leave the breeding school and aggregate in loose groups of about 40 animals. As the males grow older they separate from the bachelor schools and remain solitary most of the year (Best 1979). Male sperm whales may not reach physical maturity until they are 45 years old (Waring et al. 2002). The sperm whales prey consists of larger mesopelagic squid (e.g., Architeuthis and Moroteuthis) and fish species (Perry et al. 1999). Sperm whales, especially mature males in higher latitude waters, have been observed to take significant quantities of large demersal and mesopelagic sharks, skates, and bony fishes (Clarke 1962, 1980).

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.

Documented takes primarily involve offshore fisheries such as the offshore lobster pot fishery and pelagic driftnet and pelagic longline fisheries. The NMFS Sea Sampling program recorded three entanglements (in 1989, 1990, and 1995) of sperm whales in the swordfish drift gillnet fishery prior to permanent closure of the fishery in January 1999. All three animals were injured, found alive, and released. However, at least one was still carrying gear. Opportunistic reports of sperm whale entanglements for the years 1993-1997 include three records involving offshore lobster pot gear, heavy monofilament line, and fine mesh gillnet from an unknown source. Sperm whales may also interact opportunistically with fishing gear. Observers aboard Alaska sablefish and Pacific halibut longline vessels have documented sperm whales feeding on longline caught fish in the Gulf of Alaska (Perry et al. 1999). Behavior similar to that observed in the Alaskan longline fishery has also been documented during longline operations off South America where sperm whales have become entangled in longline gear, have been observed feeding on fish caught in the gear, and have been reported following longline vessels for days (Perry et al. 1999).

Sperm whales are also struck by ships. In May 1994 a ship struck sperm whale was observed south of Nova Scotia (Waring et al. 2002). A sperm whale was also seriously injured as a result of a ship strike in May 2000 in the western Atlantic. Due to the offshore distribution of this species, interactions that do occur are less likely to be reported than those involving right, humpback, and fin whales that more often occur in nearshore areas. Other impacts noted above for baleen whales may also occur.

Due to their offshore distribution, sperm whales tend to strand less often than, for example, right whales and humpbacks. Preliminary data for 2000 indicate that of ten sperm whales reported to the stranding network (nine dead and one injured) there was one possible fishery interaction, one ship strike (wounded with bleeding gash on side) and eight animals for which no signs of entanglement or injury were sighted or reported. No sperm whales have stranded or been reported to the stranding network as of February 2001.

Atlantic Bottlenose dolphin

Most of the information which follows concerning Atlantic bottlenose dolphin 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, citing stranding patterns during a high mortality event in 1987-88 and observed density patterns along the US Atlantic coast. 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. For example, year-round resident populations have been reported at a variety of sites in the southern part of the range, from Charleston, South Carolina (Zolman 1996) to central Florida (Odell and Asper 1990); seasonal residents and migratory or transient animals also occur in these areas (summarized in Hohn 1997). In the northern part of the range the patterns reported include seasonal residency, year-round residency with large home ranges, and migratory or transient movements (Barco and Swingle 1996, Sayigh et al. 1997). Communities of dolphins have been recognized in embayments and coastal areas of the Gulf of Mexico (Wells et al. 1996; Scott et al. 1990; Weller 1998) so it is not surprising to find similar situations along the Atlantic coast (Waring et al. 2002).

Recent genetic analyses of samples from Jacksonville, FL, southern South Carolina (primarily the estuaries around Charleston), southern North Carolina, and coastal Virginia, using both mitochondrial DNA and nuclear microsatellite markers, indicate that a significant amount of the overall genetic variation can be explained by differences between the groups (NMFS 2001). These results indicate a minimum of four populations of coastal bottlenose dolphins in the Northwest Atlantic and reject the null hypothesis of one homogeneous population of bottlenose dolphins. Integration of the preliminary results from genetics, photo-identification, satellite telemetry, and stable isotope studies confirms a complex mosaic of stocks of coastal bottlenose dolphins in the western North Atlantic (Waring et al. 2002). As an interim measure, pending additional results, seven management units within the range of the “coastal migratory stock” have been defined.

The true population structure is likely more than the seven units identified in Waring et al. (2002); research efforts continue in an attempt to identify that structure.

Earlier aerial (CETAP 1982) and shipboard (NMFS unpublished data) surveys north of Cape Hatteras identified two concentrations of bottlenose dolphins, one inshore of the 25 m isobath and the other offshore of the 25 m isobath. The lowest density of bottlenose dolphins was observed over the continental shelf, with higher densities along the coast and near the continental shelf edge. It was suggested that the coastal morphotype is restricted to waters < 25 m in depth north of Cape Hatteras (Kenney 1990). There was no apparent longitudinal discontinuity in bottlenose dolphin herd sightings during aerial surveys south of Cape Hatteras in the winter (Blaylock and Hoggard 1994). NMFS surveys conducted from 1992-1998 show a clustering of bottlenose dolphins nearshore and then additional bottlenose dolphins in the offshore areas. Unfortunately, the morphotype of bottlenose dolphins (WNA offshore or WNA coastal) cannot be determined from the air so attributing each sighting to a specific morphotype is not possible. There is also a potential for confusing immature spotted dolphins, with few or no spots dorsally, with bottlenose dolphins where the two species are co-occur. In 1995, NMFS conducted two aerial surveys along the Atlantic coast (Blaylock 1995; Garrison and Yeung 2001). One survey was conducted during summer 1995 between Cape Hatteras, NC, and Sandy Hook, NJ, and included three replicate surveys. The second survey was conducted during winter 1995 between Cape Hatteras, NC, and Ft. Pierce, FL. A distributional analysis identified a significant spatial pattern in bottlenose dolphin sightings as a function of distance from shore (Garrison 2001a). During the northern (summer) surveys, the significant spatial boundary occurred at 12 km from shore. During the southern (winter) survey, the significant spatial boundary occurred at 27 km from shore. The gap in sightings best defines, for the time being, the eastern extent of the coastal morphotype for purposes of habitat definition and abundance estimates. NMFS continues to collect biopsy samples from Tursiops throughout the possible range of the coastal morphotype so that stock boundaries can be confirmed or modified on the basis of a more comprehensive data set (Waring et al. 2002).

