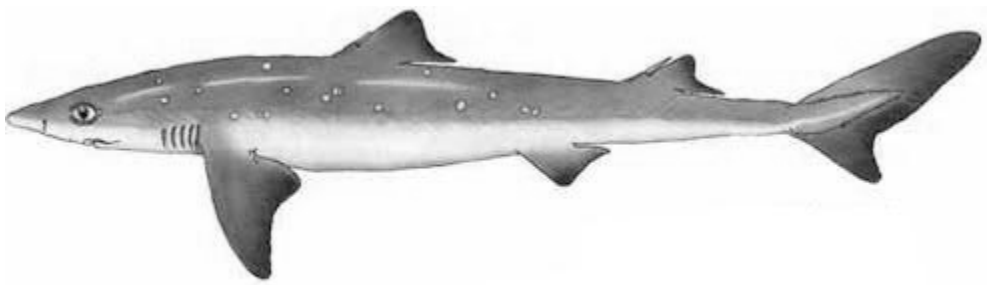
2011
Spiny Dogfish Specifications, Environmental Assessment, Regulatory Impact Review, and Initial Regulatory Flexibility Analysis



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1.0 EXECUTIVE SUMMARY

Statutory/Regulatory Basis

Pursuant to the Magnuson Stevens Fishery Conservation and Management Act of 1976 (MSA) as amended, the Northwest Atlantic stock of spiny dogfish (*Squalus acanthias*) is jointly managed by the Mid-Atlantic (MAFMC) and New England Fishery Management Councils (NEFMC; Councils) through the Federal Spiny Dogfish Fishery Management Plan (FMP). In accordance with the FMP, this document has been prepared as part of the specification process through which the Councils recommend an annual commercial quota and other management measures for spiny dogfish (50 CFR § 648 Subpart L). Additionally, in accordance with the National Environmental Policy Act of 1969 (NEPA) and the National Oceanic and Atmospheric Administration (NOAA) Administrative Order (NAO) 216-6, the environmental impacts of the recommended management actions and the anticipated level of significance of these impacts are addressed.

Management History/Objectives

The Federal Spiny Dogfish FMP was developed in 1998 and implemented in 2000 in order to halt large scale depletion of reproductively mature female spiny dogfish and allow the stock to recover to a sustainable level. This was a necessary management response under the MSA because the biomass of mature females (i.e. spawning stock biomass, or SSB) was below the biomass threshold such that the stock was deemed "overfished" (NEFSC 1997). The directed dogfish fishery of the 1990s harvested primarily the largest (80+ cm) spiny dogfish in the stock, and the species' life history is such that these market-size fish are primarily mature females. The rebuilding plan intended to constrain fishing mortality (F) on mature females at a rate ($F_{rebuild}$ = 0.11) that would rebuild the stock as quickly as possible. Because the commercial fishery concentrated on mature females, achieving $F_{rebuild}$ required the elimination of the directed fishery. Accordingly, catch quotas and trip limits were reflective of a small bycatch fishery. Management measures consistent with achieving $F_{rebuild}$ were maintained in federal waters throughout the rebuilding period. Because SSB increased substantially in response to rebuilding efforts, an increase in federal spiny dogfish quota from 4 M lbs (the fishing year –FY 2000 through 2008 quota) to 12 M lbs in FY2009 was possible while continuing to achieve $F_{rebuild}$. In June 2010, the spiny dogfish stock was formally declared rebuilt (Attachment A). The commercial quota for FY2010 increased to 15 M lbs to achieve an F target of 0.167, a level associated with a 98% probability of preventing overfishing from occurring.

In state waters, 0-3 nautical miles (nm) from shore, spiny dogfish are managed under the Atlantic States Marine Fisheries Commission (ASMFC) Interstate FMP for Spiny Dogfish. Both the state and federal FMPs apply to a single spiny dogfish stock along the Atlantic coast of the United States (i.e., in both state and federal waters from 0-200 nm). Importantly, although the FMPs are independent, allowing for different quotas in state or federal jurisdictional waters, the quotas established under the FMPs in a given year are *not* additive. As such, when the quota implemented under the Interstate FMP is higher than the federal quota, the federal quota is generally exceeded through the landing of spiny dogfish taken from state waters. For FY 2009 and FY2010, state and federal quotas were set consistently at 12 and 15 M lb respectively. Previous inconsistencies in the state and federal FMPs are likely to have prolonged the timeframe for stock recovery, are confusing for fishermen, and create administrative burden.

Stock Status

In January 2010, a TRAC (Transboundary Resource Assessment Committee) was convened for a benchmark stock assessment of spiny dogfish. The benchmark assessment was unsuccessful; however, participants in the TRAC were able to evaluate spiny dogfish biological reference points, the metrics used to determine the status of the stock. Following that review, the biomass (SSB) target is 159,288 mt (351 M lb) with ½ of that target corresponding to the SSB threshold (79,644 mt; 175.5 M lb). The updated fishing mortality (F) reference points are $F_{target} = 0.207$ and $F_{threshold} = 0.325$. In accordance with the Framework Adjustment 2 to the FMP, stock status determination criteria may be redefined through the specification process following review by an acceptable peer-review body, such as the TRAC reviewers. The TRAC reviewers noted that estimated SSB was above the defined SSB target in 2008 and 2009, consistent with a rebuilt stock. The Northeast Regional Office (NERO) communicated the rebuilt status of the stock to the Councils in June 2010 (Attachment A).

In September 2010, the Northeast Fisheries Science Center (NEFSC) further updated the status of the spiny dogfish stock using the most recent successful benchmark assessment approach (NEFSC 2006), 2009 catch data, and results from the 2010 trawl survey (Attachment B). The updated stochastic estimate of SSB for 2010 is 164,066 mt (362 M lbs), about 3% above SSB_{max} (159,288 mt). This corresponds to a *100% probability that the stock is not overfished*.

Several sources of removals contribute to the estimate of fishing mortality (F) for 2009. These include U.S. commercial landings (5,377 mt), Canadian commercial landings (113 mt), U.S. dead discards (5,897 mt), and U.S. recreational landings (34 mt). Total removals in 2009 were approximately 11,421 mt (23.871 M lbs) corresponding to an F estimate of 0.113, well below the overfishing threshold of F = 0.39 and essentially equivalent to $F_{rebuild} = 0.11$, specified for 2009. Therefore, *overfishing was not occurring* ($F_{2009} < F_{threshold}$).

Although biomass is above the target level, other information should also be considered for this stock. Low pup production from 1997 through 2003 has been implicated by survey catches of pups and is further supported by subsequent low survey catches of the size categories these age classes have grown into. As such, a decline in SSB is expected when these small year-classes recruit into the SSB (approximately 2015). Another potentially important factor is that the current survival rate for pups may be less than historic levels due to reduced maternal size and a skewed male to female sex ratio. Finally, as with all fish species, environmental variables are likely to be contributing to recruitment success, but no specific factor has been identified. The important point is that a simplistic comparison of current SSB to the SSB_{target} reference point may result in optimistic conclusions about the condition of the stock, and management measures should be appropriately precautionary.

Proposed Management Measures

The quota recommendations in this specification package are based upon the latest stock status information, given above. This information was reviewed by the MAFMC's Scientific and Statistical Committee at its September 2010 meeting and by the Councils at their October (MAFMC) and November (NEFMC) 2010 meetings. The “Preferred Alternative” consists of the

commercial quota and trip limit recommended by both the Mid-Atlantic and New England Councils.

In developing its recommendations for the 2011 fishing year (Attachment C), the MAFMC's Scientific and Statistical Committee (SSC) noted that long-term projections of SSB at the newly established F reference points resulted in biomass declining to levels near or below the biomass threshold. Because of this the SSC rejected the use of the existing reference points as they are currently defined, rejecting $F_{threshold}$ (0.325) outright and substituting F_{target} (0.207) to function as $F_{threshold}$. The SSC also noted that there are multiple sources of uncertainty in the model and the data and that spiny dogfish life history makes it vulnerable to overfishing. These factors determined how the SSC applied its risk policy in identifying the catch level that the Councils could recommend. Specifically, the SSC recommended 75% of the catch at $F_{threshold}$ (0.207), which corresponds to 15,200 mt (33.510 M lbs). Because of the problems with the existing F-reference points, the Council has requested that a formal review of these reference points be conducted by the NEFSC prior to the next specification cycle. The NEFSC has agreed to conduct this review and has recommended that the MAFMC's SSC as well as a member of the NEFMC's SSC comprise the review body.

In order to calculate a commercial quota consistent with the total catch recommended by the SSC, the Spiny Dogfish Monitoring Committee (MC) reduced total catch by all other sources of mortality (Canadian commercial landings, U.S. recreational landings, and U.S. discards (commercial and recreational). The MC used catch levels observed in 2009 as the basis for the reduction. The MC did not expect Canadian landings to return to historic levels, and expected a general decrease in commercial fishing effort, primarily for trawl gear which accounts for the majority of spiny dogfish discards. Starting with a total catch of 15,200 mt, a combined 6,044 mt are taken away to account for U.S. commercial and recreational discards (5,897 mt), Canadian commercial landings (113 mt), and U.S. recreational landings (34 mt). This leaves 9,156 mt (20.185 M lbs) for the commercial quota. The MC further reduced this to 20.0 M lbs to account for other sources of uncertainty.

The MAFMC and NEFMC are recommending a commercial quota of 20.0 M lbs and commercial trip limits of 3,000 lbs for FY2011. Although Framework Adjustment 1 established an allowance for management measures to be established in a given specification setting year for up to five subsequent years, the Councils are recommending that the specifications and management measures be set for fishing year 2011 only. This is primarily because of the formal review of the F-reference points for the stock that has been requested prior to the next specification cycle.

Alternative 1 – (Status Quo – Set quota to maintain current FY2010 level: 15.0 M lb): For FY2011, specify a commercial quota of 15.0 M lbs with trip limits of 3,000 lbs (vessels are prohibited from landing more than the specified amount in one calendar day). As per the FMP, the quota would be divided with quota Period 1 (May 1 through October 31) allocated 57.9% of the quota (8.685 M lbs), and quota Period 2 (November 1 through April 30) allocated 42.1% of the quota (6.315 M lbs).

According to CEQ regulations, the No Action Alternative should be used for the purposes of evaluating an environmental baseline. A "true" No Action Alternative for dogfish fishery

management, however, is not equivalent to status quo or baseline conditions. If the actions proposed in this document are not taken, some current management measures will remain in place (i.e. 3,000 lb trip limit), but the overall management program will not be identical to that of 2010 (i.e. there would be no specified quota for FY 2011). The "true" No Action Alternative for this fishery is infeasible and inconsistent with the FMP which requires specifications, or quotas, to be established for the fishery. Therefore, the "true" No Action Alternative is not analyzed in this document.

Alternative 2 – (Councils' Preferred Alternative – Set quota to achieve SSC recommendation - 75% of catch at Fmsy: 20.0 M lbs): For FY2011, specify a commercial quota of 20.0 M lbs with trip limits of 3,000 lbs (vessels are prohibited from landing more than the specified amount in one calendar day). As per the FMP, the quota would be divided with quota Period 1 (May 1 through October 31) allocated 57.9% of the quota (11.580 M lbs), and quota Period 2 (November 1 through April 30) allocated 42.1% of the quota (8.420 M lbs).

Alternative 3 – (Set quota to achieve existing F_{target} (0.207): 31.4 M lbs): For FY2011, specify a commercial quota of 31.4 M lbs with trip limits of 3,000 lbs (vessels are prohibited from landing more than the specified amount in one calendar day). As per the FMP, the quota would be divided with quota Period 1 (May 1 through October 31) allocated 57.9% of the quota (18.2 M lbs), and quota Period 2 (November 1 through April 30) allocated 42.1% of the quota (13.2 M lbs).

Impacts of the Management Actions

The 20.0 million lb quota under Alternative 2 is consistent with the SSC and MC recommendations. None of the alternatives are expected to result in significant impacts to non-target species (including fish and protected resources) and habitat. Specifically, Alternative 2 is not expected to have a negative impact on Atlantic sturgeon for the entirety of FY 2011. As discussed in Section 6.4, any increase in fishing effort from the increase in quota under Alternative 2 will likely occur in the bottom longline fishery, which will not affect Atlantic sturgeon. The 20 million lb quota would result in greater economic benefits than Alternative 1 and lower short-term benefits compared to Alternative 3. Alternative 2 is not associated with significant direct or indirect impacts and has a positive cumulative impact in the context of other ongoing activities.

Further discussion on the impacts of the alternatives is presented in Section 7.0, and summarized in Table E-1 below. Table E-1 presents a qualitative summary of the direct and indirect impacts of the various management alternatives.

Table E-1. Qualitative summary of the expected impacts of various alternatives considered for the spiny dogfish specifications.

Proposed Federal Action		Valued Ecosystem Component (VEC)				
Spiny Dogfish Management Alternatives		**Target Species**	**Non-target/Bycatch Species**	**Habitat (including Essential Fish Habitat [EFH])**	**Protected Resources**	**Human Communities**
Alt. 1 Set quota to maintain status quo quota	Quota: 15 M lbs Trip Limits: 3,000 lbs	**Positive** Fishing mortality is minimized among the alternatives.	**Very Low Negative** Low level discarding will continue to occur with status quo fishing effort.	**Very Low Negative** Low level gear impacts on habitat will continue to occur with status quo fishing effort.	**Potential Low Negative** Low level encounters will continue to occur with status quo fishing effort.	**Positive** Overall revenue levels are expected to be maintained with status quo landings
Alt. 2 Set quota to achieve 75% of catch at Fmsy	Quota: 20.0 M lbs Trip Limits: 3,000 lbs	**Positive** Fishing mortality consistent with risk averse harvest policy.	**Low Negative** Discarding more likely to increase compared to Alt 1, less than Alt 3 (function of relative size of quotas)	**Low Negative** Habitat impacts more likely to increase compared to Alt 1, less than Alt 3 (function of relative size of quotas	**Negative** Encounters more likely to increase compared to Alt 1, less than Alt 3 (function of relative size of quotas). Any increase in encounters likely in bottom longline gear.	**Positive** Overall revenue increases expected
Alt. 3 Set quota to achieve F_{target} (0.207)	Quota: 31.4 M lbs Trip Limits: 3,000 lbs	**Low Negative** Highest fishing mortality rate among the alternatives, but not expected to result in overfishing.	**Negative** Discarding more likely to increase compared to Alts 1,2 (function of larger quota)	**Negative** Habitat impacts more likely to increase compared to Alts 1,2 (function of larger quota)	**Negative** Encounters more likely to increase compared to Alts 1,2 (function of larger quota)	**Positive** Overall revenue increases expected

2.0 LIST OF ACRONYMS

ACCSP	Atlantic Coastal Cooperative Statistics Program
ACFCMA	Atlantic Coastal Fisheries Cooperative Management Act
ASMFC	Atlantic States Marine Fisheries Commission
B	Biomass
CEQ	Council on Environmental Quality
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EO	Executive Order
ESA	Endangered Species Act of 1973
F	Fishing Mortality Rate
FR	Federal Register
FMP	Fishery Management Plan
FONSI	Finding of No Significant Impact
FY	Fishing Year
HPTRP	Harbor Porpoise Take Reduction Plan
IRFA	Initial Regulatory Flexibility Analysis
M	Natural Mortality Rate
MC	Spiny Dogfish Monitoring Committee
MAFMC	Mid-Atlantic Fishery Management Council
MMPA	Marine Mammal Protection Act
MRFSS	Marine Recreational Fisheries Statistical Survey
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSRA	Magnuson-Stevens Fishery Conservation and Management Reauthorization Act
MSY	Maximum Sustainable Yield
mt	metric tons
NAO	NOAA Administrative Order
NE	New England
NEFMC	New England Fishery Management Council
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
nm	nautical mile
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
PBR	Potential Biological Removal
PRA	Paperwork Reduction Act
RFA	Regulatory Flexibility Act
RIR	Regulatory Impact Review
SARC	Stock Assessment Review Committee
SAW	Stock Assessment Workshop
SSB	Spawning Stock Biomass
SFA	Sustainable Fisheries Act
VECs	Valued Ecosystem Components
VTR	Vessel Trip Report

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4.0 INTRODUCTION AND BACKGROUND OF SPECIFICATION PROCESS

4.1 Purpose and Need for the Action

The purpose of this action is to set federal spiny dogfish specifications and management measures for FY 2011(May 1, 2011 - April 30, 2012). As required by the FMP, this action is needed to establish a commercial fishing quota and any other management measures that will ensure that the (appropriate) target fishing mortality rate for spiny dogfish is not exceeded in any given year. 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.

Basis of Specifications and Management Measures

The FMP established a procedure to develop specifications and management measures based on analyses of fishery and scientific information by the Spiny Dogfish MC. Furthermore, the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (MSRA) mandates review of management measures by the Mid-Atlantic Council's SSC.

As announced in the Federal Register (75 FR 55743), the MAFMC's SSC met September 21, 2010 to determine the ABC for spiny dogfish for FY2011. A subsequent meeting to identify the appropriate commercial quota and trip limit for 2011 was held by the MAFMC's MC on September 24, 2010 (75 FR 53952).

In developing its recommendations for the 2011 fishing year (Attachment C), the MAFMC's SSC noted that long-term projections of SSB at the newly established F reference points resulted in biomass declining to levels near or below the biomass threshold. Because of this the SSC rejected the use of the existing reference points as they are currently defined, rejecting $F_{threshold}$ (0.325) outright and substituting F_{target} (0.207) to function as $F_{threshold}$. The SSC also noted that there are multiple sources of uncertainty in the model and the data and that spiny dogfish life history makes it vulnerable to overfishing. These factors determined how the SSC applied its risk policy in identifying the catch level that the Councils could recommend. Specifically, the SSC recommended 75% of the catch at $F_{threshold}$ (redefined as 0.207), which corresponds to 15,200 mt (33.510 M lbs). Because of the problems with the existing F-reference points, the Council has requested that a formal review of these reference points be conducted by the NEFSC prior to the next specification cycle. The NEFSC has agreed to conduct this review and has recommended that the MAFMC's SSC as well as a member of the NEFMC's SSC comprise the review body.