The 1995 aerial surveys were conducted to estimate population size of the hypothesized single coastal migratory stock (Blaylock 1995; Garrison and Yeung 2001). The summer aerial survey was conducted between July 1 and August 14, 1995, covering Cape Hatteras, NC, to Sandy Hook, NJ, (35.23oN-40.5oN), and from the mainland shore to the 25 m isobath. This survey provided coverage and abundance estimates for the Northern Migratory (NM) and Northern North Carolina (NNC) management units. However, coverage of the NNC unit was incomplete as the surveys did not cover the region south of Cape Hatteras, NC, to Cape Lookout, NC. Abundance was estimated for each stratum pooling across the three replicate surveys. The winter survey was conducted between January 27 and March 6, covering from Fort Pierce, FL, to Cape Hatteras, NC, from the mainland shore to 9.25 km (5 Nautical Miles) beyond the inshore edge of the Gulf Stream or <200 km offshore. This survey included coverage of the NNC, Southern North Carolina (SNC), South Carolina (SC), Georgia (GA), Northern Florida (NFL) and Central Florida (CFL) management units. However, the coverage of the NNC management unit was incomplete and did not include the region north of Cape Hatteras, NC. These abundance estimates also include NM unit animals that have migrated south of the NC/VA border during winter. Abundance for each management unit was estimated using line transect methods and the program DISTANCE (Buckland et al. 1993) for both the winter and summer surveys. There was no significant difference between the abundance estimates for the combined NM and NNC management units in summer and the combined NM, NNC, and SNC stocks in winter. Another set of aerial surveys was conducted parallel to the coastline from the North Carolina/South Carolina border to the Maryland/Delaware border during 1998 and 1999 to document the distribution of dolphins and fishing gear in nearshore waters (Hohn et al. unpubl. data). These strip transect surveys were conducted weekly, weather permitting, over 12 months in most of North Carolina and for six months (May to December) in Virginia and Maryland. In retrospect, they provide seasonal coverage of the Southern North Carolina, Northern North Carolina, and Northern Migratory management units. The strip transect surveys cannot be used directly for abundance estimation because they did not follow the design constraints of line transect survey methods and covered only a small proportion of the habitat of coastal bottlenose dolphin. The density of dolphins near the coastline is high relative to habitats further offshore, and the use of density estimates in this region to calculate overall abundance would likely result in significant positive bias. However, these surveys do provide information on the relative abundance of dolphins between regions that may be used to supplement the abundance estimates from the line transect surveys conducted in 1995 (Garrison and Hohn 2001). Both sets of aerial surveys covered ocean coasts only. An abundance estimate was generated for bottlenose dolphins in estuarine waters of North Carolina using mark-recapture methodology (Read et al. - in review). It is possible to post-stratify the markrecapture estimates consistent with management unit definitions (Palka et al. 2001). Abundance estimates for each management unit are the sum of estimates, where appropriate, from the recent analyses. Estimated overall abundance was 9,206 from summer surveys and 19,459 from winter surveys. However, for consistency with achieving the goals of the MMPA, such as maintaining marine mammals as functioning components of their ecosystems, it is more appropriate to establish abundance estimates for each management unit. Abundance for each management unit was estimated by post-stratifying sightings and effort data consistent with geographic and seasonal management unit boundaries (Garrison and Yeung 2001; Palka et al. 2001). Although these estimates are improved relative to previous abundance estimates for coastal bottlenose dolphins, potential biases remain. The aerial survey estimates are not corrected for g(0), the probability of detecting a group on the track line as a function of perception bias and availability bias. The exclusion of g(0) from the abundance estimate results in a negative bias of unknown magnitude. A positive bias may occur if the longitudinal boundaries have been extended too far offshore resulting in offshore dolphins being included in the abundance estimates for the coastal morphotype or if estuarine dolphins were over-represented in coastal waters during the time of the survey. Further uncertainties in the abundance estimates result from incomplete coverage of some seasonal management units during the line transect surveys. While the strip transect surveys were used to supplement the survey coverage, uncertainties associated with that analysis also introduce uncertainty in the overall abundance estimate (Garrison and Hohn 2001).

The minimum population size (NMIN) for each management was calculated by Waring et al. (2002) according to he Potential Biological Removal (PBR) Guidelines (Wade and Angliss 1997): $NMIN = N/\exp(0.842 \times [\ln(1+[CV(N)]2)]½)$. It was recognized that these estimates may be negatively biased because they do not include corrections for g(0) and, for some of the managements units, do not include the entire spatial range of the unit during that season. The strip transect surveys compensate for some of the abundance omitted during line-transect survey; nonetheless, for some management units the entire range was not covered. There are insufficient data to determine the population trend for this stock (Waring et al. 2002).

In addition, Current and maximum net productivity rates are not known for the WNA coastal morphotype. The maximum net productivity rate was assumed to be 0.04. This value is based on theoretical modeling showing that cetacean populations may not grow at rates much greater than 4% given the constraints of their reproductive life history (Barlow et al. 1995; Waring et al. 2002).

PBR is the product of the minimum population size, one-half the maximum productivity rate, and a "recovery" factor (Wade and Angliss 1997). The "recovery" factor is assumed to be 0.50, the default for depleted stocks and stocks of unknown status. At least part of the range-wide stock complex is depleted; for the remainder, status is unknown. For consistency with achieving the goals of the MMPA, such as maintaining marine mammals as functioning components of their ecosystems, it is more appropriate to establish separate PBRs for each management unit.

Total estimated average annual fishery-related mortality or serious injury resulting from observed fishing trips during 1996-2000 was 233 bottlenose dolphins (CV=0.16) in the mid-Atlantic coastal gillnet fishery (Waring et al. 2002). The management units affected by this fishery would be the NM, NNC, and SC. An estimated 24 (CV=0.89) 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).

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. There are nine Category II commercial fisheries that interact with WNA coastal bottlenose dolphins in the 2001 MMPA List of Fisheries (LOF), six of which occur in North Carolina waters. Category II fisheries include the mid-Atlantic coastal gillnet, NC inshore gillnet, mid-Atlantic haul/beach seine, NC long haul seine, NC stop net, Atlantic blue crab trap/pot, Southeast Atlantic gillnet, Southeastern U.S. Atlantic shark gillnet and the Virginia pound net (see 2001 List of Fisheries, 66 FR 42780, August 15, 2001; Waring et al. 2002). The mid-Atlantic haul/beach seine fishery also includes the haul seine and swipe net fisheries. There are five Category III fisheries that may interact with WNA coastal bottlenose dolphins. Three of these are inshore gillnet fisheries: the Delaware Bay inshore gillnet, the Long Island Sound inshore gillnet, and the Rhode Island, southern Massachusetts, and New York Bight inshore gillnet. The remaining two are the shrimp trawl and mid-Atlantic menhaden purse seine fisheries. There have been no takes observed by the NMFS observer programs in any of these fisheries (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).

Between 1994 and 1998, 22 bottlenose dolphin carcasses (4.4 dolphins per year on average) recovered by the Stranding Network between North Carolina and Florida's Atlantic coast displayed evidence of possible interaction with a trap/pot fishery (i.e., rope and/or pots attached, or rope marks). Additionally, at least 5 dolphins were reported to be released alive (condition unknown) from blue crab traps/pots during this time period. In recent years, reports of strandings with evidence of interactions between bottlenose dolphins and both recreational and commercial crab-pot fisheries have been increasing in the Southeast Region (McFee and Brooks 1998). The increased reporting may result from increased effort towards documenting these marks or increases in mortality (Waring et al. 2002).

Data from the Chesapeake Bay suggest that the likelihood of bottlenose dolphin entanglement in pound net leads may be affected by the mesh size of the lead net (Bellmund et al. 1997), but the information is not conclusive. Stranding data for 1993-1997 document interactions between WNA coastal bottlenose dolphins and pound nets in Virginia. Two bottlenose dolphin carcasses were found entangled in the leads of pound nets in Virginia during 1993-1997, for an average of 0.4 bottlenose dolphin strandings per year. A third record of an entangled bottlenose dolphin in Virginia in 1997 may have been applicable to this fishery. This entanglement involved a bottlenose dolphin carcass found near a pound net with twisted line marks consistent with the twine in the nearby pound net lead rather than with monofilament gillnet gear. Given that other sources of annual serious injury and mortality estimates (e.g., observer data) are not available, the stranding data (0.4 bottlenose dolphins per year) were used as a minimum estimate of annual serious injury and mortality and this fishery was classified as a Category II fishery in the 2001 List of Fisheries (Waring et al. 2002).

The shrimp trawl fishery operates from North Carolina through northern Florida virtually year around, moving seasonally up and down the coast. One bottlenose dolphin was recovered dead from a shrimp trawl in Georgia in 1995 (Southeast USA Marine Mammal Stranding Network unpublished data), and another was taken in 1996 near the mouth of Winyah Bay, SC, during a research survey. No other bottlenose dolphin mortality or serious injury has been previously reported to NMFS (Waring et al. 2002).

The Atlantic menhaden purse seine fishery targets the Atlantic menhaden in Atlantic coastal waters. Smith (1999) summarized menhaden fishing patterns by the Virginia-North Carolina vessels from 1985-1996. Most of the catch and sets during that time occurred within three miles of the shore. Between 1994 and 1997, menhaden were processed at only three facilities, two in Reedville Beach, VA, and one in Beaufort, NC. Each of the Virginia facilities had a fleet of 9-10 vessels while the Beaufort facility is supported by 2-6 vessels. Since 1998, only one plant has operated in Virginia and the number of vessels has been reduced to ten in Virginia and two in North Carolina (Vaughan et al. 2001). The fishery moves seasonally, with most effort occurring off of North Carolina from November-January and moving northward to southern New England during warmer months. Menhaden purse seiners have reported an annual incidental take of 1 to 5 bottlenose dolphins, although observer data are not available (Waring et al. 2002).