In order to calculate a commercial quota consistent with the total catch recommended by the SSC, the MC reduced total catch by all other sources of mortality (Canadian commercial landings, U.S. recreational landings, and U.S. discards (commercial and recreational). The Committee used catch levels observed in 2009 as the basis for the reduction. The MC did not expect Canadian landings to return to historic levels, and expected a general decrease in commercial fishing effort, primarily for trawl gear which accounts for the majority of spiny dogfish discards. Starting with a total catch of 15,200

mt, a combined 6,044 mt are taken away to account for U.S. commercial and recreational discards (5,897 mt), Canadian commercial landings (113 mt), and U.S. recreational landings (34 mt). This leaves 9,156 mt (20.185 M lbs) for the commercial quota. The MC further reduced this to 20.0 M lbs to account for other sources of uncertainty. The MC also recommended setting trip limits at 3,000 lbs which would maintain status quo. According to the specification process laid out in the FMP, the Joint Spiny Dogfish Committee reviewed the recommendation of the MC and endorsed the 20 M lb quota and 3,000 lb trip limit as their recommendation to the Councils.

The Councils received the recommendations of the various Committees and adopted the recommendations outlined in Section 5.0.

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

Three alternatives are presented for consideration as specifications and management measures for the dogfish fishery for FY2011. These alternatives were based on the Councils' recommendations and informed by the recent stock assessment update which indicated that the spiny dogfish stock is rebuilt, is not overfished, and that overfishing is not occurring. Box 5.0.1 below shows commercial quota, total catch, and F estimates under the three alternatives. Note that under no alternative are trip limits, minimum or maximum sizes, seasons, mesh size or any other gear restrictions considered. Currently there are no gear or size restrictions for the spiny dogfish fishery. A 3,000 lb trip limit (daily possession limit) is in place for the commercial fishery and would stay in place under each alternative. In order to be consistent with the MC's calculations, total catch = the specified commercial quota + 6,044 mt (other sources of mortality). The corresponding fishing mortality estimates under each quota are taken from the projection

tables provided in the NEFSC (unpubl. 2010; Attachment B) update on stock status. For Alternatives 1 and 2, the total catch is less than any of the projected scenarios and as such, fishing mortality under these scenarios is listed as less than (<) or much less than (<<) the lowest fishing mortality rate given in the projection tables for 2011 (0.173). Alternative 1 represents the most conservative approach and would maintain the status quo quota (15 M lbs) while achieving F <<0.173 in FY2011. Alternative 2 is based on the recommendations of the MAFMC's SSC and is derived from total catch at 75% of Fmsy, where Fmsy is 0.207 as temporarily redefined by the SSC. Alternative 3 is based on achieving the Ftarget as currently defined in the FMP (0.207) for a rebuilt stock and the commercial quota is calculated directly from the projection scenario for Ftarget provided in NEFSC (unpubl. 2010; Table 9 in Attachment B). In basing expected discards on observed 2009 levels, the MC departed from the discards in the projection tables in NEFSC (unpubl. 2010) where discards were assumed to be proportional to landings. In reviewing discard levels relative to landings, the MC observed that discards did not appear to be proportional to landings.

Although the No Action Alternative is required by NEPA for comparing the impacts of actions against baseline conditions, in this case Alternative 1 represents the status quo baseline conditions since the stock was declared rebuilt in 2010. No other alternatives were considered and analyzed in this EA.

Box 5.0.1. Calculation of commercial quota under the three management alternatives

	A	+ B		= C		
	Canadian landings (113 mt) + U.S. discards (5,897 mt) + U.S. recreational landings (34 mt)	U.S. Comm quota (mt)	U.S. Comm quota (M lbs)	Total catch (mt)	Total catch (M lbs)	Fishing Mortality Rate (F)
Alternative 1	6,044mt (13.325 M lbs)	6,804	15.000	12,848	28.325	<< 0.173
Alternative 2		9,156	20.000	15,200	33.510	< 0.173
Alternative 3*		14,223	31.356	20,267	44.681	0.207

* Calculated as C – A = B, where C is from Table 9 in Attachment B.

5.1 Alternative 1 – (Status Quo – Set quota to maintain current FY2010 level: 15.0 M lb)

For FY2011, specify a commercial quota of 15.0 M lbs with trip limits of 3,000 lbs (vessels are prohibited from landing more than the specified amount in one calendar day). As per the FMP, the quota would be divided with quota Period 1 (May 1 through October 31) allocated 57.9% of the quota (8.685 M lbs), and quota Period 2 (November 1 through April 30) allocated 42.1% of the quota (6.315 M lbs).

According to CEQ regulations, the No Action Alternative should be used for the purposes of evaluating an environmental baseline. A "true" No Action Alternative for dogfish fishery management, however, is not equivalent to status quo or baseline conditions. If the actions proposed in this document are not taken, some current management measures

will remain in place (i.e. 3,000 lb trip limit), but the overall management program will not be identical to that of 2010 (i.e. there would be no specified quota for FY 2011). The "true" No Action Alternative for this fishery is infeasible and inconsistent with the FMP which requires specifications, or quotas, to be established for the fishery. Therefore, the "true" No Action Alternative is not analyzed in this document.

5.2 Alternative 2 – (Councils' Preferred Alternative – Set quota to achieve SSC recommendation - 75% of catch at Fmsy: 20.0 M lbs)

For FY2011, specify a commercial quota of 20.0 M lbs with trip limits of 3,000 lbs (vessels are prohibited from landing more than the specified amount in one calendar day). As per the FMP, the quota would be divided with quota Period 1 (May 1 through October 31) allocated 57.9% of the quota (11.580 M lbs), and quota Period 2 (November 1 through April 30) allocated 42.1% of the quota (8.420 M lbs).

5.3 Alternative 3 – (Set quota to achieve existing Ftarget (0.207): 31.4 M lbs)

For FY2011, specify a commercial quota of 31.4 M lbs with trip limits of 3,000 lbs (vessels are prohibited from landing more than the specified amount in one calendar day). As per the FMP, the quota would be divided with quota Period 1 (May 1 through October 31) allocated 57.9% of the quota (18.2 M lbs), and quota Period 2 (November 1 through April 30) allocated 42.1% of the quota (13.2 M lbs).

6.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT AND FISHERIES

The Valued Ecosystem Components (VECs) affected by the alternatives include the spiny dogfish resource, non-target/bycatch species, protected resources, habitat including Essential Fish Habitat (EFH), and human communities/socio-economic environment, all of which are described below.

6.1 Spiny Dogfish Stock and Fisheries

In the sections below, the biology of the stock, history and current status of the stock, as well as U.S. and Canadian catch information is presented. Currently, there is a small directed fishery for spiny dogfish. Discards are about equal to total landings but have been declining for the last 4 years (see Table 2 in Attachment B).

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 of the FMP. A summary is provided here.

The spiny dogfish, *Squalus acanthias*, is a small coastal shark with a circumboreal distribution (i.e., in the Northern region of the Atlantic Ocean). 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 (living near the surface of the ocean floor), 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 inches and 6 years for males and 30.6 inches 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 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. The current estimate of the natural mortality rate is 0.092, which was the value assumed for spiny dogfish greater than 12 inches 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

Historic Stock Status

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 lbs). A large scale unregulated fishery developed and quickly depleted the stock of mature female spiny dogfish such that in 1997 a stock assessment showed that the stock was overfished (NEFSC 1997). A Federal Spiny Dogfish FMP was developed in 1998 and implemented in 2000 in order to halt further depletion of mature female spiny dogfish and allow the stock to recover to a sustainable level. Because the directed commercial fishery concentrated on mature females, achieving $F_{rebuild}$ required the elimination of the directed fishery. Accordingly, an incidental catch quota (4.0 M lbs) and restrictive trip limits (600 lbs per trip in quota Period 1 and 300 lbs per trip in quota Period 2[1]) were established upon implementation of the FMP and maintained through FY2008. Rebuilding efforts were highly successful and the commercial quota was allowed to increase from 4.0 M lbs to 12 M lbs in FY2009 while still achieving $F_{rebuild}$.

[1] The annual commercial quota is distributed between two periods (Period 1 is May 1 - October 31 and Period 2 is November 1 - April 30) based on the historical percentage of commercial landings for each semi-annual period during the years 1990 through 1997. Period 1 is allocated 57.9% of the annual quota and Period 2 is allocated 42.1%. This is intended to preserve the traditional distribution of landings, both geographically and seasonally.

In state waters, 0-3 nautical miles (nm) from shore, spiny dogfish are managed under the ASMFC Interstate FMP for Spiny Dogfish. Spiny dogfish management measures in state-jurisdictional waters are implemented through the Interstate FMP and have differed from federal measures until recently (Box 6.1.2.1). The Federal and Interstate FMPs apply to the entire spiny dogfish population along the Atlantic coast of the United States (i.e., in both state and federal waters from 0-200 nm). As such, when the state waters quota has been greater than the federal quota, the federal quota has been exceeded through the landing of spiny dogfish from state waters. For FY2010, state and federal quotas were set consistently at 15 M lb. Previous inconsistencies in the Interstate and Federal FMPs are likely to have prolonged the timeframe for stock recovery, are confusing for fishermen, and create administrative burden.

Current Stock Status

In January 2010, a TRAC (Transboundary Resource Assessment Committee) was convened for a benchmark stock assessment of spiny dogfish. The benchmark assessment was unsuccessful; however, participants in the TRAC were able to evaluate spiny dogfish biological reference points, the metrics used to determine the status of the stock. Following that review, the biomass (SSB) target is 159,288 mt (351 M lb) with ½ of that target corresponding to the SSB threshold (79,644 mt; 175.5 M lb). The updated fishing mortality (F) reference points are $F_{target} = 0.207$ and $F_{threshold} = 0.325$. In accordance with the Framework Adjustment 2 to the FMP, stock status determination criteria may be redefined through the specification process following review by an acceptable peer-review body, such as the TRAC reviewers. The TRAC reviewers noted that estimated SSB was above the defined SSB target in 2008 and 2009, consistent with a rebuilt stock. The Northeast Regional Office (NERO) communicated the rebuilt status of the stock to the Councils in June 2010 (Attachment A).

Several sources of removals contribute to the estimate of fishing mortality (F) for 2009. These include U.S. commercial landings (5,377 mt), Canadian commercial landings (113 mt), U.S. dead discards (5,897 mt), and U.S. recreational landings (34 mt). Total removals in 2009 were approximately 11,421 mt (23.871 M lbs) corresponding to an F estimate of 0.113, well below the overfishing threshold of F = 0.39 and essentially equivalent to $F_{rebuild} = 0.11$, specified for 2009. Therefore, *overfishing was not occurring* ($F_{2009} < F_{threshold}$).

In September 2010, the Northeast Fisheries Science Center (NEFSC) further updated the status of the spiny dogfish stock using the most recent successful benchmark assessment approach (NEFSC 2006), 2009 catch data, and results from the 2010 trawl survey. The updated stochastic estimate of SSB for 2010 is 164,066 mt (362 M lbs), about 3% above SSB_{max} (159,288 mt). This corresponds to a *100% probability that the stock is not overfished*.

Although biomass is above the target level, other information should also be considered for this stock. Low pup production from 1997 through 2003 has been implicated by survey catches of pups and is further supported by subsequent low survey catches of the size categories these age classes have grown into. As such, a decline in SSB is expected when these small year-classes recruit into the SSB (approximately 2015). Another

potentially important factor is that the current survival rate for pups may be less than historic levels due to reduced maternal size and a skewed male to female sex ratio. Finally, as with all fish species, environmental variables are likely to be contributing to recruitment success, but no specific factor has been identified. The important point is that a simplistic comparison of current SSB to the SSB_{target} reference point may result in optimistic conclusions about the condition of the stock, and management measures should be appropriately precautionary.

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. Calendar year harvest estimates from 1962-2009 are provided 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 of the FMP (MAFMC 1999). Since the federal FMP was implemented in 2000, annual landings of spiny dogfish have declined considerably (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 from state and federal waters, as well as Canadian commercial landings (Table 1). Canadian commercial discards are not currently estimated.

6.1.3.1.1 U.S. Commercial Spiny Dogfish Landings

From FY2000-2008, landings of spiny dogfish from the EEZ were constrained by a 4.0 million pound federal quota. Substantial increases in SSB since 2000 allowed for an increase in the federal quota in FY2009 to 12 M lbs while still maintaining the rebuilding period F target ($F_{rebuild} = 0.11$). Under the interstate FMP, the state water quota was set at 4.0 M lbs in FY2006, 6.0 M lbs in FY2007, 8.0 M lbs in FY2008 and finally 12.0 M lbs in FY2009. Landings relative to the different jurisdictional quotas are given in Box 6.1 below. Note that in FY2010, the commercial quota implemented in state waters was lower than for federal waters. Both quotas were based on the same scientific advice, however, the state water quota reflects reductions for overages in accordance with Addendum 2 to the ISFMP. Similar accountability measures will be applied in federal waters following implementation of Amendment 2 to the federal FMP.

Box 6.1. Specified quotas (M lb) in federal and state jurisdictional waters as well as aggregate landings (M lb) by fishing year.

Fishing year (May 1 - Apr 30)	Quota (M lb)		Landings (M lb)
	Federal quota	States' quota	
2000	4.0	n/a	8.2
2001	4.0	n/a	5.1
2002	4.0	n/a	4.8
2003	4.0	8.8	3.2
2004	4.0	4.0	1.5
2005	4.0	4.0	2.6
2006	4.0	6.0	6.6
2007	4.0	6.0	6.5
2008	4.0	8.0	9.0
2009	12.0	12.0	11.9
2010	15.0	14.4	-

Commercial harvest has historically been dominated by Massachusetts (Table 2). Starting in 2007, dogfish landings from Virginia were greater than or approximately equivalent to those of Massachusetts. State-by-state landings since 2007 are influenced by the regional allocation of commercial quota through the ASMFC's Interstate FMP. Currently, that FMP specifies that the annual commercial quota be allocated to two regions (north and south) and North Carolina. Specifically, 58% of the quota is allocated to the northern region (Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut), 26% to the southern region (New York, New Jersey, Delaware, Maryland, Virginia), and 16% to North Carolina.

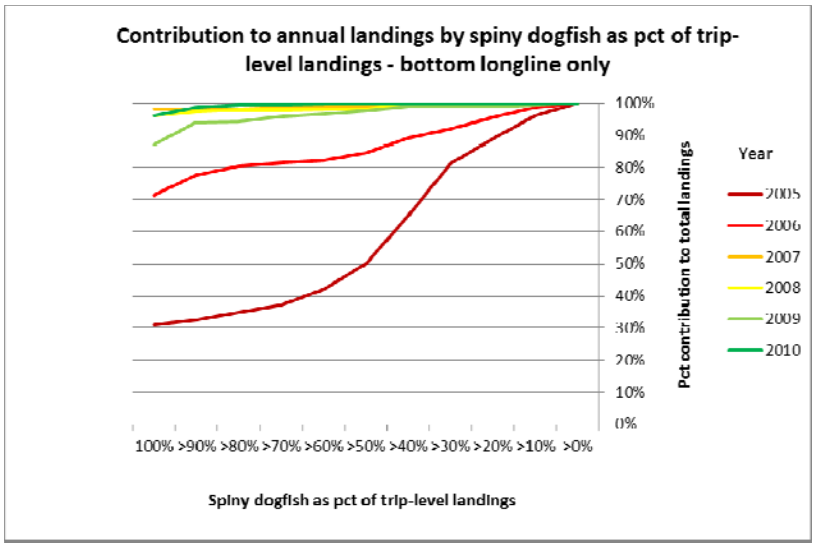
U.S. commercial landings in calendar year 2009 were 11.882 M lbs, which is about 19.7% of the 1996 high (60.055 M lbs; Table 1). Unpublished NMFS dealer reports indicate that the total ex-vessel value of commercially landed spiny dogfish in calendar year 2009 was about $2.544 million, and in fishing year 2009 was about $2.360 million making the approximate price/lb of spiny dogfish $0.21 in calendar year 2009 and $0.2 in fishing year 2009 (Table 3).

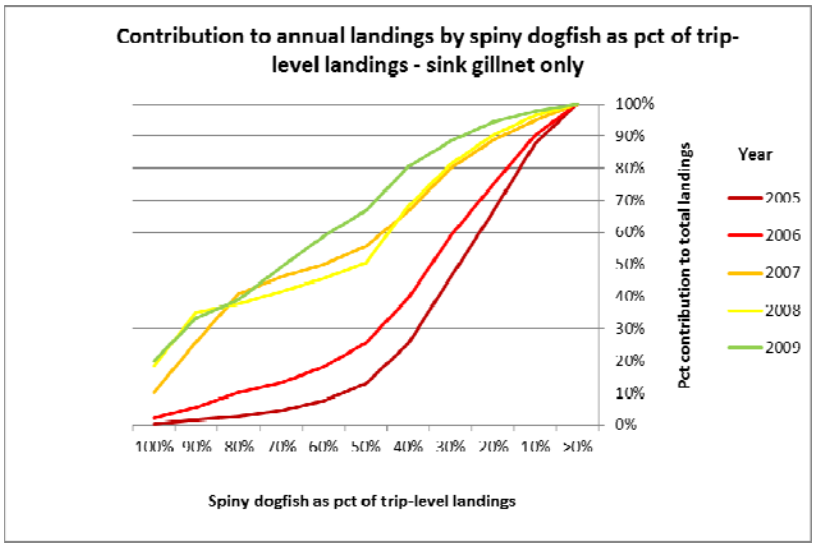
Commercial landings in FY2009 (11.882 M lbs) represented about a 31% increase from FY2008 landings (9.057 M lbs). Spiny dogfish were landed in all months except May in FY2009 with peak landings occurring in July-September of Period 1 and November-January of Period 2 (Table 4).

Certain commercial gear types are associated with the retention of spiny dogfish in federal waters. The catch of spiny dogfish by gear in FY2009 is given in Table 5. These data indicate that spiny dogfish landings came mostly from gill nets (67.42%), bottom otter trawls (13.13%), hook and line (11.93%), as well as unknown (5.78%) or other gear (1.92%).