From 1997-1999, 995 bottlenose dolphins were reported stranded along the Atlantic coast from New York to Florida (Hohn and Martone 2001; Hohn et al. 2001; Palka et al. 2001). Of these, it was possible to determine whether a human interaction had occurred for 449 (45%); for the remainder it was not possible to make that determination. The proportion of carcasses determined to have been involved in a human interaction averaged 34%, but ranged widely from 11-12% in Delaware and Georgia to 49% and 53% in Virginia and North Carolina, respectively.

The nearshore habitat occupied by the coastal morphotype is adjacent to areas of high human population and in the northern portion of its range is highly industrialized. The blubber of stranded dolphins examined during the 1987-88 mortality event contained anthropogenic contaminants in levels among the highest recorded for a cetacean (Geraci 1989). There are no estimates of indirect human-caused mortality resulting from pollution or habitat degradation.

The coastal migratory stock is designated as depleted under the MMPA. From 1995-2001, NMFS recognized only a single migratory stock of coastal bottlenose dolphins in the WNA and, therefore, the entire stock was listed as depleted. The management units in this report now replace the single coastal migratory stock. A re-analysis of the depletion designation on a management unit basis needs to be undertaken. In the interim, because one or more of the management units may be depleted, all management units retain the depleted designation. In addition, mortality in multiple units exceeds PBR (Waring et al. 2002). 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).

The species is not listed as threatened or endangered under the Endangered Species Act, but because, as noted above, 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 potential biological removal level.

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). Evidence from tag returns and strandings in the western Atlantic suggests that adults engage in routine migrations between boreal, temperate and tropical waters (NMFS and USFWS, 1992). 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. However, leatherbacks may migrate close to shore, as a leatherback was satellite tracked along the mid-Atlantic coast, thought to be foraging in these waters. 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. Shoop and Kenney (1992) also observed concentrations of leatherbacks during the summer off the south shore of Long Island and off New Jersey. Leatherbacks in these waters are thought to be following their preferred jellyfish prey. 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).

Compared to the current knowledge regarding loggerhead populations, the genetic distinctness of leatherback populations is less clear. However, genetic analyses of leatherbacks to date indicate female turtles nesting in St. Croix/Puerto Rico and those nesting in Trinidad differ from each other and from turtles nesting in Florida, French Guiana/Suriname and along the South African Indian Ocean coast. Much of the genetic diversity is contained in the relatively small insular subpopulations. Although populations or subpopulations of leatherback sea turtles have not been formally recognized, based on the most recent reviews of the analysis of population trends of leatherback sea turtles, and due to our limited understanding of the genetic structure of the entire species, the most conservative approach would be to treat leatherback nesting populations as distinct populations whose survival and recovery is critical to the survival and recovery of the species. Further, any action that appreciably reduced the likelihood for one or more of these nesting populations to survive and recover in the wild, would appreciably reduce the species' likelihood of survival and recovery in the wild.

Leatherbacks are predominantly a pelagic species and feed on jellyfish (i.e., Stomolophus, Chryaora, and Aurelia (Rebel 1974)), cnidarians (medusae, siphonophores) and tunicates (salps, pyrosomas). Time-Depth-Recorder data recorded by Eckert et al. (1998b) indicate that leatherbacks are night feeders and are deep divers, with recorded dives to depths in excess of 1000 meters. However, leatherbacks may come into shallow waters if there is an abundance of jellyfish nearshore. Leary (1957) reported a large group of up to 100 leatherbacks just offshore of Port Aransas, Texas associated with a dense aggregation of Stomolophus. Leatherbacks also occur annually in places such as Cape Cod and Narragansett Bays during certain times of the year, particularly the fall.

Although leatherbacks are a long lived species (> 30 years), they are somewhat faster to mature than loggerheads, with an estimated age at sexual maturity reported as about 13-14 years for females, and an estimated minimum age at sexual maturity of 5-6 years, with 9 years reported as a likely minimum (Zug and Parham 1996) and 19 years as a likely maximum (NMFS 2001). In the U.S. and Caribbean, female leatherbacks nest from March through July. They nest frequently (up to 7 nests per year) during a nesting season and nest about every 2-3 years. During each nesting, they produce 100 eggs or more in each clutch and thus, can produce 700 eggs or more per nesting season (Schultz 1975). The eggs will incubate for 55-75 days before hatching. The habitat requirements for post-hatchling leatherbacks are virtually unknown (NMFS and USFWS 1992).

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. Zug and Parham (1996) attribute the sharp decline in leatherback populations to the combination of the loss of long-lived adults in fishery related mortality, and the lack of recruitment stemming from elimination of annual influxes of hatchlings because of intense egg harvesting.

Poaching is not known to be a problem for U.S. nesting populations. However, numerous fisheries that occur in both U.S. state and Federal waters are known to negatively impact juvenile and adult leatherback sea turtles. These include incidental take in several commercial and recreational 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). At a workshop held in the Northeast in 1998 to develop a management plan for leatherbacks, experts expressed the opinion that incidental takes in fisheries were likely higher than is being reported.

Leatherback interactions with the southeast shrimp fishery are also common. Turtle Excluder Devices (TEDs), typically used in the southeast shrimp fishery to minimize sea turtle/fishery interactions, are less effective for the large-sized leatherbacks. Therefore, the NMFS has used several alternative measures to protect leatherback sea turtles from lethal interactions with the shrimp fishery. These include establishment of a Leatherback Conservation Zone (60 FR 25260). NMFS established the zone to restrict, when necessary, shrimp trawl activities from off the coast of Cape Canaveral, Florida to the Virginia/North Carolina Border. It allows the NMFS to quickly close the area or portions of the area to the shrimp fleet on a short-term basis when high concentrations of normally pelagic leatherbacks are recorded in more coastal waters where the shrimp fleet operates. Other emergency measures may also be used to minimize the interactions between leatherbacks and the shrimp fishery. For example, in November 1999 parts of Florida experienced an unusually high number of leatherback strandings. In response, the NMFS required shrimp vessels operating in a specified area to use TEDs with a larger opening for a 30-day period beginning December 8, 1999 (64 FR 69416) so that leatherback sea turtles could escape if caught in the gear.