Directed Fishing.

By design, low-level commercial landings of spiny dogfish were an artifact of activity in other fisheries during the rebuilding period (2000 – 2009). Beginning in 2009, however, increases in annual quota, and more importantly, an increase in the commercial trip limit, made directed effort on spiny dogfish in federal waters more likely. Overall landings as a function of proportional trip-level landings by gear was examined using federal vessel trip report (VTR) data from 2005 – (partial year) 2010. Figure 1 illustrates the results of this exercise for the three major gear-types that are associated with spiny dogfish landings (bottom longline, sink gillnet, and bottom otter trawl. For all gear types, trips where spiny dogfish comprised the majority (>50%) of trip-level landings contributed more to overall landings in 2009-2010 than in 2005-2006. Differences among gear types, however, are evident. In 2009-2010, the bulk (e.g., 90%) of bottom otter trawl landings of spiny dogfish came from trips where spiny dogfish comprised at least 10-20% of the trip-level landings. For sink gillnets the bulk of landings (90%) came from trips where spiny dogfish were 30-40% of trip-level landings. In contrast, the bulk (90%) of bottom longline landings came from trips where spiny dogfish were at least 90% of trip-level landings. These findings suggest, but do not prove, that directed fishing has increased somewhat across gear types. However, it appears that directed fishing is very limited in the trawl fishery and most likely to occur in the bottom longline fishery with sink gillnets somewhere in the middle. The degree to which directed fishing is occurring becomes important in the analysis gear-specific impacts on habitat and non-target species (including protected resources).





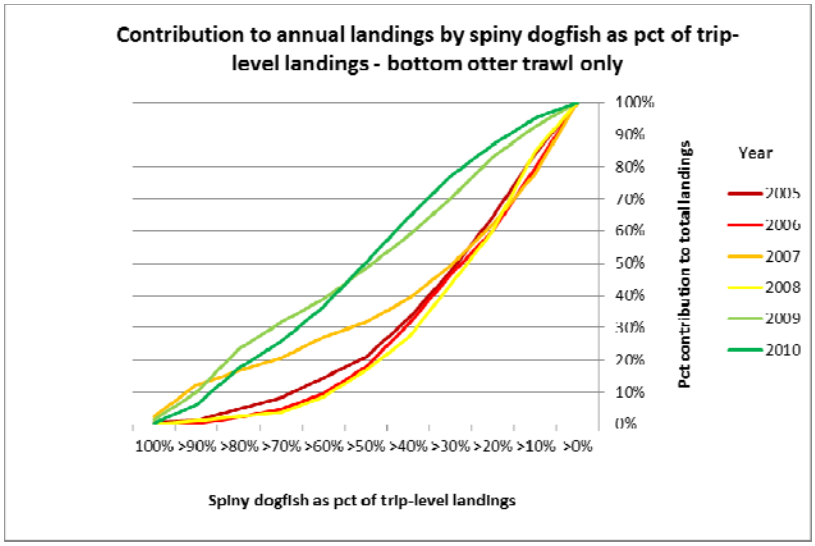


Figure 1. Total annual landing of spiny dogfish as a function of proportional trip-level landings by gear type. Source: Vessel trip report database. Note: As of the submission of this document, there were no gillnet landings reported in the VTR database for 2010.

6.1.3.1.2 U.S. Commercial Spiny Dogfish Discards

A method for estimating spiny dogfish discards as a function of landings from various commercial fishing sectors (catch-based method) was developed in NEFSC (Wigley et al. 2007). Following this method, dead discards are calculated as the product of total estimated discards by gear type and proportional mortality by gear type. Proportional mortalities by gear type were reviewed in NEFSC (2006) and are currently assumed to be 50% for trawls, 30% for gillnets, and 10% for hook gear. Dead discards from U.S. commercial fishing activity appear to have peaked at about 19,000 mt (41.9 M lbs) in 1992, and subsequently declined and stabilized at around 5,000 mt (11.0 M lbs) since 1997 . In 2009, dead discards from U.S. commercial fisheries were estimated to be about 5,324 mt (11.7 M lbs). Although landings of dogfish are dominated by gillnet and hook and line gear, the predominant discard gear is otter trawl. NEFSC (2010 unpubl.) includes estimates of dead discards (2009 only) by gear category: otter trawl – 3,505 mt (7.727 M lbs), sink gill net – 1,462 mt (3.223 M lbs), scallop dredge – 273 mt (0.602 M lbs), and line gear 84 mt (0.185 M 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 exceeded U.S. commercial landings for the first time. Canadian commercial landings have fluctuated since then (Table 1). In 2008, Canadian landings were about 1,572 mt (3.466 M lbs), but in 2009 landings dropped precipitously to 113 mt (0.249 M lbs). Although Canada has allowed a directed fishery under a 2,500 mt (5.512 M lbs) quota with no trip limits, market conditions in 2009 were unfavorable for the Canadian fishery.

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). The estimated recreational discard mortality is 20% compared to the assumed discard mortality for commercially caught spiny dogfish from hook and line gear which is 10%. The higher mortality rate is based on spiny dogfish being generally caught with live bait, which can result in deep hooking, and also that dogfish are often mishandled by anglers. The 20% recreational mortality rate is in the upper range of recreational mortality rates applied by the NEFSC based on Malchoff (1995). Total recreational removals (landings [75 mt] + dead discards [574 mt]) for 2009 were estimated to be about 649 mt (1.430 M lbs) which is roughly consistent with levels reported in NEFSC (2006) since 2001. As indicated in Table 6, New Jersey accounted for the largest share of the recreational landings (34.42%), followed by Massachusetts (34.24%), Delaware (11.17%), New Hampshire (7.50%), Georgia (5.18%), Maryland (2.18%), and 1.92% from all other states.

6.2 Non-target Species

An analysis of discards associated with the harvest of spiny dogfish in 2009 was informed by the analysis in Section 6.1.3.1 regarding directed fishing. The general approach was to tabulate gear-specific discards from the Northeast Fisheries Observer Program (NEFOP) data that are associated with the bulk of spiny dogfish landings (e.g., 90%+ of total landings). The degree to which those landings come from trips consisting of mostly spiny dogfish makes is more likely that discards are a result of directed spiny dogfish effort. Accordingly, discards are likely to be associated with directed spiny dogfish effort in longline gear where 95% of the landings come from trips consisting of 90% dogfish or more by weight. Discards are less tied to directed spiny dogfish effort in the gillnet fishery where accounting for 90% of total landings includes trips consisting of 30% dogfish by weight. Lastly, the bottom trawl fishery, where 90% of the spiny dogfish landings include trips where dogfish are as little as 10% of the trip-level catch are more likely to be associated with incidentally caught dogfish such that discards of other species are least likely to be a function of directed spiny dogfish effort.

On observed trips in 2009 when spiny dogfish were landed at the proportions listed for the gear types above, spiny dogfish comprised 95.9% of the discards for bottom longlines, 72.8% for sink gillnets, and 23.0% for bottom otter trawls. Spiny dogfish was the number one discard species by weight for all gear types. There was very limited discarding in the bottom longline fishery with only five species among the discards besides dogfish when any spiny dogfish were landed. Other species reported to be discarded included Atlantic cod in both sink gill nets (5.2%) and hook gear (1.8 %), as well as black sea bass and striped bass in hook gear (both 1.8%). All other species comprised less than 1% of discards in these two gear types. A wider variety of discarded species occurred in bottom otter trawl catches (Table 7).

6.3 Physical Environment and Essential Fish Habitat (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 species managed by the New England and Mid-Atlantic Fishery Management Councils. 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 Section 6.1, there has been no large directed fishery for spiny dogfish in federal waters since FY2000. Commercial gear types used to harvest spiny dogfish include sink gill nets, hook gear, and to a much lesser extent bottom otter trawls (Table 6). Over two-thirds of the reported landings of spiny dogfish in FY 2009 were caught in sink gill nets, 13% in bottom trawls, and 12% from hook and line. Of these three gear types, the bottom otter trawl is the only gear known to significantly affect benthic marine habitats (NRC 2002, Morgan and Chuenpagdee 2003, Stevenson et al. 2004).

Physical Environment

The Northeast U.S. Shelf Ecosystem has been described as including the area from the Gulf of Maine south to Cape Hatteras, extending from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream (Figure 2). The continental slope includes the area east of the shelf, out to a depth of 2000 m. Four distinct sub-regions comprise the NOAA Fisheries Northeast Region: the Gulf of Maine, Georges Bank, the Mid-Atlantic Bight, and the continental slope. Occasionally another sub-region, Southern New England, is described; however, we incorporated discussions of any distinctive features of this area into the sections describing Georges Bank and the Mid-Atlantic Bight.

The Gulf of Maine is an enclosed coastal sea, characterized by relatively cold waters and deep basins, with a patchwork of various sediment types. Georges Bank is a relatively shallow coastal plateau that slopes gently from north to south and has steep submarine canyons on its eastern and southeastern edge. It is characterized by highly productive, well-mixed waters and strong currents. The Mid-Atlantic Bight is comprised of the sandy, relatively flat, gently sloping continental shelf from southern New England to Cape Hatteras, NC. The continental slope begins at the continental shelf break and continues eastward with increasing depth until it becomes the continental rise. It is fairly homogenous, with exceptions at the shelf break, some of the canyons, the Hudson Shelf Valley, and in areas of glacially rafted hard bottom.

Pertinent physical characteristics of the three sub-regions that could potentially be affected by this action are described in this section. Information included in this document was extracted from Stevenson et al. (2004).

Gulf of Maine

Although not obvious in appearance, the Gulf of Maine (GOM) is actually an enclosed coastal sea, bounded on the east by Browns Bank, on the north by the Nova Scotian (Scotian) Shelf, on the west by the New England states, and on the south by Cape Cod and Georges Bank (Figure 3). The GOM was glacially derived, and is characterized by a system of deep basins, moraines and rocky protrusions with limited access to the open ocean. This geomorphology influences complex oceanographic processes that result in a rich biological community.

The GOM is topographically unlike any other part of the continental border along the U.S. Atlantic coast. The GOM's geologic features, when coupled with the vertical variation in water properties, result in a great diversity of habitat types. It contains twenty-one distinct basins separated by ridges, banks, and swells. The three largest basins are Wilkinson, Georges, and
Jordan. Depths in the basins exceed 250 meters (m), with a maximum depth of 350 m in Georges Basin, just north of Georges Bank. The Northeast Channel between Georges Bank and Browns Bank leads into Georges Basin, and is one of the primary avenues for exchange of water between the GOM and the North Atlantic Ocean.

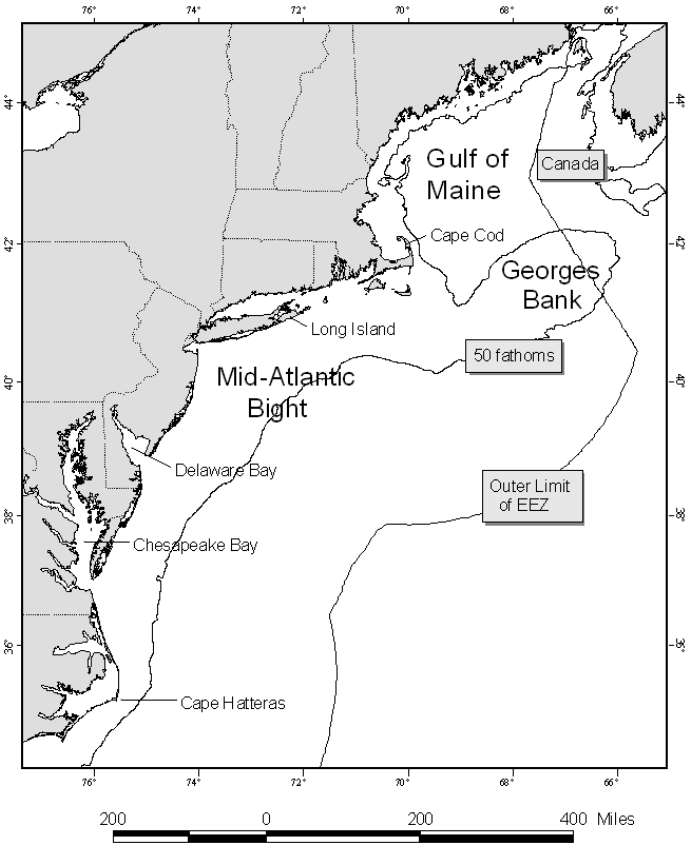


Figure 2. Northeast U.S Shelf Ecosystem.

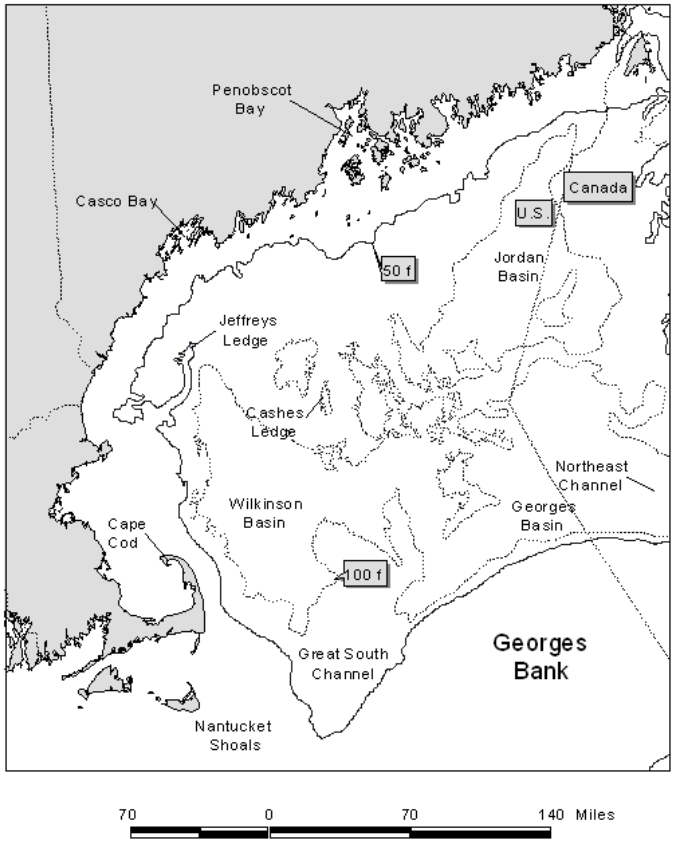


Figure 3. Gulf of Maine.

High points within the Gulf include irregular ridges, such as Cashes Ledge, which peaks at 9 m below the surface, as well as lower flat topped banks and gentle swells. Some of these rises are remnants of the sedimentary shelf that was left after most of it was removed by the glaciers. Others are glacial moraines and a few, like Cashes Ledge, are outcroppings of bedrock. Very fine sediment particles created and eroded by the glaciers have collected in thick deposits over much of the GOM, particularly in its deep basins (Figure 4). These mud deposits blanket and obscure the irregularities of the underlying bedrock, forming topographically smooth terrains. Some shallower basins are covered with mud as well, including some in coastal waters. In the rises between the basins, other materials are usually at the surface. Unsorted glacial till covers some morainal areas, as on Sewell Ridge to the north of Georges Basin and on Truxton Swell to the south of Jordan Basin. Sand predominates on some high areas and gravel, sometimes with boulders, predominates on others.

Coastal sediments exhibit a high degree of small-scale variability. Bedrock is the predominant substrate along the western edge of the GOM north of Cape Cod in a narrow band out to a depth of about 60 m. Rocky areas become less common with increasing depth, but some rock outcrops poke through the mud covering the deeper sea floor. Mud is the second most common substrate on the inner continental shelf. Mud predominates in coastal valleys and basins that often abruptly border rocky substrates. Many of these basins extend without interruption into deeper water. Gravel, often mixed with shell, is common adjacent to bedrock outcrops and in fractures in the rock. Large expanses of

gravel are not common, but do occur near reworked glacial moraines and in areas where the seabed has been scoured by bottom currents. Gravel is most abundant at depths of 20 - 40 m, except in eastern Maine where a gravel-covered plain exists to depths of at least 100 m. Bottom currents are stronger in eastern Maine where the mean tidal range exceeds 5 m. Sandy areas are relatively rare along the inner shelf of the western GOM, but are more common south of Casco Bay, especially offshore of sandy beaches.

Georges Bank

Georges Bank is a shallow (3 - 150 m depth), elongate (161 km wide by 322 km long) extension of the continental shelf that was formed by the Wisconsinian glacial episode. It is characterized by a steep slope on its northern edge and a broad, flat, gently sloping southern flank. The Great South Channel lies to the west. Natural processes continue to erode and rework the sediments on Georges Bank. It is anticipated that erosion and reworking of sediments will reduce the amount of sand available to the sand sheets, and cause an overall coarsening of the bottom sediments (Valentine and Lough 1991).

Glacial retreat during the late Pleistocene deposited the bottom sediments currently observed on the eastern section of Georges Bank, and the sediments have been continuously reworked and redistributed by the action of rising sea level, and by tidal, storm and other currents. The strong, erosive currents affect the character of the biological community. Bottom topography on eastern Georges Bank is characterized by linear ridges in the western shoal areas; a relatively smooth, gently dipping sea floor on the deeper, easternmost part; a highly energetic peak in the north with sand ridges up to 30 m high and extensive gravel pavement; and steeper and smoother topography incised by submarine canyons on the southeastern margin.