Leatherbacks are also susceptible to entanglement in lobster and crab gear, possibly as a result of attraction to gelatinous organisms and algae that collect on buoys and buoy lines at or near the surface, attraction to the buoys which could appear as prey, or the gear configuration which may be more likely to wrap around flippers. The total number of leatherbacks reported entangled from New York through Maine from all sources for the years 1980 - 2000 is 119; out of this total, 92 of these records occurred from1990-2000. Entanglements are also common in Canadian waters where Goff and Lien (1988) reported that 14 of 20 leatherbacks encountered off the coast of Newfoundland/Labrador were entangled in fishing gear including salmon net, herring net, gillnet, trawl line and crab pot line. It is unclear how leatherbacks become entangled in such gear. Prescott (1988) reviewed stranding data for Cape Cod Bay and concluded that for those turtles where cause of death could be determined (the minority), entanglement in fishing gear is the leading cause of death followed by capture by dragger, cold stunning, or collision with boats.

Spotila et al. (1996) describe a hypothetical life table model based on estimated ages of sexual maturity at both ends of the species' natural range (5 and 15 years). The model concluded that leatherbacks maturing in 5 years would exhibit much greater population fluctuations in response to external factors than would turtles that mature in 15 years. Furthermore, the simulations indicated that leatherbacks could maintain a stable population only if both juvenile and adult survivorship remained high, and that if other life history stages (i.e., egg, hatchling, and juvenile) remained static. Model simulations indicated that an increase in adult mortality of more than 1% above background levels in a stable population was unsustainable. 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).

Spotila et al. (1996) recommended not only reducing mortalities resulting from fishery interactions, but also advocated protection of eggs during the incubation period and of hatchlings during their first day, and indicated that such practices could potentially double the chance for survival and help counteract population effects resulting from adult mortality. They conclude, "stable leatherback populations could not withstand an increase in adult mortality above natural background levels without decreasing . . . the Atlantic population is the most robust, but it is being exploited at a rate that cannot be sustained and if this rate of mortality continues, these populations will also decline. "

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, not only by fishery related mortality but, at least historically, primarily due to intense exploitation of the eggs (Ross 1979). On some beaches nearly 100% of the eggs laid have been harvested (Eckert 1996). Eckert (1996) and Spotila et al. (1996) record that adult mortality has also increased significantly, particularly as a result of driftnet and longline fisheries. Spotila (2000) states that a conservative estimate of annual leatherback fishery-related mortality (from longlines, trawls and gillnets) in the Pacific during the 1990s is 1,500 animals. He estimates that this represented about a 23% mortality rate (or 33% if most mortality was focused on the East Pacific population).

Nest counts are currently the only reliable indicator of population status available for leatherback turtles. 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. Eastern Atlantic (i.e., off Africa, numbering ~ 4,700) and Caribbean (4,000) populations appear to be stable, but there is conflicting information for some sites and it is certain that some populations (e.g., St. John and St. Thomas, U.S. Virgin Islands) have been extirpated (NMFS and USFWS 1995). It does appear, however, that the Western Atlantic 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. First-time nesting adults have increased from 6% to 28% from 1981 to 1989, and from 23% to 41% from 1990 to 1994, indicating that the ridley population may be in the early stages of growth (TEWG 1998). 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 water 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. 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. In the Chesapeake Bay, ridleys frequently forage in shallow embayments, particularly in areas supporting submerged aquatic vegetation (Lutcavage and Musick 1985). The juvenile population in Chesapeake Bay is estimated to be 211 to 1,083 turtles.

The model presented by Crouse et al. (1987) illustrates the importance of subadults to the stability of loggerhead populations and may have important implications for Kemp's ridleys. The vast majority of ridleys identified along the Atlantic Coast have been juveniles and subadults. Sources of mortality in this area include incidental takes in fishing gear, pollution and marine habitat degradation, and other man-induced and natural causes. Loss of individuals in the Atlantic, therefore, may impede recovery of the Kemp's ridley sea turtle population. Sea sampling data from the northeast otter trawl fishery and southeast shrimp and summer flounder bottom trawl fisheries has recorded takes of Kemp's ridley turtles.

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. In the western Atlantic region, the summer developmental habitat encompasses estuarine and coastal waters as far north as Long Island Sound, Chesapeake Bay, and the North Carolina sounds, and south throughout the tropics (NMFS 1998). Most of the individuals reported in U.S. waters are immature (NMFS 1998). Green sea turtles found north of Florida during the summer must return to southern waters in autumn or risk the adverse effects of cold temperatures.

There is evidence that green turtle nesting has been on the increase during the past decade. For example, increased nesting has been observed along the Atlantic coast of Florida on beaches where only loggerhead nesting was observed in the past (NMFS 1998). Recent population estimates for the western Atlantic area are not available. Green turtles are threatened by incidental captures in fisheries, pollution and marine habitat degradation, destruction/disturbance of nesting beaches, and other sources of man-induced and natural mortality.