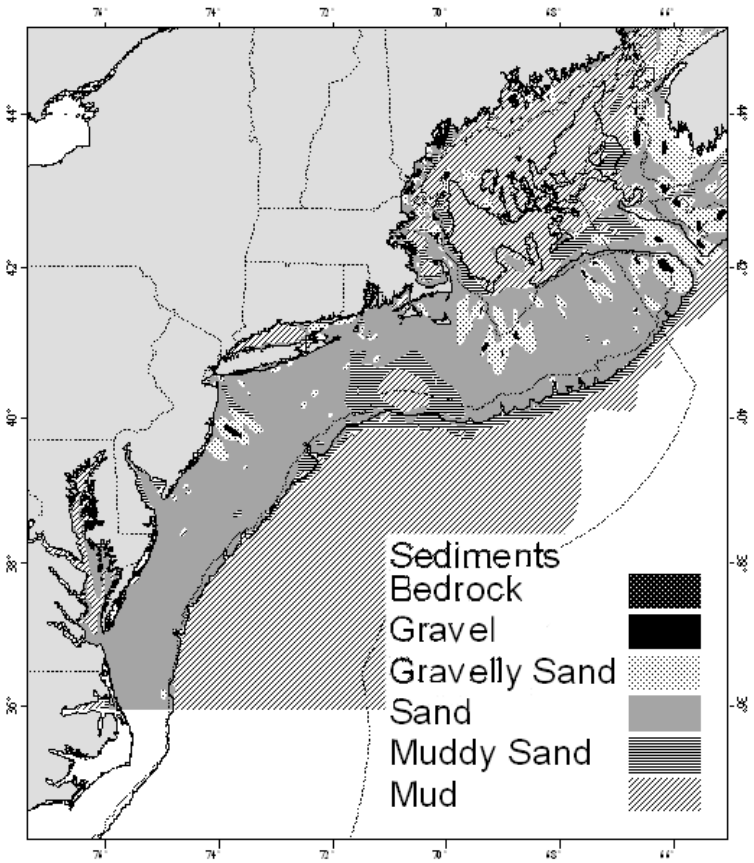


Figure 4. Northeast region sediments, modified from Poppe et al. (1989a and b).

The central region of the Bank is shallow, and the bottom is characterized by shoals and troughs, with sand dunes superimposed upon them. The two most prominent elevations on the ridge and trough area are Cultivator and Georges Shoals. This shoal and trough area is a region of strong currents, with average flood and ebb tidal currents greater than 4 km/h, and as high as 7 km/h. The dunes migrate at variable rates, and the ridges may also move. In an area that lies between the central part and Northeast Peak, Almeida *et al.* (2000) identified high-energy areas as between 35 - 65 m deep, where sand is transported on a daily basis by tidal currents, and a low-energy area at depths > 65 m that is affected only by storm currents.

The area west of the Great South Channel, known as Nantucket Shoals (Figure 3), is similar in nature to the central region of the Bank. Currents in these areas are strongest where water depth is shallower than 50 m. This type of traveling dune and swale morphology is also found in the Mid-Atlantic Bight, and further described in that section of the document. The Great South Channel separates the main part of Georges Bank from Nantucket Shoals. Sediments in this region include gravel pavement and mounds, some scattered boulders, sand with storm generated ripples, and scattered shell and mussel beds. Tidal and storm currents range from moderate to strong, depending upon location and storm activity (Valentine, pers. comm.).

Mid-Atlantic Bight

The Mid-Atlantic Bight includes the shelf and slope waters from Georges Bank south to Cape Hatteras, and east to the Gulf Stream (Figure 2). Like the rest of the continental shelf, the topography of the Mid-Atlantic Bight was shaped largely by sea level fluctuations caused by past ice ages. The shelf's basic morphology and sediments derive from the retreat of the last ice sheet, and the subsequent rise in sea level. Since that time, currents and waves have modified this basic structure.

Shelf and slope waters of the Mid-Atlantic Bight have a slow southwestward flow that is occasionally interrupted by warm core rings or meanders from the Gulf Stream. On average, shelf water moves parallel to bathymetry isobars at speeds of 5 - 10 cm/s at the surface and 2 cm/s or less at the bottom. Storm events can cause much more energetic variations in flow. Tidal currents on the inner shelf have a higher flow rate of 20 cm/s that increases to 100 cm/s near inlets.

The shelf slopes gently from shore out to between 100 and 200 km offshore where it transforms to the slope (100 - 200 m water depth) at the shelf break. In both the Mid-Atlantic and on Georges Bank, numerous canyons incise the slope, and some cut up onto the shelf itself. The primary morphological features of the shelf include shelf valleys and channels, shoal massifs, scarps, and sand ridges and swales. Most of these structures are relic except for some sand ridges and smaller sand-formed features. Shelf valleys and slope canyons were formed by rivers of glacier outwash that deposited sediments on the outer shelf edge as they entered the ocean. Most valleys cut about 10 m into the shelf, with the exception of the Hudson Shelf Valley that is about 35 m deep. The valleys were partially filled as the glacier melted and retreated across the shelf. The glacier also left behind a lengthy scarp near the shelf break from Chesapeake Bay north to the eastern end of Long Island. Shoal retreat massifs were produced by extensive deposition at a cape or estuary mouth. Massifs were also formed as estuaries retreated across the shelf.

Some sand ridges are more modern in origin than the shelf's glaciated morphology. Their formation is not well understood; however, they appear to develop from the sediments that erode from the shore face. They maintain their shape, so it is assumed that they are in equilibrium with modern current and storm regimes. They are usually grouped, with heights of about 10 m, lengths of 10 - 50 km and spacing of 2 km. Ridges are usually oriented at a slight angle towards shore, running in length from northeast to southwest. The seaward face usually has the steepest slope. Sand ridges are often covered with smaller similar forms such as sand waves, megaripples, and ripples. Swales occur between sand ridges. Since ridges are higher than the adjacent swales, they are exposed to more energy from water currents, and experience more sediment mobility than swales. Ridges tend to contain less fine sand, silt and clay while relatively sheltered swales contain more of the finer particles. Swales have greater benthic macrofaunal density, species richness and biomass, due in part to the increased abundance of detrital food and the physically less rigorous conditions.

Sand waves are usually found in patches of 5 - 10 with heights of about 2 m, lengths of 50 - 100 m and 1 - 2 km between patches. Sand waves are primarily found on the inner

shelf, and often observed on sides of sand ridges. They may remain intact over several seasons. Megaripples occur on sand waves or separately on the inner or central shelf. During the winter storm season, they may cover as much as 15% of the inner shelf. They tend to form in large patches and usually have lengths of 3 - 5 m with heights of 0.5 - 1 m. Megaripples tend to survive for less than a season. They can form during a storm and reshape the upper 50 - 100 cm of the sediments within a few hours. Ripples are also found everywhere on the shelf, and appear or disappear within hours or days, depending upon storms and currents. Ripples usually have lengths of about 1 - 150 cm and heights of a few centimeters.

Sediments are uniformly distributed over the shelf in this region (see Figure 4). A sheet of sand and gravel varying in thickness from 0 - 10 m covers most of the shelf. The mean bottom flow from the constant southwesterly current is not fast enough to move sand, so sediment transport must be episodic. Net sediment movement is in the same southwesterly direction as the current. The sands are mostly medium to coarse grains, with finer sand in the Hudson Shelf Valley and on the outer shelf. Mud is rare over most of the shelf, but is common in the Hudson Shelf Valley. Occasionally relic estuarine mud deposits are re-exposed in the swales between sand ridges. Fine sediment content increases rapidly at the shelf break, which is sometimes called the "mud line," and sediments are 70 - 100% fines on the slope. On the slope, silty sand, silt, and clay predominate.

The northern portion of the Mid-Atlantic Bight is sometimes referred to as southern New England. Most of this area was discussed under Georges Bank; however, one other formation of this region deserves note. The mud patch is located just southwest of Nantucket Shoals and southeast of Long Island and Rhode Island (Figure 3). Tidal currents in this area slow significantly, which allows silts and clays to settle out. The mud is mixed with sand, and is occasionally resuspended by large storms. This habitat is an anomaly of the outer continental shelf.
Artificial reefs are another significant Mid-Atlantic habitat, formed much more recently on the geologic time scale than other regional habitat types. These localized areas of hard structure have been formed by shipwrecks, lost cargoes, disposed solid materials, shoreline jetties and groins, submerged pipelines, cables, and other materials (Steimle and Zetlin 2000). While some of materials have been deposited specifically for use as fish habitat, most have an alternative primary purpose; however, they have all become an integral part of the coastal and shelf ecosystem. It is expected that the increase in these materials has had an impact on living marine resources and fisheries, but these effects are not well known. In general, reefs are important for attachment sites, shelter, and food for many species, and fish predators such as tunas may be attracted by prey aggregations, or may be behaviorally attracted to the reef structure.

6.4 Endangered and Other Protected Species

There are numerous species that inhabit the environment within the spiny dogfish FMP management unit and that have the potential to occur in the operations area of the spiny dogfish fishery. These species are afforded protection under the Endangered Species Act of 1973 (ESA) and/or the Marine Mammal Protection Act of 1972 (MMPA), and are under NMFS' jurisdiction. Thirteen are classified as endangered or threatened under the

ESA, while the remainder are protected by the provisions of the MMPA and are known to interact with the spiny dogfish fishery. Non ESA-listed species that are protected by the MMPA and utilize the same environment, but have no documented interaction with the spiny dogfish fishery will not be discussed in this document. The Council has determined that the following list of species protected either by the ESA and the MMPA 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 borealis*)	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
Harbor porpoise (*Phocoena phocoena*)	Protected

Pinnipeds

Species	Status
Harbor seal (*Phoca vitulina*)	Protected
Gray Seal (*Halichoerus grypus*)	Protected
Harp Seal (*Pagophilus groenlandicus)*	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
Atlantic sturgeon (*Acipenser oxyrinchus*)	Proposed**
Atlantic Bluefin Tuna (*Thunnus thynnus*)	Candidate***
Cusk (Brosme brosme)	Candidate***

*On March 16, 2010, NMFS and United States Fish and Wildlife Service (USFWS) proposed nine distinct population segments of loggerhead turtles, seven of which are proposed as endangered, and two of which are proposed as threatened.

** At this time, Atlantic sturgeon has been proposed for listing under the ESA. A status review for Atlantic sturgeon was completed in 2007. NMFS has concluded that the U.S. Atlantic sturgeon spawning populations comprise five Distinct Population Segments (DPSs) (ASSRT, 2007). The Gulf of Maine DPS of Atlantic sturgeon is proposed to be listed as threatened, and the New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs of Atlantic sturgeon are proposed as endangered. On October 6, 2010 (75 FR 61872 and 75 FR 61904), NMFS proposed listing five populations of Atlantic sturgeon along the U.S. East Coast as either threatened or endangered species. A final listing rule is expected by October 6, 2011.

***Candidate species are those petitioned species that are actively being considered for listing as endangered or threatened under the ESA, as well as those species for which NMFS has initiated an ESA status review that it has announced in the *Federal Register*. Atlantic bluefin tuna and cusk, each of which have been designated as candidate species by NMFS, are known to occur within the action area of the spiny dogfish fishery and have documented interactions with types of gear used in the spiny dogfish fishery.

Species Not Likely to be Affected
Several ESA-listed species, while their distribution overlaps to some degree with the management unit of the spiny dogfish FMP, are not likely to be affected by the fishery since the fishery does not typically operate in areas where these species occur. These species include shortnose sturgeon, the Gulf of Maine Distinct Population of Atlantic Salmon, hawksbill sea turtles, blue whales, and fin whales.

Species Likely to be Affected
It is expected that all of the remaining species identified above have the potential to be affected by the dogfish fishery. 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. (2009). The most recent information on the stock assessment of various marine mammals through 2009 can be found at: http://www.nmfs.noaa.gov/pr/sars/. Three other useful websites on marine mammals are: http://www.nmfs.noaa.gov/pr/recovery, http://spo.nwr.noaa.gov/mfr611/mfr611.htm, and http://www.nmfs.noaa.gov/pr/species/mammals.

Summary information for the ESA-listed species likely to be affected by the spiny dogfish fishery, along with information on their interactions and overlap with the fishery is presented below.

Atlantic sturgeon:

Atlantic sturgeon is an anadromous species that spawns in relatively low salinity, river environments, but spends most of its life in the marine and estuarine environments from Labrador, Canada to the Saint Johns River, Florida (Holland and Yelverton 1973, Dovel

and Berggen 1983, Waldman et al. 1996, Kynard and Horgan 2002, Dadswell 2006, ASSRT 2007). Tracking and tagging studies have shown that subadult and adult Atlantic sturgeon that originate from different rivers mix within the marine environment, utilizing ocean and estuarine waters for life functions such as foraging and overwintering (Stein et al. 2004a, Dadswell 2006, ASSRT 2007, Laney et al. 2007, Dunton et al. 2010). Fishery-dependent data as well as fishery-independent data demonstrate that Atlantic sturgeon use relatively shallow inshore areas of the continental shelf; primarily waters less than 50 m (Stein et al. 2004b, ASMFC TC 2007, Dunton et al. 2010). The data also suggest regional differences in Atlantic sturgeon depth distribution with sturgeon observed in waters primarily less than 20 m in the Mid-Atlantic Bight and in deeper waters in the Gulf of Maine (Stein et al. 2004b, ASMFC TC 2007, Dunton et al. 2010).

Comprehensive information on current abundance of Atlantic sturgeon is lacking for all of the spawning rivers (ASSRT, 2007). Based on data through 1998, an estimate of 870 spawning adults per year was developed for the Hudson River (Kahnle et al., 2007), and an estimate of 343 spawning adults per year is available for the Altamaha River, GA, based on data collected in 2004-2005 (Schueller and Peterson, 2006). Data collected from the Hudson River and Altamaha River studies cannot be used to estimate the total number of adults in either subpopulation, since mature Atlantic sturgeon may not spawn every year, and it is unclear to what extent mature fish in a non-spawning condition occur on the spawning grounds. Nevertheless, since the Hudson and Altamaha Rivers are presumed to have the healthiest Atlantic sturgeon subpopulations within the United States, other U.S. subpopulations are predicted to have fewer spawning adults than either the Hudson or the Altamaha (ASSRT, 2007). It is also important to note that the estimates above represent only a fraction of the total population size as spawning adults comprise only a portion of the total population (e.g., this estimate does not include subadults and early life stages). Based on the best available information, NMFS has concluded that bycatch, vessel strikes, water quality and water availability, dams, lack of regulatory mechanisms for protecting the fish, and dredging are the most significant threats to Atlantic sturgeon.

Atlantic sturgeon from any of the five populations could occur in areas where the spiny dogfish fishery operates, and the species has been captured in gear known to target spiny dogfish (Stein et al. 2004a, ASMFC 2007). The proposed action to set specifications and management measures in the spiny dogfish fishery is expected to be completed before the anticipated date of a final listing determination for Atlantic sturgeon. However, the conference provisions of the ESA apply to actions proposed to be taken by federal agencies once a species is proposed for listing (50 CFR 402.10). Therefore, this EA includes information on the anticipated effects of the proposed action on Atlantic sturgeon.

Candidate species receive no substantive or procedural protection under the ESA; however, NMFS recommends that project proponents consider implementing conservation actions to limit the potential for adverse effects on candidate species from any proposed project. The Protected Resources Division of the NMFS Northeast Regional Office has initiated review of recent stock assessments, bycatch information, and other information for these candidate species which will be incorporated in the status review reports for both candidate species. The results of those efforts are needed to

accurately characterize recent interactions between fisheries and the candidate species in the context of stock sizes. Any conservation measures deemed appropriate for these species will follow the information from these reviews. Please note that the conference provisions apply only if a candidate species is proposed for listing (and thus becomes a proposed species (see 50 CFR 402.10).

Sea turtles:
Sea turtles have a seasonal distribution in Mid-Atlantic waters north of Cape Hatteras, NC. In general, turtles move up the coast from southern wintering areas south of Cape Hatteras as water temperatures warm in the spring and then reverse direction in the fall as water temperatures decline; returning to waters south of Cape Hatteras for the winter (Keinath *et al.* 1987; Shoop and Kenney 1992; Musick and Limpus 1997; Morreale and Standora 1993; Morreale and Standora 1998; Braun-McNeill and Epperly 2004; James *et al.* 2005; Morreale and Standora 2005). Recreational anglers have reported sightings of sea turtles in waters defined as inshore waters (bays, inlets, rivers, or sounds; Braun-McNeill and Epperly 2004) as far north as New York as early as March-April, but in relatively low numbers (Braun-McNeill and Epperly 2004). Greater numbers of loggerheads, Kemp's ridleys, and greens are found in Virginia's inshore, nearshore, and offshore waters from May through November and in New York's inshore, nearshore, and offshore waters from June through October (Keinath *et al.* 1987; Morreale and Standora 1993 ; Braun-McNeill and Epperly 2004). Leatherback sea turtles have a similar seasonal distribution but have a more extensive range in the Gulf of Maine compared to the hardshelled species, which appear to be temperature limited to waters only as far north as Cape Cod (Shoop and Kenney 1992).

The loggerhead sea turtle is listed as threatened throughout its worldwide range. On July 12, 2007, NMFS and USFWS (Services) received a petition from Center for Biological Diversity and Turtle Island Restoration Network to list the ‘‘North Pacific populations of loggerhead sea turtle’’ as an endangered species under the ESA. In addition, on November 15, 2007, the Services received a petition from Center for Biological Diversity and Oceana to list the ‘‘Western North Atlantic populations of loggerhead sea turtle’’ as an endangered species under the ESA. NMFS published notices in the Federal Register, concluding that the petitions presented substantial scientific information indicating that the petitioned actions may be warranted (72 FR 64585, November 16, 2007; 73 FR 11849; March 5, 2008). In 2008, a Biological Review Team (BRT) was established to assess the global population structure to determine whether Distinct Population Segments (DPSs) exist and, if so, the status of each DPS. The BRT identified nine loggerhead DPSs, distributed globally (Conant et al. 2009). On March 16, 2010, the Services announced 12-month findings on the petitions to list the North Pacific populations and the Northwest Atlantic populations of the loggerhead sea turtle as DPSs with endangered status and published a proposed rule to designate nine loggerhead DPSs worldwide, seven as endangered (North Pacific Ocean DPS, South Pacific Ocean DPS, Northwest Atlantic Ocean DPS, Northeast Atlantic Ocean DPS, Mediterranean Sea DPS, North Indian Ocean DPS, and Southeast Indo-Pacific Ocean DPS) and two as threatened (Southwest Indian Ocean DPS and South Atlantic Ocean DPS). On March 22, 2011, the timeline for the final determination was extended for six months until September 16, 2011 (76 FR 15932).

Marine mammals:

The distribution of ESA-listed right, humpback, fin, and sei whales in New England and Mid-Atlantic waters also varies seasonally with each species following the general pattern of migration between low latitude winter calving grounds and high latitude summer foraging grounds (Perry *et al.* 1999; Kenney 2002). Nevertheless, this is an oversimplification of cetacean movements.

Critical habitat for right whales has been designated for Cape Cod Bay, Great South Channel, and coastal Florida and Georgia (outside of the action area for this Opinion). Cape Cod Bay and Great South Channel were designated critical habitat for right whales due to their importance as spring/summer foraging grounds for this species. Although the physical and biological processes shaping acceptable right whale habitat are poorly understood, there is no evidence to suggest that operation of the spiny dogfish fishery adversely affects the value of critical habitat designated for the right whale.

Similarly, humpback whale sightings are most frequent in New England waters from mid-March through November between 41°N and 43°N latitude, 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, including the waters of Stellwagen Bank. Like right whales, humpback whales traverse Mid-Atlantic waters to and from the calving/mating grounds, but it may also be an important winter feeding area for juvenile humpback whales. During the 1978-1982 CeTAP 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 (CeTAP 1982). The single most important area for the species appeared to be from the Great South Channel, along the 50m isobaths past Cape Cod, over Stellwagen Bank, and past Cape Ann to Jeffrey's Ledge (Hain *et al.* 1992). In comparison, the sei whale is often found in the deeper waters characteristic of the continental shelf region (Hain *et al.* 1985; Waring *et al.* 2009*).* NMFS aerial surveys found substantial numbers of sei whales in this area, south of Nantucket, in the spring of 2001 (Waring *et al.* 2009). Indications are that, at least during the feeding season, a major portion of the sei whale stock is centered in northerly waters, perhaps on the Scotian shelf (Mitchell and Chapman 1977; Waring *et al.* 2009). The southern portion of the species range during spring and summer includes the northern portions of the U.S. EEZ -the Gulf of Maine and Georges Bank (Waring *et al.* 2009*).*

Interactions between Gear and Protected Resources:

The North Carolina gillnet fishery for spiny dogfish has historically caught both sea turtles and Atlantic bottlenose dolphins. To date, management measures consistent with the federal spiny dogfish rebuilding plan have eliminated widespread 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) and Bottlenose Dolphin Take Reduction Plan (BDTRP) in combination with federal spiny dogfish harvest policy have been sufficient to reduce gillnet fishery interactions with harbor porpoises and bottlenose dolphins below Potential Biological Removal (PBR) levels.

The dominant gear types associated with the retention of spiny dogfish in 2009 (sink gillnet, bottom otter trawl, and bottom longline) are used by several fisheries identified in the List of Fisheries for 2011 (75 CFR 68468). Sink gill nets are deployed in two Category I fisheries: "Mid-Atlantic gillnet" and "Northeast sink gillnet". Hook gear that catches spiny dogfish is deployed by a Category III fishery: "Northeast/Mid-Atlantic bottom longline/hook and line". Category I fisheries are those identified in the List of Fisheries as associated with frequent incidental mortality and serious injury of marine mammals. Category III fisheries have a remote likelihood of, or no known incidental mortality and serious injury of marine mammals.

The Mid-Atlantic gillnet and Northeast sink gillnet fisheries are both included in the Atlantic Large Whale Take Reduction Plan (ALWTRP), as these gears, which are used in the spiny dogfish fishery, are known to interact with large whales. The ALWTRP contains a suite of management measures for gillnet, as well as pot/trap gear. More information on the ALWTRP can be found at http://www.nero.noaa.gov/whaletrp/.

Atlantic sturgeon are known to be captured in sink gillnet, drift gillnet, and otter trawl gear (Stein et al. 2004a, ASMFC TC 2007). Of these gear types, sink gillnet gear poses the greatest known risk of mortality for bycaught sturgeon (ASMFC TC 2007). Sturgeon deaths were rarely reported in the otter trawl observer dataset (ASMFC TC 2007). However, the level of mortality after release from the gear is unknown (Stein et al. 2004a). In a review of the Northeast Fishery Observer Program (NEFOP) database for the years 2001-2006, observed bycatch of Atlantic sturgeon was used to calculate bycatch rates that were then applied to commercial fishing effort to estimate overall bycatch of Atlantic sturgeon in commercial fisheries. This review indicated sturgeon bycatch occurred in statistical areas abutting the coast from Massachusetts (statistical area 514) to North Carolina (statistical area 635) (ASMFC TC 2007). Based on the available data, participants in an ASMFC bycatch workshop concluded that sturgeon encounters tended to occur in waters less than 50 m throughout the year, although seasonal patterns exist (ASMFC TC 2007). The ASMFC analysis determined that an average of 650 Atlantic sturgeon mortalities occurred per year (during the 2001 to 2006 timeframe) in sink gillnet fisheries. Stein et al (2004a), based on a review of the NMFS Observer Database from 1989-2000, found clinal variation in the bycatch rate of sturgeon in sink gillnet gear with lowest rates occurring off of Maine and highest rates off of North Carolina for all months of the year.

In an updated analysis (see tables 11 – 15), the Northeast Fisheries Science Center (NEFSC) was able to use data from the NEFOP database to provide updated estimates for the 2006 to 2010 timeframe. Data were limited by observer coverage to waters outside the coastal boundary (fzone>0) and north of Cape Hatteras, NC. Sturgeon included in the data set were those identified by federal observers as Atlantic sturgeon, as well as those categorized as unknown sturgeon. At this time, data were limited to information collected by the NEFOP. The frequency of encounters in the observer programs were expanded by total landings recorded on VTRs rather than dealer data, since the dealer data does not include information on mesh sizes. Generally, the VTR data represent greater than 90 percent of total landings. Data were combined into division (identified as the first 2 digits in the statistical area codes), quarter, gear type (otter trawl (fish) and sink

gillnet) and mesh categories. Mesh sizes were categorized for otter trawl as small (<5.5") or large (greater than or equal to 5.5") and small (<5.5"), large (between 5.5" and 8") and extra large (>8") in sink gillnets. Spiny dogfish are caught, although not necessarily targeted, in all gear and mesh sizes analyzed by NEFOP (Tables 11 – 15). Tables 17 – 18 below summarize the sturgeon encounters by gear type, area, and season for all mesh sizes combined.

Spiny dogfish are predominantly harvested incidentally in other fisheries, such as the multispecies and monkfish fisheries. Although there are no specific mesh requirements for the spiny dogfish fishery, vessels must adhere to the more restrictive NE multispecies regulations when fishing in various areas. As described in Section 6.1.3.1.1, 67.42 percent of dogfish landings were caught using gillnet gear, and 13.13 percent of landings were caught in bottom otter trawls. Spiny dogfish landings occur throughout all coastal Atlantic waters from Maine to North Carolina and all statistical areas analyzed by the NEFSC. Dogfish landings are consistent with the seasonality of the species range, and landings in the Northern states (Maine through Connecticut) occur exclusively in Period 1 of the Federal fishery (May 1 – October 30) and landings in the Southern states (New York to North Carolina) occur predominantly in Period 2 of the Federal fishery (November 1 – April 30). On average, only 3.4 percent of Period 1 landings from 2006 through 2010, came from the Southern states. This seasonality is also reflected in the commercial quota allocations under the ASMFC's Interstate Spiny Dogfish FMP (Interstate FMP). Under the Interstate FMP, the Northern states are allocated 58 percent of the state waters commercial quota, which is harvested during Period 1 of the Federal fishery) and the remaining 42 percent is allocated to the Southern states and is harvested primarily during Period 2.

The updated data provided by the NEFSC on Atlantic sturgeon encounters from 2006 - 2010 were provided by quarter (rather than by month given the relatively low frequencies of occurrence). Period 1 of the Federal spiny dogfish fishery, therefore corresponds to Quarters 2 (April – June) and 3 (July – September) combined, as the fishery begins on May 1 and landings are minimal after September 30. Period 2 of the Federal spiny dogfish fishery roughly corresponds to Quarters 1 (January – March) and 4 (October – December) combined, as the fishery begins on November 1 and there are only minimal landings after March 30 (the majority of Period 2 landings are consistently during the month of January in North Carolina). Therefore, sturgeon encounters in the spiny dogfish fishery are most likely to occur in the Northern statistical areas (500 series) from May to October (Period 1; Quarters 2 and 3) and in the Southern statistical areas (600 series) from November to April (Period 2; Quarters 1 and 4). The discussion below does not focus on the Northern statistical areas during Period 2 (November through April) or in the Southern statistical areas during Period 1 (May through October). Although data indicate that there Atlantic sturgeon caught in gear used to catch spiny dogfish during these times, it is highly unlikely due to management restrictions (i.e., fishery closures) and spiny dogfish migratory patterns that this gear is used to target spiny dogfish during these periods. Sturgeon encounters using otter trawl and sink gillnet gear during periods and in locations where the spiny dogfish fishery is not active are therefore likely due to interactions with other fisheries.

As illustrated in Table 17, between 2006 through 2010, there was an average of 1,023 Atlantic sturgeon encounters on observed trips, which were expanded by total landings recorded on VTRs per year, using sink gillnet gear, of which an average of 86.2 sturgeon were encountered in the Northern statistical areas during Period 1 and an average of 285.4 sturgeon are encountered in the Southern statistical areas during Period 2. These two time periods and associated statistical areas account for 36.3 percent of the annual average of Atlantic sturgeon encounters estimated during the calendar years 2006 through 2010. In addition, the number of sturgeon encounters during the Northern region during Period 1 and the Southern region during Period 2 appears to have declined in recent years to well over half of that estimated in 2006.

As shown in Tables 17 and 18, there were substantially less sturgeon encounters in otter trawl gear than in gillnet gears in the Northern region in Period 1. Tables 17 and 18 show that there were three times as many sturgeon encounters with gillnet gear (86.2 on average) as with large mesh otter trawl (11.2 on average) in the Northern region during Period 1. Conversely, there were 379 encounters on average in otter trawl gear in the Southern region during Period 2 compared to 285 in sink gillnet gear during the same time and period. The majority of the sturgeon encounters in Period 2 in the Southern region were with otter trawl gear. As mentioned previously, only 13.13 percent of spiny dogfish landings were caught in bottom otter trawls in FY 2010 and it is therefore likely that the majority of these sturgeon encounters did not occur while targeting spiny dogfish.

The total number of estimated annual takes of Atlantic sturgeon in sink gillnet and otter trawl gear ranges from 1,536 to 3,221 sturgeon annually, with an average of 2,215 encounters on observed trips were expanded by total landings recorded on VTRs (Table 16). Mortality rates from encounters with sink gillnet and otter trawl gear are between 10 to 25 percent; however, the mortality rate of Atlantic sturgeon that is specifically attributed to the directed spiny dogfish fishery is unknown. As the majority of spiny dogfish landings are caught incidentally while targeting other federally managed species such as NE multispecies and monkfish, the impacts of the small directed spiny dogfish fishery on Atlantic sturgeon are not likely to be significant. While mortality rates in specific gears used to catch spiny dogfish may be higher than the total average, it is unknown to what extent the impacts of the small directed spiny dogfish fishery have on Atlantic sturgeon populations. In addition, while spiny dogfish commercial quotas have been steadily increasing as the fishery has recovered and been rebuilt (i.e., the Federal quota has quadrupled in the last three fishing years, from 4 million lb in 2008 to 15 million lb in FY 2010), and the possession limits have increased from 600 lb per trip in 2006 to 3,000 lb per trip in 2009 and beyond, sturgeon encounters have remained the same or decreased in that same time period. This may be due to the fact that a large-scale directed dogfish fishery was essentially eliminated in the original FMP, and the redevelopment of a large-scale directed fishery has been stymied by low possession limits, so that the stock has the ability to fully recover and remain rebuilt.

It is therefore important to note that, while the sturgeon encounters presented here can be attributed to gear types known to catch spiny dogfish, spiny dogfish is primarily caught incidentally in other fisheries, and so the actual encounters in what is a small directed fishery are likely to be substantially lower than shown in Tables 17 and 18. However, because the NEFOP data available for this analysis did not identify the fishery in which

the Atlantic sturgeon bycatch occurred, a more precise evaluation of encounters in only the spiny dogfish fishery cannot be specified at this time. Data clearly indicate that gear used in the spiny dogfish fishery is likely to interact with Atlantic sturgeon during FY 2011, the time period for this action; however a more precise evaluation of encounters in only the spiny dogfish fishery cannot be specified at this time.

As noted above, there are no total population size estimates for any of the five Atlantic sturgeon DPSs at this time. However, there are two estimates of spawning adults per year for two river systems (e.g., 870 spawning adults per year for the Hudson River, and 343 spawning adults per year for the Altamaha River). These estimates represent only a fraction of the total population size as Atlantic sturgeon do not appear to spawn every year and additionally, these estimates do not include sub-adults or early life stages. Based on the observer data expanded by VTR landings from 2006 and 2010, an average of 97Atlantic sturgeon encounters occurred in both gillnet and otter trawl gear(including small, large, and extra large mesh) in the Northern region during Period 1 (May through October). Based on the available information, it is not possible at this time to attribute these mortalities to the DPS(s) from which these fish originated. However, given the migratory nature of sub-adult and adult Atlantic sturgeon, it is expected that these mortalities represent takes from multiple DPSs. This conclusion is supported by preliminary genetic mixed stock analyses undertaken by Dr. Isaac Wirgin from New York University and Dr. Tim King from the U.S. Geological Survey. These additional data support the conclusion from the earlier bycatch estimate that the spiny dogfish fishery may interact with Atlantic sturgeon from now until the time a final listing determination is made for the species. Thus, while the operations of this fishery over the five months between May 1 and early October 2011 will most likely result in adverse impacts to Atlantic sturgeon, the magnitude of that interaction (e.g., up to 97 fish from multiple DPSs) during this short timeframe of interest is not likely to result in jeopardy to the species. As the precise numbers of encounters on Atlantic sturgeon attributable to the directed spiny dogfish fishery are unknown, NMFS is conferencing to gather more information specific to the spiny dogfish fishery. However, the impacts associated with the directed spiny dogfish fishery are not expected to be significant based on the small scale of the directed fishery.

In summary, the gears used in the spiny dogfish fishery have been known to interact with several MMPA and ESA-related species (i.e., listed, proposed to be listed, and candidate). However, as long as the retention of spiny dogfish is generally a byproduct of the activity of other fisheries, and a large directed fishery for spiny dogfish does not exist that would result in substantially increased fishing effort for this species, then interactions with protected species will continue to be analyzed under the management plans for those other fisheries.

6.5 Human Communities/ Socio-economic Environment

Human communities include the individuals that harvest the stock, as well as the ports and communities in which they reside, home port of the vessels, and otherwise indirectly support shore-side businesses. The following section discusses the participants involved in the spiny dogfish fishery, as well as their home ports and/or states.

6.5.1 Vessel Activity and Permit Information

According to unpublished NMFS permit file data, 3,020 vessels were issued federal spiny dogfish permits in FY2009, while 398 of these vessels contributed to overall landings. The distribution of permitted and active vessels by home port state is given in Table 8. Most of the active vessels were from home ports in Massachusetts (36.9%), New Jersey (14.1%), Maine (11.9%), New York (9.8%), Rhode Island (6.7%), North Carolina (5.2%), New Hampshire (4.8%), and Virginia (4.7%). All other states comprised 4.2% of the total.

NMFS permit data indicate that 462 dealers possessed federal spiny dogfish dealer permits in FY2009 while dealer reports indicate 77 of those dealers actually bought spiny dogfish. The distribution of permitted and active dealers by state is given in Table 9. Most of the active dealers were from the states of Massachusetts (26.0%), New York (20.8%), Rhode Island (14.3%), North Carolina (10.4%), New Jersey, (9.1%), Virginia (7.8%), Maryland, (3.9%), New Hampshire (3.9%) with other states comprising 3.9% of the total.

Spiny dogfish landings were reported from a total of 70 unique ports in the dealer data. Unknown ports accounted for 6.2% of the landings. Landings by port for FY2009 are given in Table 10. Gloucester, MA accounted for the largest share of total FY2009 landings (13.8%), followed by Chatham, MA (11.5%), Seabrook, NH (6.9%), Barnegat Light/Long Beach, NJ (7.4%), Rye, NH (4.5%), and Portsmouth, NH (4.6%).

Comparing spiny dogfish revenue to total revenue by port where ex-vessel dogfish revenue was $100,000 or more, spiny dogfish landings accounted for 9.5% of total revenue ($228,339 / $2,415,856) in Seabrook, NH, 7.1% ($149,695/ $2,117,372) and Rye, NH, and 3.4% ($130,779 / $3,859,063) in Portsmouth, NH, and 2.3% (293,866 / 12,549,241) in Chatham, MA (Table 10). Spiny dogfish revenue was less than 1% for other ports. This suggests that dependence on the harvest of spiny dogfish by fishing communities on the Atlantic Coast is fairly limited.

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 Spiny Dogfish FMP contains details of McCay et al. (1993) with regard to the spiny dogfish fishery. Port descriptions taken from the NEFSC's "Community Profiles for the Northeast US Fisheries" for Seabrook, NH; Rye, NH; Portsmouth, NH; and Chatham, MA, each of which accounted for more than 1% of total dogfish landings, are provided in Appendix 1. These are available on the internet at: http://www.nefsc.noaa.gov/read/socialsci/community_profiles/

7.0 ENVIRONMENTAL CONSEQUENCES – ANALYSIS OF DIRECT AND INDIRECT IMPACTS

As discussed in Section 6.0 (Description of the Affected Environment and Fisheries), the VECs include the target species (spiny dogfish), non-target and bycatch species, protected resources, and human communities. This section describes and characterizes the impacts of the alternatives on these VECs as compared to the No Action Alternative. As stated in Section 5.4, the No Action Alternative is effectively the same as Alternative 1. A “true” No Action Alternative for dogfish fishery management, however, is not equivalent to status quo or baseline conditions.