Juvenile green sea turtles occupy pelagic habitats after leaving the nesting beach. At approximately 20 to 25 cm carapace length, juveniles leave pelagic habitats, and enter benthic foraging areas, shifting to a chiefly herbivorous diet (NMFS 1998). Post-pelagic green turtles feed primarily on sea grasses and benthic algae, but also consume jellyfish, salps, and sponges. Known feeding habitats along U.S. coasts of the western Atlantic include shallow lagoons and embayments in Florida, and similar shallow inshore areas elsewhere (NMFS 1998).

Sea sampling data from the scallop dredge fishery and southeast shrimp and summer flounder bottom trawl fisheries have recorded incidental takes of green turtles

Shortnose Sturgeon

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

Shortnose sturgeon are benthic and mainly inhabit the deep channel sections of large rivers. They feed on a variety of benthic and epibenthic invertebrates including molluscs, crustaceans (amphipods, chironomids, isopods), and oligochaete worms (Vladykov and Greeley 1963; Dadswell 1979). Shortnose sturgeon are long-lived (30 years) and mature at relatively old ages. In northern areas, males reach maturity at 5-10 years, while females reach sexual maturity between 7 and 13 years.

In the northern part of their range, shortnose sturgeon exhibit three distinct movement patterns that are associated with spawning, feeding, and overwintering periods. In spring, as water temperatures rise above 8° C, pre-spawning shortnose sturgeon move from overwintering grounds to spawning areas. Spawning occurs from mid/late April to mid/late May. Post-spawned sturgeon migrate downstream to feed throughout the summer.

As water temperatures decline below 8° C again in the fall, shortnose sturgeon move to overwintering concentration areas and exhibit little movement until water temperatures rise again in spring (NMFS 1998). Young-of-the-year shortnose sturgeon are believed to move downstream after hatching (NMFS 1998) but remain within freshwater habitats. Older juveniles tend to move downstream in fall and winter as water temperatures decline and the salt wedge recedes. Juveniles move upstream in spring and feed mostly in freshwater reaches during summer.

Shortnose sturgeon spawn in freshwater sections of rivers, typically below the first impassable barrier on the river (e.g., dam). Spawning occurs over channel habitats containing gravel, rubble, or rock-cobble substrates (NMFS 1998). Environmental conditions associated with spawning activity include decreasing river discharge following the peak spring freshet, water temperatures ranging from 9 -12 C, and bottom water velocities of 0.4 - 0.7 m/sec (NMFS 1998).

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. These include the Dennys, East Machias, Machias, Pleasant, Narraguagus, Ducktrap, and Sheepscot Rivers and Cove Brook. 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. While at sea, salmon generally undergo an extensive northward migration to waters off Canada and Greenland. Data from past commercial harvest indicate that post-smolts overwinter in the southern Labrador Sea and in the Bay of Fundy. 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 surfclam and ocean quahog fisheries.

Smalltooth sawfish

NMFS issued a final rule to list the DPS of smalltooth sawfish in the United States as an endangered species on April 1, 2003. Smalltooth sawfish are tropical marine and estuarine fish that have the northwestern terminus of their Atlantic range in the waters of the eastern United States. In the United States, smalltooth sawfish are generally a shallow water fish of inshore bars, mangrove edges, and seagrass beds, but larger animals can be found in deeper coastal waters. In order to assess both the historic and the current distribution and abundance of the smalltooth sawfish, a status review team collected and compiled literature accounts, museum collection specimens, and other records on the species. This information indicated that prior to around 1960, smalltooth sawfish occurred commonly in shallow waters of the Gulf of Mexico and eastern seaboard up to North Carolina, and more rarely as far north as New York. Subsequently their distribution has contracted to peninsular Florida and, within that area, they can only be found with any regularity off the extreme southern portion of the state. The current distribution is centered in the Everglades National Park, including Florida Bay (NMFS 2003).

Smalltooth sawfish have declined dramatically in U.S. waters over the last century, as indicated by publication and museum records, negative scientific survey results, anecdotal fishermen observations, and limited landings per unit effort (NMFS 2003). The fact that documented smalltooth sawfish catch records have declined during the twentieth century despite tremendous increases in fishing effort underscores the population reduction in the species. While NMFS lacks time-series abundance data to quantify the extent of the DPS's decline, the best available information indicates that the abundance of the U.S. DPS of smalltooth sawfish is at an extremely low level relative to historic levels.

The smalltooth sawfish continues to face threats from: (1) loss of wetlands, (2) eutrophication, (3) point and non point sources of pollution, (4) increased sedimentation and turbidity, (5) hydrologic modifications, and (6) incidental catch in fisheries (NMFS 2003). Commercial bycatch has played the primary role in the decline of this species.

While Federal, state, and interjurisdictional laws, regulations, and policies lead to overall environmental enhancements indirectly aiding smalltooth sawfish, very few have been applied specifically for the protection of smalltooth sawfish. Based on the species' low intrinsic rate of increase resulting from their slow growth, late maturation, and low fecundity, population recovery potential for the species is limited and the species is at risk of extinction. Current protective measures and conservation efforts underway to protect the smalltooth sawfish are confined to: actions directed at increasing general awareness of this species and the risks it faces; possession prohibitions in the state waters of Florida and Louisiana; and research being pursued by the Mote Marine Laboratory's Center for Shark Research. There are no Federal or state conservation plans for the smalltooth sawfish.

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 fishing gear. Human activities such as coastal development, habitat degradation, and the presence of organochlorine contaminants are considered the major threats to some seabird populations.