If the actions proposed in this document are not taken, some current management measures will remain in place (i.e. 3,000 lb trip limit), but the overall management program will not be identical to that of FY2010 (i.e. there would be no specified quota for FY 2011). The “true” No Action Alternative for this fishery is infeasible and inconsistent with the FMP which requires specifications, or quotas, to be established for the fishery. Therefore, the “true” No Action Alternative is not analyzed in this document. Since management measures consistent with achieving $F_{rebuild}$ (consistent with a 15 million lb quota for FY2010) have been in place since 2000, this is considered to be the baseline condition, and is referred to as Alternative 1.

7.1. Target Species (Spiny Dogfish) Impacts

The alternative management measures are described in Section 5.0 of this document. A 15.0 million lb quota as under Alternative 1 is projected to achieve $F << 0.173$ in FY2011. Alternative 1 represents a more precautionary response to stock condition in comparison with the larger quotas associated with Alternatives 2 and 3. Alternative 2 (preferred) proposes a 20.0 M lb quota and Alternative 3 proposes a 31.4 M lb quota. Stock biomass is expected to continue to grow in the near term under any alternative, however, long term biomass projections at $F = 0.207$ (Alternative 3) show a subsequent decline approaching the "overfished" threshold in approximately ten years, well beyond the scope of this analysis, but a negative impact to the resource if allowed. Alternative 3 is more likely to result in F_{target} (0.207, redefined by the SSC as $F_{threshold}$) being exceeded in FY2011 than Alternatives 1 and 2.

None of the alternatives propose to modify the status quo 3,000 lb trip limit. Directed fishing is not expected to increase on a per-trip basis under status quo trip limits The trip limit is also not associated with a particular fishing mortality rate and thus impacts on the stock are somewhat difficult to evaluate, however, it is logical to expect that maintaining the status quo trip limit would result in null impacts to the stock.

The overall number of directed trips could increase if the length of the commercial season expands under the larger quotas proposed in Alternatives 2 and 3. As indicated in Section 6.1, the gear types that appear to be associated with the greatest probability of directed fishing are longline and to a lesser extent gillnets. Discarding on non-directed trips is expected to decrease with overall decreases in effort under Amendment 16 to the Northeast (NE) Multispecies FMP. The offsetting effects of marginal increases in mortality from a greater number of directed trips and decreases in mortality from fewer non-directed trips would result in mixed effects on the spiny dogfish stock. Any increases, however, are expected to maintain fishing mortality at or below the F_{target} as indicated in paragraph 1 of this section.

In summary, stock size is expected to grow in FY2011 under all of the alternatives, the most under Alternative 1, the least under Alternative 3, with Alternative 2 in between. As such, Alternative 1 is likely to most positively impact the dogfish population by contributing to long term recovery of the female stock. Alternative 2 is slightly less and Alternative 3 is least likely to benefit the stock.

7.2 Non-target Species Impacts

The degree to which discarding of non-target species would change under any of the alternatives is related to how fishing effort would change if a given alternative is implemented. If the quota in the EEZ is increased (as under Alternatives 2 and 3), then it is likely that there will be some increase in dogfish fishing effort. If this occurs, then bycatch of non-target species would be expected to increase. Directed fishing is addressed in Section 6.1.3.1.1 and appears to be related to the type of gear used with much greater likelihood of directed effort with bottom longlines, less likelihood with bottom otter trawls, and gillnets somewhere in between. Additionally, because the abundance of dogfish has increased, larger catches are not necessarily associated with an increase in fishing effort. That a given trip would be made for the sole purpose of harvesting dogfish is also less likely the farther from shore that trip occurs. Nevertheless, in comparison to the Alternative 1, it is expected that the extent of directed dogfish fishing in the EEZ is more likely to increase than decrease under Alternatives 2 and 3, and to the greatest degree under Alternative 3.

None of the alternatives propose to modify the status quo 3,000 lb trip limit. Trip limit impacts on non-target species are somewhat difficult to evaluate, however, it is logical to expect that maintaining the status quo trip limit would result in null impacts to the stock.

The composition of the bycatch from dogfish fishing is expected to be similar to that described in Section 6.2 and Table 7. For bottom longline gear, species other than dogfish comprise a very small proportion of discards and increased effort is not expected to result in negative impacts. For gillnets, the species composition of the discards is broader including cod which is experiencing overfishing, however, overall decreases in fishing effort through Amendment 16 to the Northeast Multispecies FMP (~40%) are expected to overwhelm marginal increases in effort from directed fishing under Alternatives 2 and 3. The diversity of bycatch species in the trawl fishery is much greater than the other two gear types, however, it appears that directed trawl fishing for dogfish is uncommon, and thus impacts on those trawl bycatch species is not expected to be directly related to an increase in the quota. In conclusion, discards associated with spiny dogfish harvest are more likely to increase under Alternative 2 and 3 than under Alternative 1, and to the greatest extent under Alternative 3. These would be negative impacts, however the magnitude is likely marginal given that directed fishing for dogfish is more likely for gear types with the lowest incidence of bycatch.

7.3 Habitat Impacts

Habitat impacts associated with the harvest of spiny dogfish would potentially increase under Alternatives 2 or 3 since they represent increases in the quota over the status quo

(Alternative 1). As such, adverse habitat impacts are not expected under Alternative 1 since the quota would remain the same. Because no change is proposed in the trip limit (3,000 lb), that aspect of the alternatives is not related to a change in habitat impacts under any alternative.

None of the alternatives propose to modify the status quo 3,000 lb trip limit. Trip limit impacts on habitat are somewhat difficult to evaluate, however, it is logical to expect that maintaining the status quo trip limit would result in null impacts to the stock.

A major factor in habitat impacts is the type of fishing gear used to harvest dogfish. Commercial gear for spiny dogfish includes gill nets, hook gear and, to a much lesser degree, bottom otter trawls (Table 6). Currently, most of the reported landings of spiny dogfish are caught in sink gill nets, with only 13% from bottom trawls (Table 6). Of these three gear types, the bottom otter trawl is the only one known to significantly affect benthic marine habitats since it is a bottom-tending mobile gear, while bottom gill nets and hook gear (bottom long lines) are stationary and cause minor impacts to benthic habitats (NRC 2002, Morgan and Chuenpagdee 2003, NEFSC 2002). Benthic habitats for a number of federally-managed species in the Northeast region are moderately or highly vulnerable to adverse impacts associated with bottom otter trawls (Stevenson et al. 2004) and both regional Councils have implemented management measures in recent years to minimize these impacts, to the extent practicable, as required by the MSA.

Bottom otter trawls were an important component of the directed fishery during the 1990s, accounting for as much as 30% of the annual landings in 1999. Since the implementation of quota management in the federal Spiny Dogfish FMP in 1998, there has been no directed trawl fishery for dogfish. Directed fishing is addressed in Section 6.1.3.1.1 and appears to be related to the type of gear used with much greater likelihood of directed effort with bottom longlines, less likelihood with bottom otter trawls, and gillnets somewhere in between. Additionally, because the abundance of dogfish has increased, larger catches are not necessarily associated with an increase in fishing effort. That a given trip would be made for the sole purpose of harvesting dogfish is also less likely the farther from shore that trip occurs. Nevertheless, in comparison to the Alternative 1, it is expected that directed dogfish fishing in the EEZ is more likely to increase than decrease under Alternatives 2 and 3, and to the greatest degree under Alternative 3.

There has been an overall decline in bottom trawling activity for groundfish in the Northeast region in recent years, and most recently under Amendment 16 to the Multispecies FMP. That added to the fact that management measures (closed areas) are in place for minimizing the adverse habitat impacts of bottom trawling and dredging, it is unlikely that any additional measures would be required to minimize the impacts of a directed dogfish fishery with an increased quota.

7.4 Impacts on Endangered Species and Other Protected Resources

The degree to which encounters with endangered and other protected species would change under any of the alternatives is related to how fishing effort would change if a

given alternative is implemented. If the quota is increased over the Status Quo Alternative 1 level (as under Alternatives 2 and 3), then it is possible that there could be some increase in the extent of *directed* dogfish fishing in the EEZ. If this occurs, then encounters with protected resources could be attributable to activity by the dogfish fishery. Directed fishing is addressed in Section 6.1.3.1.1 and appears to be related to the type of gear used with much greater likelihood of directed effort with bottom longlines, less likelihood with bottom otter trawls, and gillnets somewhere in between. Additionally, because the abundance of dogfish has increased, larger catches are not necessarily associated with an increase in fishing effort. That a given trip would be made for the sole purpose of harvesting dogfish is also less likely the farther from shore that trip occurs. Nevertheless, in comparison to the Alternative 1, it is expected that directed dogfish fishing in the EEZ is more likely to increase than decrease under Alternatives 2 and 3, and to the greatest degree under Alternative 3.

None of the alternatives propose to modify the status quo 3,000 lb trip limit. Trip limit impacts on protected resources are somewhat difficult to evaluate, however, it is logical to expect that maintaining the status quo trip limit would result in null impacts to the stock.

The protected species that would be encountered from directed dogfish fishing would likely be similar to those which occurred in the historic North Carolina gill net fishery. As such, one might expect that encounters with coastal bottlenose dolphins, sea turtles, and harbor porpoises may occur (see Section 6.4). However, since the implementation of the Bottlenose Dolphin Take Reduction Plan and Harbor Porpoise Take Reduction Plan, more stringent rules are in place than existed when those previously mentioned encounters took place. Specifically, nets must be attended and no night time sets are allowed. Similarly, the Atlantic Large Whale Take Reduction Plan should reduce potential encounters with whales.

It is likely with this potential for increased fishing, gear interactions with protected resources would also increase, resulting in negative impacts to this VEC. There is the potential for continued low negative impacts to protected resources under Alternative 1. However, because the abundance of dogfish has increased greatly, effort is unlikely to increase significantly.

It is possible that protected resource encounters associated with spiny dogfish harvest may increase under Alternatives 2 and 3 as compared to Alternative 1, and to the greatest degree under Alternative 3. Although the proposed alternative (Alternative 2) would allow for increases in dogfish landings, fishing effort in the spiny dogfish fishery is unlikely to increase due to maintaining the possession limit at 3,000 lb per trip or calendar day. Any increases in fishing effort that may occur would likely occur in the bottom longline sector of the fishery (Section 6.1.3.1.1).

With regards to Atlantic sturgeon, the increase in protected resource encounters that may occur under Alternatives 2 and 3 is likely to be minor in comparison to what was considered for the October 2010 Biological Opinion on the spiny dogfish fishery. The October 2010, Biological Opinion did not consider effects to Atlantic sturgeon. However, the Stein et al (2004a) paper did review sturgeon bycatch in the spiny dogfish

fishery for 1989-2000; a time period when effort in the spiny dogfish fishery would have been much greater than what was considered for the October 2010 Biological Opinion, or what would occur if fishing effort were to increase as a result of Alternatives 2 or 3. Stein et al., (2004a) found the bycatch rate of Atlantic sturgeon (reported as pounds of sturgeon catch per pounds of targeted species landed) to be 0.000947 for spiny dogfish.

One of the factors cited in NMFS' proposed listing for the five DPSs of Atlantic sturgeon is bycatch. The ASMFC analysis concluded that to remain stable or grow, populations of Atlantic sturgeon can sustain only very low anthropogenic sources of mortality. It is apparent, therefore, that should the proposed listing be finalized, reductions in bycatch mortality may be required in order to recover Atlantic sturgeon. Final listing determinations for the Atlantic sturgeon DPSs are expected by October 6, 2011. If the final listing rules are published, they will likely become effective 30 days after publication. With the publication of a final listing rule, a Section 7 consultation would be required, as the analysis conducted by the ASMFC and Stein et al (2004a) and an updated evaluation of NEFOP data from 2006 through 2010 (see Section 6.4) demonstrate that the spiny dogfish fishery may affect Atlantic sturgeon. Through that consultation process, the effects would be estimated and analyzed.

At this point, because Atlantic sturgeon is a proposed species under the ESA, the question is whether the proposed action is likely to jeopardize the continued existence of the proposed species. Atlantic sturgeon is a proposed species only until a final listing determination is made. When a final listing determination is made, the proposed rule will either be withdrawn or final listing rule will be published. NMFS has considered whether the spiny dogfish fishery, including implementation of FY 2011 specifications and management measures, is likely to jeopardize the proposed Atlantic sturgeon DPSs between the anticipated effective date of this action and the time a final listing determination is made, and conclude that it is not. While it is possible that there may be interactions between Atlantic sturgeon and gear used in the spiny dogfish fishery, the number of interactions that will occur between now and the time a final listing determination will be made (e.g., up to 97 encounters from multiple DPSs) is not likely to cause an appreciable reduction in survival and recovery of any of the five DPSs as described in section 6.4.

NMFS has also considered whether the spiny dogfish fishery, including implementation of FY 2011 specifications, is likely to significantly affect the proposed Atlantic sturgeon DPSs between when a final listing determination will be made and the remainder of FY 2011 (until April 30, 2012), and conclude that it is not. Although Tables 17 and 18 show that there are an average of 665 sturgeon encounters in Period 2 in the Southern region, the majority of those encounters are likely attributable to other fisheries. As discussed in Section 6.4, the majority of the sturgeon encounters in Period 2 in the Southern region (where the spiny dogfish fishery is active from October – April) were in otter trawl gear. As only 13.13 percent of spiny dogfish landings were caught using otter trawl gear in FY 2010, it is likely that the majority of these sturgeon encounters did not occur while targeting spiny dogfish. Therefore, NMFS has concluded that the preferred alternative will not result in significant impacts to Atlantic sturgeon for the remainder of FY 2011 (until April 30, 2012) compared to the No Action alternative.

As discussed in Section 6.4, estimated encounters with Atlantic sturgeon by the gear known to capture spiny dogfish and in waters in which the spiny dogfish fishing effort is based (the 500 series of statistical areas from May – October and the 600 series of statistical areas from November - April) have been declining in recent years, with only 121 sink gillnet encounters estimated in 2010 compared to 384 in 2006. As 67.4 percent of spiny dogfish landings are caught using sink gillnet gear, it is reasonable to assume that sturgeon encounters have declined in the fishery. As described in section 6.4, sturgeon encounters have declined as commercial quotas in the spiny dogfish fishery have steadily increased. This may be due to the fact that a large-scale directed dogfish fishery has been stymied by low possession limits so that the stock could fully recover and remain rebuilt. In addition, any increases in fishing effort as a result of the FY 2011 specifications and management measures are likely to occur by vessels using bottom longline gear, a gear type not estimated to have high encounters with Atlantic sturgeon. It is therefore important to note that, while these data can be attributed to the spiny dogfish fishery, spiny dogfish is primarily caught incidentally in other fisheries, and so the actual encounters in what is a small directed fishery are likely to be substantially lower than what has been presented here. Because the NEFOP data available for this analysis did not identify the species targeted, a more precise evaluation of encounters in only the spiny dogfish fishery cannot be specified at this time.

As noted in Section 6.4, DPS-specific population levels for Atlantic sturgeon are difficult to quantify at this time, and further work needs to be done to accurately quantify the population of this species, thereby triggering the need for a conference on whether NMFS should seek to implement, under its discretionary authority, measures to reduce any adverse impacts on the Atlantic sturgeon. Current estimates indicate that the Hudson River DPS likely consists of approximately 870 spawning individuals in any one year. However, adult Atlantic sturgeon are not believed to spawn annually, but rather every other year for males and every two to five years for females. Although NMFS does not have information necessary to determine the sex or spawning condition of Atlantic sturgeon encountered by the spiny dogfish fishery, these encounters may include both males and females and fish that may or may not spawn during that year. Therefore, encounters of Atlantic sturgeon by the spiny dogfish fishery may be a subset of the entire population, as opposed to being comprised exclusively of the smaller annual spawning population.

Despite limited information that can be used to accurately estimate the number of Atlantic sturgeon in each DPS, because estimated encounters and expected mortalities are lower in recent years than has been estimated in the past and because an increased spiny dogfish quota does not directly result in an increase in fishing effort , it is unlikely that the implementation of spiny dogfish specifications and management measures would result in significant impacts to any DPS of Atlantic sturgeon during FY 2011. Further, the yearly encounters and mortalities with Atlantic sturgeon that were estimated in Section 6.4 include encounters and mortalities by all fisheries utilizing sink gillnet and trawl gear, including the multispecies, and monkfish fisheries. Thus, it is likely that yearly encounters and mortalities by the spiny dogfish fishery would be lower than the estimates presented here; however, the NEFSC analysis of observer data was by gear type, and not fishery specific. Therefore, it is difficult to determine the rate of Atlantic sturgeon bycatch specific to the directed spiny dogfish fishery.

In order to gain a better understanding of the fishery specific impacts of the spiny dogfish fishery on Atlantic sturgeon DPSs, NMFS has initiated the collection of additional information concerning the potential impact of the spiny dogfish fishery on Atlantic sturgeon, including information that can be utilized to develop measures to reduce impacts to this proposed listed species. The information that is currently available consists of bycatch estimates by gear type, mesh size, quarter, and division (i.e., grouped Northeast statistical areas). Over the course of the summer and early fall 2011, the NMFS Northeast Regional Office will work with the NEFSC to establish Atlantic sturgeon bycatch estimates on an FMP basis, thereby providing a specific bycatch estimate for the Spiny dogfish FMP. The NEFSC is also expected to provide an analysis of correlations between Atlantic sturgeon bycatch and factors such as depth, time, area, mesh size, and gillnet soak time. In addition, NMFS will more fully analyze mixed stock component information to be able to partition Atlantic sturgeon takes among the five DPSs. Once this analysis is completed, NMFS will be able to more accurately estimate the impact of the directed spiny dogfish fishery on the five proposed DPSs of Atlantic sturgeon which would include an estimation of incidental take levels and if necessary, identify measures necessary to reduce interactions in order to avoid jeopardy and minimize impacts on the species. Based upon this information, NMFS will also be better able to suggest appropriate management measures to achieve the target level of reduction. Such measures may include seasonal and/or area closures, reduced soak times for sink gillnet gear, and modifications to sink gillnet gear such as adjustments to tie-down hanging ratios.