TABLES

Table 1. Landings of spiny dogfish (lbs) in the Northwest Atlantic Ocean for calendar years 1962 to 2003.

Year	US Comm	US Rec	US Total	Canada	Former 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	10,083,840	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	59,359,722	56,881	59,416,603	917,114	-	520,286	60,854,002
1997	45,034,114	146,295	45,180,409	983,252	-	471,784	46,635,445
1998	47,428,917	133,513	47,562,430	2,378,763	-	1,338,192	51,279,385
1999	33,862,195	119,378	33,981,573	5,438,748	-	1,221,348	40,641,669
2000	21,108,616	11,237	21,119,853	5,901,714	-	1,089,072	28,110,639
2001	5,056,407	61,760	5,118,167	8,278,273	-	665,789	14,062,229
2002	4,847,595	450,852	5,298,447	6,613,800	-	-	11,912,247
2003	2,486,825	87,307	9,159,825	2,799,842	-	-	5,373,974

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

Table 2. Commercial landings (1000's lbs) of spiny dogfish by state from calendar years 1996 through 2003.

State	1996	1997	1998	1999	2000	2001	2002	2003
Maine	911	449	274	35	8	0	1	0
New Hampshire	1,080	1,009	1,893	1,238	2,334	536	349	175
Massachusetts	26,812	21,664	24,911	14,915	5,762	3,912	3,799	2,006
Rhode Island	1,129	1,015	1,769	1,338	306	394	442	123
Connecticut	706	347	267	88	30	7	6	0
New York	1,246	489	1,457	1,453	1,906	63	50	38
New Jersey	4,632	3,950	6,305	3,925	5,222	17	1	0
Delaware	0	0	2	0	0	0	0	0
Maryland	7,151	4,227	2,399	2,134	450	0	2	1
Virginia	2,483	4,275	3,190	5,018	1,545	126	196	144
North Carolina	13,211	7,608	4,961	3,719	3,546	0	3	0
Total	59,360	45,034	47,429	33,862	21,109	5,056	4,848	2,487

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

Table 3. Commercial landings (1000's lbs) of spiny dogfish by state and month, 1996-2003 combined.

State	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maine	21	25	15	18	310	1,192	2,329	1,041	135	14	42	13
New Hampshire	68	46	30	94	187	1,848	2,908	3,585	1,755	1,340	1,218	239
Massachusetts	466	262	300	1,039	9,300	28,520	35,042	29,697	20,782	18,363	9,774	2,082
Rhode Island	848	205	88	430	424	1,319	412	714	873	1,076	573	655
Connecticut	156	70	86	167	96	254	114	39	127	287	256	92
New York	820	747	1,034	314	343	465	202	147	119	525	1,463	1,691
New Jersey	3,170	3,059	3,079	3,437	848	135	49	105	207	3,224	6,683	3,566
Delaware	0	0	0	0	0	1	1	0	0	0	0	0
Maryland	5,158	2,579	6,190	3,583	40	208	41	0	0	2	848	2,260
Virginia	6,332	3,918	2,591	1,623	560	55	13	8	3	13	508	2,453
North Carolina	9,195	13,392	11,773	860	10	18	1	4	1	2	420	5,782
NE Total	1,559	607	520	1,748	10,317	33,133	40,805	35,075	23,672	21,080	11,863	3,080
MA Total	24,675	23,695	24,667	9,817	1,801	882	307	264	331	3,765	9,922	15,752
GrandTotal	26,235	24,302	25,186	11,566	12,119	34,015	41,113	35,340	24,003	24,845	21,785	18,831

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

Table 4. Commercial spiny dogfish landings (lbs) for fishing year 2003 (Period I: May through Oct 2003; Period II: Nov 2002 through April 2004) .

	Period I		Period II		Total FY2003	
State	Landings	Percent of total	Landings	Percent of total	Landings	Percent of total
Massachusetts	2,005,770	85.4%	-	0.0%	2,005,770	63.9%
North Carolina	-	0.0%	422,689	53.6%	422,689	13.5%
Virginia	137,449	5.9%	221,531	28.1%	358,980	11.4%
New Hampshire	174,803	7.4%	-	0.0%	174,803	5.6%
Rhode Island	8,231	0.0%	121,148	0.0%	129,379	4.1%
New York	21,476	0.0%	19,309	0.0%	40,785	1.3%
Other	551	0.0%	4,221	0.5%	4,772	0.2%
Total	2,348,280	100.0%	788,898	100.0%	3,137,178	100.0%

	Period I						
Month	May	June	July	August	September	October	Total
Total Landings	134,119	23,327	2,172	514,608	828,006	846,048	2,348,280
Percent of Total	5.7%	1.0%	0.1%	21.9%	35.3%	36.0%	100.0%
	Period II						
Month	November	December	January	February	March	April	Total
Total Landings	30,238	87,365	363,324	126,071	85,057	96,843	788,898
Percent of Total	3.8%	11.1%	46.1%	16.0%	10.8%	12.3%	100.0%

Source: unpublished NMFS Dealer Weighout data.

Table 5. Ex-vessel value and price per pound of commercially landed spiny dogfish, Maine - North Carolina combined, 1996-2003.

Year	Value ($)	Price ($/lb)	FYear	Value ($)	Price ($/lb)
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	0.22
2002	988	0.21	2002	970	0.20
2003	344	0.14	2003	444	0.14

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

Table 6. Recreational landings (N) of spiny dogfish by state for 2003.