Serious injuries and mortalities of Atlantic sturgeon in commercial fishing gear are a likely concern for the long term persistence and recovery of the DPSs, and was a primary reason cited for the proposals to list the DPSs under the ESA. If final listing determinations are issued, the existing Section 7 consultation for the spiny dogfish fishery would need to be reinitiated consistent with the requirement to reinitiate formal consultation where discretionary Federal agency involvement or control of the action has been retained and a new species is listed that may be affected by the action. During the reinitiation, the effects of the spiny dogfish fishery on the five DPSs would be fully examined. Along with the impacts analysis, the formal consultation process will result in conservation recommendations and, if pertinent, reasonable and prudent measures, which would be actions deemed necessary or appropriate to minimize the impacts.

7.5 Human Community Impacts

As noted in Section 6.5, the dealer data associate a very limited number of fishing communities with a high (> 5%) proportion of spiny dogfish revenue to total commercial landings revenue. Additionally, none of the alternatives proposes to decrease revenue relative to the baseline by decreasing the quota. Alternative 1 would be expected to maintain current revenue levels and Alternatives 2 and 3 would be expected to increase revenue from dogfish landings. As such, positive or null economic impacts are expected under any of the scenarios under consideration.

Maintaining the status quo trip limit (3,000 lb under all alternatives) is not expected to result in more directed fishing on a per-trip basis, and should result in null impacts to

human communities. Nevertheless, the larger quotas proposed under Alternatives 2 and 3 could result in more directed trips due to a longer fishing season. This would tend to prolong any positive impacts associated with spiny dogfish harvest to human communities over the course of the fishing year.

Total spiny dogfish revenue from the last complete fishing year (FY2009) was reported as $2.360 million. Using the average FY2009 price/lb ($0.22) landing the full FY2010 quota (and therefore also FY2011 quota under Alternative 1) corresponds to $3.300 million. Using the same approach, revenue would be expected to increase to $4.400 million under Alternative 2 and $6.898 under Alternative 3. Assuming the distribution of landings by port is consistent with FY2009 (Section 6.5), the increases in dogfish revenue should benefit those ports that are more heavily dependent on dogfish revenue than other communities, assuming all other revenue sources do not change (e.g., Seabrook, NH, Rye, NH, Portsmouth, NH, Chatham, MA – Table 10). Additionally, increases or maintaining status quo revenues would benefit fishing vessel crews. In FY2009, 131 vessels with federal dogfish permits were reported in the dealer data to have had dogfish revenues greater than 5% of total revenue (dogfish revenue range $17 to 45,758, average = $9,169; dogfish rev / total rev range 5.0% to 100%, average = 10.0%). Among the vessels, crew size ranged from 1 to 7 (average = 2.87). The economic benefits would be greatest under Alternative 3 and to a lesser extent Alternative 2, but fishermen would still benefit with the potential for maintained revenue under Alternative 1, relative to the Status Quo Alternative. If the Alternative 1 (Status Quo) remained in place, revenue from federal water landings would remain constant.

7.6 Cumulative Impacts

7.6.1 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 MSA, as amended, 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 MSA promotes long-term positive impacts on the environment through guidance outlined in the National Standards. Under this regulatory regime, the cumulative impacts of past, present, and future federal fishery management actions on the spiny dogfish stock should generally be positive. This document analyzes the significance to the human environment of impacts that may result from the alternatives. 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 Assessment specifically considers the proposed management alternatives in the context of the cumulative impacts of past, present and reasonably foreseeable future fishing and non-fishing actions. The analysis is generally qualitative in nature because of the limitations of determining effects over time and over the large geographic areas under consideration.

Temporal and Geographic Scope of the Cumulative Impacts Assessment
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, 2011) and when the periods of low pup production have recruited into the fishery (approximately 2015)

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 (information available online in latest stock assessments for each species). The geographic range for socioeconomic impacts is defined as those fishing communities bordering the range of the commercial spiny dogfish fishery (Sections 6.5) from the U.S.-Canada border to, and including, North Carolina.

7.6.2 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 discharge of chemical pollutants and sewage; changes in water temperature, salinity and dissolved oxygen; an increase in suspended sediment, windy energy development, and liquefied natural gas (LNG) terminals and activities that involve dredging and the disposal of dredged material. Non-fishing activities generally tend to be concentrated in nearshore areas and only affect localized areas offshore. Wherever these activities co-occur, they can work additively or synergistically to decrease habitat quality and, as such, may indirectly constrain the sustainability of the managed resources, non-target species, and protected resources. Decreased habitat suitability could tend to reduce the tolerance of these VECs to the impacts of fishing effort. Impacts are generally negative in the immediate area of the activity. Installation of LNG terminals or wind energy turbines has the potential to displace fishing effort and negatively impact habitat. Although the overall impact to the affected species and their habitats on a population level is difficult to predict, it may be considered “low negative” or even “negligible”, since a large portion of these species have a limited or minor exposure to these local non-fishing perturbations due to the large range and various habitat regions the species occupies.

7.6.3 Fishing Activities: Past, Present, and Reasonably Foreseeable Future Activities

7.6.3.1 Target Species Impacts

The federal Spiny Dogfish FMP eliminated the large-scale directed fishing for spiny dogfish in federal waters, 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 four year timeframe that had originally been envisioned. The ASMFC implemented its Interstate FMP (ISFMP) for spiny dogfish in November 2002, and it went into effect May 1, 2003. Commercial quotas under the ISFMP were either non-existent (due to delayed implementation) or inconsistent with quotas under the federal FMP in all years except 2005 and 2006.

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 was about 30% of SSB_{max} necessitating continuation of rebuilding efforts. Nevertheless, the rebuilding efforts were effective, and by 2010 SSB (164,066 mt) was above the biomass target (159,288 mt) for the third year in a row and the stock was officially determined to be rebuilt in June 2010.
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The ASMFC implemented Addendum II to the ISFMP in October 2008. That addendum established regional allocation of the quota and a quota overage provision. Quota allocation is not expected to have impacts on the spiny dogfish population. The quota overage provision, however, reduces the offending region's allocation when that region is found to have exceeded its allocation in the previous year. This should prevent landings from deviating too far from target levels on a consistent basis. Since 2009, the annual quota implanted by the federal and states' FMPs have been consistent. The 2010 states' quota was actually lower than the federal quota (14.4 M lbs vs. 15 M lb) after reductions to for quota overages.
Long term projections indicate that no matter what fishing mortalities are achieved, biomass will oscillate - continuing to increase in the near term, then declining to a "low" around 2017, followed by another increase. The reason for this oscillation is a "hole" in female biomass that is the result of prolonged low production from 1997-2003.

7.6.3.2 Non-target Species Impacts

The establishment of the federal Spiny Dogfish FMP and later, the ISFMP, eliminated the major directed spiny dogfish fishery in federal and state waters. These actions are associated with positive impacts on non-target species. The current possession limit in both jurisdictions is 3,000 lbs per trip, and the proposed actions would maintain that trip limit. The abundance of dogfish has increased greatly and while larger trip limits may result in greater directed fishing, increased landings do not necessarily correspond to increased fishing effort. There are no known plans to investigate methods to decrease spiny dogfish bycatch in other fisheries. Given that a major directed spiny dogfish

fishery associated with the bycatch of non-target species is unlikely to develop in the near future, impacts on non-target species as a result of spiny dogfish harvest are not expected to be significant in future years.

7.6.3.3 Habitat Impacts

Commercial gear types historically used to harvest spiny dogfish include sink gill nets, bottom longlines, and to a much lesser extent, bottom otter trawls. Of these gear types, the bottom otter trawl is the only gear known to significantly affect benthic habitats since it is a bottom-tending mobile gear. Prior to the implementation of the federal and states' Spiny Dogfish FMPs, 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 FY2009, however, bottom otter trawls contributed 13.1% of the total commercial landings (Table 6). Additional adverse habitat impacts would be expected with the increases in the quota as under Alternatives 2 or 3, but not under Alternative 1. Because the abundance of dogfish has increased greatly, larger catches would not necessarily be associated with an equivalent increase in fishing effort. Directed fishing is addressed in Section 6.1.3.1.1 and appears to be related to the type of gear used with much greater likelihood of directed effort with bottom longlines, less likelihood with bottom otter trawls, and gillnets somewhere in between. Additionally, because the abundance of dogfish has increased, larger catches are not necessarily associated with an increase in fishing effort. That a given trip would be made for the sole purpose of harvesting dogfish is also less likely the farther from shore that trip occurs. Nevertheless, in comparison to the Alternative 1, it is expected that directed dogfish fishing in the EEZ is more likely to increase than decrease under Alternatives 2 and 3, and to the greatest degree under Alternative 3.

7.6.3.4 Endangered and Other Protected Species Impacts

The North Carolina gillnet fishery for spiny dogfish caught both sea turtles and Atlantic bottlenose dolphins. Management measures consistent with the federal spiny dogfish rebuilding plan, have eliminated the directed gillnet fishery for spiny dogfish in North Carolina. Additionally, protective measures under the 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 reduced mortality for these species that was associated with the historic spiny dogfish fishery.

The dominant gear types currently associated with the retention of spiny dogfish (sink gill nets and hook gear) are used by several fisheries identified in the List of Fisheries for 2011 (75 CFR 67468). Sink gill nets are deployed in two Category I fisheries: "Mid-Atlantic gillnet" and "Northeast sink gillnet". Widespread directed fishing for spiny dogfish was effectively been eliminated in federal waters since FY2000. However, with the proposed increase in quota, it is possible that encounters with protected resources could increase from status quo. But, given that the abundance of dogfish has increased greatly, larger catches are not necessarily associated with an increase in fishing effort.

A major directed spiny dogfish fishery is unlikely to develop in the near future. As such, impacts on endangered and other protected species as a result of spiny dogfish harvest are not expected to be significant in future years.

One of the factors cited in NMFS' proposed listing for the five DPSs of Atlantic sturgeon is bycatch. The ASMFC analysis concluded that to remain stable or grow, populations of Atlantic sturgeon can sustain only very low anthropogenic sources of mortality. It is apparent, therefore, that should the proposed listing be finalized, reductions in bycatch mortality may be required in order to recover Atlantic sturgeon. NMFS considered whether the spiny dogfish fishery, including the proposed specifications and management measures, are likely to jeopardize the proposed Atlantic sturgeon DPSs from the effective date of this action until the listing date (October 6, 2011) and conclude that it is not. While there are clearly interactions between Atlantic sturgeon and gear used in the spiny dogfish fishery, the low number of interactions directly attributable to the spiny dogfish fishery from May to October 2011, is not likely to cause an appreciable reduction in survival and recovery of the Atlantic sturgeon DPSs.

NMFS has also considered whether the spiny dogfish fishery, including implementation of FY 2011 specifications, is likely to significantly affect the proposed Atlantic sturgeon DPSs between when a final listing determination will be made and into the foreseeable future. Because the majority of spiny dogfish landings are incidental in other fisheries, such as the NE multispecies and monkfish fisheries, any analysis regarding Atlantic sturgeon encounters in those FMPs will also serve to address concerns regarding vessels also operating under the spiny dogfish FMP. The environmental assessments (EAs) for Framework 45 to the NE Multispecies FMP and Amendment 5 to the Monkfish FMP both address impacts of gear in which Atlantic sturgeon encounters are known to occur. The Framework 45 EA analysis concluded that Atlantic sturgeon encounters in gears primarily used in the NE multispecies fishery (large-mesh sink gillnet and otter trawl) were low according to the NEFSC data from 2006-2010. Therefore, it was determined to be unlikely that the implementation of FW 45 would result in significant impacts to any DPS of Atlantic sturgeon during FY 2011.

Given the lack of information concerning how the Atlantic sturgeon DPSs are and will be impacted by takes of Atlantic sturgeon in the monkfish fishery, NMFS established a Monitoring and Action Plan in conjunction with the partial approval of Amendment 5 to the Monkfish FMP to mitigate the cumulative impact of the monkfish fishery on Atlantic sturgeon. This Plan, which is described in the Addendum to the EA for Amendment 5, outlines that NMFS is conferencing under the ESA in an effort to gather new information to determine the magnitude of the impacts of the monkfish fishery on Atlantic sturgeon and begin development of measures to reduce such impacts; NMFS will establish reasonable and prudent measures (RPMs) to reduce the impacts of this fishery on Atlantic sturgeon if the species is listed under ESA; and NMFS will monitor the impacts of the monkfish fishery on Atlantic sturgeon through the annual review process established in the Monkfish FMP, regardless of whether or not the species is listed under ESA.

Any sturgeon encounters which occur in gear used to catch spiny dogfish, but are actually attributed to fishing effort in the NE multispecies and/or monkfish fisheries are addressed under the environmental assessments for actions under those FMPs. However,

since the NEFSC analysis of NEFOP data was conducted by gear type, and not by fishery, it is unknown what the impacts of the small directed spiny dogfish fishery are on the proposed Atlantic sturgeon DPSs. Section 7(a)(4) of the ESA provides a mechanism for identifying and resolving potential conflicts between a proposed action and proposed species at an early planning stage. While consultations are required when the proposed action may affect listed species, a conference is only required when the proposed action may affect the continued existence of a proposed species, but may be initiated for the purpose of gathering more information.. In this case, NMFS has initiated conference procedures under the ESA for the purpose of gathering more information to better assess potential impacts of the directed spiny dogfish fishery on the proposed Atlantic sturgeon DPSs and develop measures to reduce those impacts. Entering the conference process enables the action agency to proceed with a close examination of the impacts of the proposed action on a proposed species, and develop measures aimed at avoiding or minimizing adverse effects to the proposed species. It is important to note that as soon as a listing determination is made and becomes effective, the prohibition against jeopardy applies regardless of the action's stage of completion. Thus, by closely examining the potential impacts of an action on a proposed species and developing measures to eliminate or minimize those impacts, if any are found to exist, the action agency is in a better position to take immediate action once a listing occurs to implement measures if a jeopardy determination is made with respect to the action. NMFS may implement a Monitoring and Action Plan similar to that used in Amendment 5 to the Monkfish FMP to mitigate any negative impacts if they should arise.

As noted in Section 7.4, serious injuries and mortalities of Atlantic sturgeon in commercial fishing gear are a likely concern for the long term persistence and recovery of the DPSs, and was a primary reason cited for the proposals to list the DPSs under the ESA. Final listing determinations for the Atlantic sturgeon DPSs are expected by October 6, 2011. If final listing rules are published, they will likely become effective 30 days after publication. If final listing determinations are issued, the existing Section 7 consultation for the spiny dogfish fishery would need to be reinitiated consistent with the requirement to reinitiate formal consultation where discretionary Federal agency involvement or control of the action has been retained and a new species is listed that may be affected by the action. During the reinitiation, the effects of the spiny dogfish fishery on the five DPSs would be fully examined. Along with a jeopardy analysis, the formal consultation process will result in conservation recommendations and, if pertinent, reasonable and prudent measures, which would be actions deemed necessary or appropriate to minimize the impact of take of Atlantic sturgeon. If appropriate, a Monitoring and Action Plan similar to what was developed for the Monkfish FMP, could be implemented for the spiny dogfish fishery. Considering the breadth to which potential impacts to Atlantic sturgeon were analyzed here, in the NE Multispecies and Monkfish FMP assessments, and that the majority of spiny dogfish landings are incidental in those fisheries, this action is not expected to result in significant adverse cumulative impacts to Atlantic sturgeon.

7.6.3.5 Fishery and Socioeconomic Impacts

As a result of the implementation of the federal and states' spiny dogfish FMPs, 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 effects are expected to be ameliorated now that the spiny dogfish stock has been rebuilt. Under the alternatives, revenue associated with spiny dogfish harvest should remain stable (Alternative 1) or increase (Alternatives 2 and 3; see Section 7.5) disregarding changes in market value.

7.6.4 Summary of Cumulative Effects/Conclusions

The proposed action is not expected to have significant negative impacts on the spiny dogfish resource or the human communities involved. The fishing mortality rate associated with the proposed action are also expected to allow for stock growth. Additionally, there is a low likelihood that a major directed spiny dogfish fishery and corresponding low negative impact associated with increases in fishery interactions with non-target species, habitat, and protected resources would develop in federal waters in the upcoming fishing year. Socioeconomic benefits are expected because harvest levels in FY2011 are expected to be greater than in FY2010 since the proposed action increases the quota by 5 million lb. In general, stock conditions have improved greatly from a cumulative effects perspective.

As discussed above, past, present, and reasonably foreseeable future fishing actions (i.e., the federal and states' FMPs, FW1, ASMFC addenda, and specifications) have had positive impacts on the spiny dogfish stock, and negligible impacts on non-target/bycatch species, habitat, and protected resources. Federal and states' management actions have had negative impacts on the human communities, due to limited annual quota and trip limits which effectively eliminated the large-scale directed fishery.

Given the importance of spiny 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. Until recently, (FY2004, 2005, 2009, 2010) divergent state water harvest policy has had a presumably constraining effect on the spiny dogfish stock rebuilding plan. For most years since 2000, the ASMFC has increased their overall quota and trip limits above federal levels. However, in the upcoming fishing year, the ASMFC quota and proposed federal action are expected to be consistent and should both help to achieve the federal rebuilding objectives.

As explained in Section 7.6.2, non-fishing actions generally tend to be concentrated in nearshore areas, and include the discharge of chemical pollutants and sewage; changes in water temperature, salinity and dissolved oxygen; an increase in suspended sediment and activities that involve dredging and the disposal of dredged material. The impacts to habitat and to the dogfish stock, non-target species, and protected species from non-fishing activities are likely negative in the immediate area of the action. However, the degree of negative impact to the population as a whole is difficult to predict, but likely low negative or even negligible, since a large portion of these species populations have a limited or minor exposure to these local non-fishing perturbations due to the large range and various habitat regions the species occupies. Also adverse effects are often reduced or even avoided as required by certain conditions placed on these activities during permitting.