State	Landings (N)	Pct of Total
MASSACHUSETTS	7,702	48.5%
CONNECTICUT	2,728	17.2%
NEW JERSEY	1,286	8.1%
NEW YORK	940	5.9%
NORTH CAROLINA	934	5.9%
VIRGINIA	739	4.7%
MARYLAND	714	4.5%
NEW HAMPSHIRE	479	3.0%
DELAWARE	317	2.0%
RHODE ISLAND	35	0.2%
Total	15,874	100.0%

Source: Marine Recreational Fisheries Statistical Survey

Table 7. Commercial gear types associated with spiny dogfish harvest in FY2003 (May 1, 2003 - Apr 30, 2004).

Commercial Gear Type	Landings (lbs)	Pct Total
GILL NET,SINK	1,451,452	46.3%
LONGLINE, BOTTOM	1,438,120	45.8%
UNKNOWN/OTHER	157,453	5.0%
TRAWL,OTTER,BOTTOM,FISH	90,153	2.9%
Total	3,137,178	100.0%

Source: Unpublished NMFS dealer reports

Table 8. Discards associated with the deployment of the dominant gear types (sink gill nets and bottom long lines) used to harvest spiny dogfish in FY2003 (May 1, 2003 - Apr 30, 2004) as reported in vessel trip report (VTR) data.

Sink Gill Nets			Bottom Longlines		
Species	Discards (lbs)	Pct of Total	Species	Discards (lbs)	Pct of Total
DOGFISH SPINY	2,752,932	82.0%	DOGFISH SPINY	116,123	92.0%
COD	267,724	8.0%	COD	3,472	2.8%
MONKFISH	90,544	2.7%	SKATES	3,087	2.4%
SKATES	62,411	1.9%	HADDOCK	1,389	1.1%
DOGFISH SMOOTH	31,956	1.0%	Other	2,130	1.7%
Other	152,257	4.5%			

Source: FY2003 vessel trip reports

Table 9. Federally permitted dogfish vessel activity by home port state in FY2003. Active vessels are defined as vessels reported to have landed spiny dogfish in FY2003.

State	Permitted Vessels	Pct of Total	State	Active Vessels	Pct of Total
MA	1205	39.8%	NY	40	42.6%
ME	361	11.9%	RI	18	19.1%
NJ	343	11.3%	NC	12	12.8%
NY	314	10.4%	MA	11	11.7%
RI	194	6.4%	Other	13	13.8%
NC	164	5.4%			
VA	162	5.4%			
NH	122	4.0%			
CT	54	1.8%			
PA	33	1.1%			
Other	73	2.4%			
Total	3025	100.0%	Total	94	100%

Source: NMFS permit database

Table 10. Federally permitted spiny dogfish dealers by state in FY2003. Active dealers are defined as dealers who reported having bought spiny dogfish in FY2003.

State	Permitted Dealers	Pct of Total	State	Active Dealers	Pct of Total
MA	74	24.7%	NY	18	40.9%
NY	66	22.1%	RI	9	20.5%
RI	31	10.4%	NC	6	13.6%
NJ	30	10.0%	MA	5	11.4%
NC	29	9.7%	Other	6	13.6%
VA	25	8.4%			
ME	18	6.0%			
NH	8	2.7%			
MD	6	2.0%			
CT	4	1.3%			
Other	8	2.7%			
Total	299	100.0%	Total	44	100.0%

Source: NMFS permit database

Table 11. Commercial landings (1000s pounds) and value (1000s dollars) of spiny dogfish by port for fishing year 2003.

Port	Landings	Pct of Total	Value	Pct of Total
CHATHAM, MA	1,481,385	47.2%	180,829	40.7%
HATTERAS, NC	298,627	9.5%	35,841	8.1%
OTHER ACCOMAC, VA	250,162	8.0%	66,676	15.0%
PLYMOUTH, MA	213,714	6.8%	23,077	5.2%
GLOUCESTER, MA	197,423	6.3%	24,824	5.6%
PORTSMOUTH, NH	124,303	4.0%	18,070	4.1%
VIRGINIA BEACH/LYNNHAVEN, VA	108,557	3.5%	27,676	6.2%
HARWICHPORT, MA	99,220	3.2%	12,899	2.9%
LITTLE COMPTON, RI	69,217	2.2%	12,393	2.8%
AVON, NC	67,100	2.1%	8,002	1.8%
WANCHESE, NC	56,362	1.8%	7,236	1.6%
SEABROOK, NH	50,500	1.6%	9,090	2.0%
POINT JUDITH, RI	44,341	1.4%	4,770	1.1%
ALL OTHERS	76,267	2.4%	35,408	3.7%
TOTAL	4,761,669	100.0%	12,773	2.9%

Source: Unpublished NMFS Dealer Reports

Table 12. Ports where the value of spiny dogfish landings was greater than 1% of the value of total commercial landings in FY2003.

Port	Total Value	Dogfish Value	Pct Dogfish
SUFFOLK, MA	1,470	1,470	100.0%
HATTERAS, NC	1,050,421	35,841	3.4%
CHATHAM, MA	7,165,394	180,829	2.5%
HARWICHPORT, MA	551,000	12,899	2.3%
ACCOMAC, VA	3,430,468	66,676	1.9%
AVON, NC	488,879	8,002	1.6%
PLYMOUTH, MA	1,580,178	23,077	1.5%
VIRGINIA BEACH/LYNNHAVEN, VA	2,060,150	27,676	1.3%

Source: Unpublished NMFS Dealer Reports