The cumulative effects on the VECs are, by definition, a combination of the proposed action and the other above described fishing and non-fishing actions. Past and current fishing regulatory actions have resulted in positive impacts to the dogfish stock, which is supported by the increase in biomass of the stock. The preferred alternative would have a positive cumulative effect since the net result would be to continue rebuilding the dogfish stock and allow further exploitation of the increased biomass at the same fishing effort. The cumulative impacts to non-target/bycatch species, habitat, and protected resources are all negligible since the impacts of the preferred alternative on these VECs are also negligible. Although past and current fishery management actions have had negative social and economic impacts to dogfish fishermen and the associated businesses, the preferred alternative offers the opportunity to increase revenues and therefore would result in positive cumulative impact to these entities. The proposed action is consistent with the 20 million lb 2011 quota under the ASMFC spiny dogfish management plan.

8.0 APPLICABLE LAWS

8.1 National Environmental Policy Act of 1969 (NEPA)

8.1.1 Finding of No Significant Environmental Impact (FONSI)

National Oceanic and Atmospheric Administration Administrative Order (NAO) 216-6 (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. In addition, the Council on Environmental Quality (CEQ) regulations at 40 C.F.R. 1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity." Each criterion listed below is relevant to making a finding of no significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the NAO 216-6 criteria and CEQ's context and intensity criteria. These include:

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

The proposed action is intended to prevent overfishing and maintain spiny dogfish biomass above the biomass target. This action is not expected to jeopardize the sustainability of any target species that may be affected by the action. As discussed in Section 6.1.2, the spiny dogfish stock is rebuilt, is not overfished, and overfishing is not occurring.

2) Can the proposed action reasonably be 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, including species proposed for listing under the Endangered Species Act (ESA). The proposed measure is not expected to significantly alter fishing methods or activities. There is limited directed fishing for spiny dogfish using gear that incidentally catches other species. The proposed action should not significantly increase directed dogfish fishing in the EEZ. As such, the incidental catch of non-target species should not increase significantly.

Although information about bycatch is limited and inconclusive with respect to fishery-wide impacts, the impact of this action on non-target species is not expected to be significant, primarily because there is unlikely to be any increases in directed dogfish effort. With respect to Atlantic sturgeon, the proposed action is not expected to result in additional impacts beyond those already occurring in the fishery given that the management measures contained in this action are expected have little to no effect on fishing effort levels in comparison to taking no action. Any minor increases in fishing effort as a result of the FY 2011 specifications and management measures are likely to occur by vessels using bottom longline gear, a gear type not estimated to have high encounters with Atlantic sturgeon. Based on 2006-2010 observer data, estimated annual takes of Atlantic sturgeon in sink gillnet gear and otter trawl gear range , including gear types not used target spiny dogfish, from 1536 to 3221 sturgeon annually, with an average of 2215 observed encounters expanded by VTR landings (Table 16). These data indicate that gear used to catch spiny dogfish is likely to interact with Atlantic sturgeon during FY 2011, the time period for this action. As described in Section 6.4, even though spiny dogfish commercial quotas increased dramatically as the fishery has recovered, and the possession limits have increased, sturgeon encounters have remained the same or decreased in that same time period. It is therefore important to note that, while these data can be attributed to gear used in the spiny dogfish fishery, spiny dogfish is primarily caught incidentally in other fisheries, and so the actual encounters in what is a small directed fishery are likely to be substantially lower than those presented above. NMFS is conferencing to determine specifically the number of encounters with Atlantic sturgeon from the small directed dogfish fishery, but based on the limited size of the directed fishery, impacts are not expected to be significant.

3) Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in FMPs?

The proposed action is not expected to cause substantial damage to the ocean, coastal habitats, and/or EFH as defined under the MSA and identified in the FMP. There has been an overall decline in bottom trawling activity for groundfish in the Northeast region in recent years and management measures (closed areas) are in place for minimizing the adverse habitat impacts of bottom trawling and dredging. Therefore, fishing activity in the limited spiny dogfish trawl fishery is not expected to increase existing levels of minimal adverse impacts to EFH and do not require any mitigation.

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

No changes in fishing behavior that would affect safety are anticipated. The overall effect of the proposed action would not adversely impact public health or safety.

5) Can the proposed action reasonably be expected to adversely affect 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. While there may be some adverse impacts by maintaining fishing effort through the proposed action, that impact is not expected to be significant. Because the abundance of dogfish has increased during the rebuilding program, effort is unlikely to increase significantly. In addition, measures in place to protect endangered or threatened species, marine mammals, and critical habitat for these species would remain in place.

Updated bycatch estimates associated with gear types known to catch spiny dogfish indicate that spiny dogfish fishery is likely to interact with Atlantic sturgeon during FY 2011. However, as noted under FONSI question #2, the proposed action is not expected to result in additional impacts on Atlantic sturgeon beyond those already occurring in the fishery given that this action will likely have little to no effect on fishing effort levels in comparison to taking no action.

6) Can the proposed action be expected to have a substantial impact on biodiversity and/or 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. The action is not expected to significantly alter fishing methods or activities or fishing effort or the spatial and/or temporal distribution of current fishing effort.

7) Are significant social or economic impacts interrelated with natural or physical environmental effects?

The proposed action is not expected to have a substantial impact on the natural or physical environment. The proposed action is not expected to significantly alter fishing methods or activities, fishing effort or the spatial and/or temporal distribution of current fishing effort. Therefore, there are no social or economic impacts interrelated with natural or physical environmental effects.

8) Are the effects on the quality of the human environment likely to be highly controversial?

On the contrary, the proposed action reflects agreement between both Councils and the ASMFC on the total quota and maximum possession limits. Individual state agencies may take actions that are more restrictive than the proposed action, and that could cause some controversy in specific states. Although there has been some controversy over the setting of dogfish specifications in the past, the effects of this action are not highly controversial.

9) Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas?

This action addresses the commercial quota and trip limit for spiny dogfish. This fishery is not known to be prosecuted in any unique areas such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas. Therefore, the proposed action is not expected to have a substantial impact on any of these areas.

10) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

The impacts of the proposed action on the human environment are described in Section 7.0 of the EA. The proposed action addresses the commercial quota and trip limit for the spiny dogfish fishery. The proposed action is not expected to significantly alter fishing methods or activities, and is not expected to significantly increase fishing effort or the spatial and/or temporal distribution of current fishing effort. The measures contained in this action are not expected to have highly uncertain, unique, or unknown risks on the human environment.

Regarding Atlantic sturgeon, in the context described above, the impacts of the proposed action versus taking no action are not highly uncertain nor do they involve unique or unknown risks. If final listing determinations for Atlantic sturgeon are issued, the existing Section 7 consultation for the spiny dogfish fishery would need to be reinitiated consistent with the requirement to reinitiate formal consultation where discretionary Federal agency involvement or control of the action has been retained and a new species is listed that may be affected by the action. During the reinitiation, the effects of the spiny dogfish fishery on the five DPSs would be fully examined.

11) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

As discussed in Section 7.6, the proposed action is not expected to have cumulatively significant impacts when considered with the impacts from other fishing and non-fishing activities. The improvements in the condition of the stock are expected to generate cumulative positive impacts overall. The proposed action, together with past and future actions are not expected to result in significant cumulative impacts on the biological, physical, and human components of the environment.

12) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

The proposed action addresses the commercial quota and trip limit for the spiny dogfish fishery. This fishery is not known to be prosecuted in any areas that might affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or cause the loss or destruction of significant scientific, cultural or historical resources. Therefore, the proposed action is not expected to affect on any of these areas.

13) Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?

The proposed action addresses the commercial quota and trip limit for the spiny dogfish fishery. There is no evidence or indication that this fishery has ever resulted in the introduction or spread of nonindigenous species. The proposed action is not expected to significantly alter fishing methods or activities, and is not expected to significantly increase fishing effort or the spatial and/or temporal distribution of current fishing effort. Therefore, it is highly unlikely that the proposed action would be expected to result in the introduction or spread of a non-indigenous species.

14) Is the proposed action likely to establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration?

The proposed action addresses the commercial quota and trip limit for the spiny dogfish fishery. The proposed action is not expected to significantly alter fishing methods or activities, and is not expected to significantly increase fishing effort or the spatial and/or temporal distribution of current fishing effort. When new stock assessment or other biological information about these species becomes available in the future, then the specifications may be adjusted according to the FMP. The proposed action will not result in significant effects, nor does it represent a decision in principle about a future consideration.

15) Can the proposed action reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?

The proposed action addresses the commercial quota and trip limit for the spiny dogfish fishery. The proposed action is not expected to alter fishing methods or activities such that they threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment. The proposed action has been found to be consistent with other applicable laws (see Sections 9.2 - 9.10 below).

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

The impacts of the proposed action on the biological, physical, and human environment are described in Section 7.0. The cumulative effects of the proposed action on target and non-target species, including Atlantic sturgeon, are detailed in Section 7.6. As explained above, however, for the purposes of this FONSI determination, impacts on Atlantic sturgeon are analyzed from the perspective of the incremental impacts of the proposed action versus taking no action. The proposed action is not expected to significantly increase fishing effort or the spatial and/or temporal distribution of current fishing effort. Therefore, the effects to target and non-target species, including species listed or are proposed to be listed under the ESA, resulting from this proposed action, are not expected to be significant. The improvements in the condition of the stock through implementation of quotas based on the fishing mortality target contained in the FMP are expected to generate positive impacts overall.

DETERMINATION

In view of the information presented in this document and the analysis contained in the supporting Environmental Assessment, it is hereby determined that the proposed actions in this 2011 Spiny Dogfish Specifications Package will not significantly impact the quality of the human environment as described above and in the Environmental Assessment. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an Environmental Impact Statement for this action is not necessary.

Regional Administrator, Northeast Region, NMFS

May 9, 2011
Date

8.2 Marine Mammal Protection Act

The MAFMC has reviewed the impacts of the proposed spiny dogfish specifications on marine mammals and has concluded that the proposed management actions 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 7.4 of this document.

8.3 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, that the proposed spiny dogfish specifications are 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 7.4).

While ESA Section 7 consultations are required when the proposed action may affect listed species, a conference is required only when the proposed action is likely to jeopardize the continued existence of a proposed species or destroy or adversely modify proposed critical habitat. Therefore, a conference would be required if it was determined that the spiny dogfish fishery, including implementation of specifications and management measures, was likely to jeopardize one or more of the proposed five DPSs of Atlantic sturgeon or one or more of the nine DPSs of loggerhead sea turtles.

A biological assessment evaluates the potential effects of an action on listed and proposed species and designated and proposed critical habitat to determine whether any such species or habitat are likely to be adversely affected by the action. A biological assessment is used in determining whether formal consultation or a conference is necessary. A formal Section 7 consultation was completed in October 2010 which analyzed the effects of the spiny dogfish fishery on listed species and designated critical habitat, including loggerhead sea turtles. For listed species, therefore, this action has been analyzed in the informal consultation dated INSERT DATE, 2011, and it has been

determined that they are not likely to cause an effect to listed species or critical habitat not considered in the October 2010 Biological Opinion.

As noted previously, one of the factors cited in NMFS' proposed listing for the five DPSs of Atlantic sturgeon is bycatch. The ASMFC analysis concluded that to remain stable or grow, populations of Atlantic sturgeon can sustain only very low anthropogenic sources of mortality. It is apparent, therefore, that should the proposed listing be finalized, reductions in bycatch mortality may be required in order to recover Atlantic sturgeon. Final listing determinations for the Atlantic sturgeon DPSs are expected by October 6, 2011. If final listing rules are published, they will likely become effective 30 days after publication. With the publication of a final listing rule, a Section 7 consultation would be required as the analysis conducted by the ASMFC and Stein et al (2004a) demonstrate that the multispecies fishery may affect Atlantic sturgeon. Through that consultation process, the effects would be estimated and analyzed. At this point, while Atlantic sturgeon is a proposed species, the question is whether the proposed action is likely to jeopardize the continued existence of the proposed species. Atlantic sturgeon is a proposed species only until a final listing determination is made. When a final listing determination is made, the proposed rules will either be withdrawn or final listing rules will be published. We have considered whether the spiny dogfish fishery, including implementation of specifications and management measures, is likely to jeopardize the proposed Atlantic sturgeon DPSs and conclude that it is not. While it is possible that there may be interactions between Atlantic sturgeon and gear used in the spiny dogfish fishery, the number of interactions that will occur between now and the time a final listing determination will be made is not likely to cause an appreciable reduction in survival and recovery based on current assessments of each DPS, as described in Section 6.4.

Serious injuries and mortalities of Atlantic sturgeon in commercial fishing gear are a likely concern for the long term persistence and recovery of the DPSs, and was a primary reason cited for the proposals to list the DPSs under the ESA. If final listing determinations are issued, the existing Section 7 consultation for the spiny dogfish fishery would need to be reinitiated consistent with the requirement to reinitiate formal consultation where discretionary Federal agency involvement or control of the action has been retained and a new species is listed that may be affected by the action. During the reinitiation, the effects of the spiny dogfish fishery on the five DPSs would be fully examined.

That October 2010 Biological Opinion for the spiny dogfish fishery concluded that the spiny dogfish fishery may affect, but was not likely to jeopardize, loggerhead sea turtles. An incidental take statement and associated reasonable and prudent measures and terms and conditions were included with that Biological Opinion. In reaching that conclusion, the Biological Opinion considered the effect of the estimated take on nesting beach aggregations and ultimately to the global species as listed. The difference between the analysis contained in the October 2010 Biological Opinion and that conducted for the proposed species would be that it was conducted at the level of the global species and it was conducted for a species listed as threatened whereas the proposal is for nine DPSs, two of which are proposed to be listed as threatened and seven to be listed as endangered. The Northwest Atlantic DPS is the one affected the most by the multispecies fishery and

it is proposed to be listed as endangered. It is important to note that the effects analysis was conducted by examining the estimated number of takes against what is known about the biological status of loggerhead sea turtles and did not explicitly include any specific variable that would be affected by the listing status (e.g. threatened or endangered). Since the October 2010 Biological Opinion considered effects at the nesting beach aggregation level first and then aggregated up to consider effects at the species level, an analysis considering effects at the DPS rather than species level and on an endangered rather than threatened species would not change the jeopardy conclusion of that Biological Opinion. Therefore, we conclude that a conference for the proposed loggerhead DPSs is not required.

8.4 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) of 1972, as amended, provides measures for ensuring stability of productive fishery habitat while striving to balance development pressures with social, economic, cultural, and other impacts on the coastal zone. It is recognized that responsible management of both coastal zones and fish stocks must involve mutually supportive goals. The Council has developed this specifications document and will submit it to NMFS; NMFS must determine whether this action is consistent to the maximum extent practicable with the CZM programs for each state (Maine through North Carolina).

8.5 Administrative Procedures Act

Sections 551-553 of the Federal Administrative Procedure Act establish procedural requirements applicable to informal rulemaking by federal agencies. The purpose is to ensure public access to the federal rulemaking process and to give the public notice and an opportunity to comment before the agency promulgates new regulations.

The Administrative Procedure Act requires solicitation and review of public comments on actions taken in the development of a fishery management plan and subsequent amendments and framework adjustments. Development of this specifications document provided many opportunities for public review, input, and access to the rulemaking process. This proposed specifications document was developed as a result of a multi-stage process that involved review of the source document (2011 Specifications and Management Measures) by affected members of the public. The public had the opportunity to review and comment on management measures during a meeting of the Council's Scientific and Statistical Committee on September 21, 2010, a Spiny Dogfish MC Meeting on September 24, 2010, a Joint Spiny Dogfish Committee meeting held on October 12, 2010, a MAFMC meeting held October 13, 2010, and an NEFMC meeting held on November 18, 2010. In addition, the public will have further opportunity to comment on this specifications package once NMFS publishes a proposed rule in the Federal Register (FR) requesting comments.

8.6 Data Quality Act

Utility of Information Product

The proposed document includes: A description of the proposed specifications, description of the alternatives considered, and the reasons for selecting the proposed management measures. This action proposes commercial quotas and other management measures for spiny dogfish in 2011. This proposed specifications document implements the FMP's conservation and management goals consistent with the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) as well as all other existing applicable laws.

This proposed specifications document was developed as a result of a multi-stage process that involved review of the source document (2011 Specifications and Management Measures) by affected members of the public. The public had the opportunity to review and comment on management measures during a meeting of the Council's Scientific and Statistical Committee on September 21, 2010, a Spiny Dogfish MC Meeting on September 24, 2010, a Joint Spiny Dogfish Committee meeting held on October 12, 2010, a MAFMC meeting held October 13, 2010, and an NEFMC meeting held on November 18, 2010.

The Federal Register notice that announces the proposed rule and the implementing regulations will be made available in printed publication and on the website for the Northeast Regional Office. The notice provides metric conversions for all measurements.

Integrity of Information Product

The information product meets the standards for integrity under the following types of documents:

Other/Discussion (e.g., Confidentiality of Statistics of the Magnuson-Stevens Fishery Conservation and Management Act; NOAA Administrative Order 216-100, Protection of Confidential Fisheries Statistics; 50 CFR 229.11, Confidentiality of information collected under the Marine Mammal Protection Act.)

Objectivity of Information Product

The category of information product that applies for this product is “Natural Resource Plans.”

In preparing specifications documents, the Council must comply with the requirements of the Magnuson-Stevens Act, the National Environmental Policy Act, the Regulatory Flexibility Act, the Administrative Procedure Act, the Paperwork Reduction Act, the Coastal Zone Management Act, the Endangered Species Act, the Marine Mammal Protection Act, the Data Quality Act, and Executive Orders 12630 (Property Rights), 12866 (Regulatory Planning), 13132 (Federalism), and 13158 (Marine Protected Areas).

This specifications document has been developed to comply with all applicable National Standards, including National Standard 2. National Standard 2 states that the FMP's conservation and management measures shall be based upon the best scientific information available. Despite current data limitations, the conservation and

management measures proposed to be implemented under this specifications document are based upon the best scientific information available. This information includes NMFS dealer weighout data for 2009, which was used to characterize the economic impacts of the management proposals. These data, as well as the NMFS Observer program database, were used to characterize historic landings, species co-occurrence in the spiny dogfish catch, and discarding. The specialists who worked with these data are familiar with the most recent analytical techniques and with the available data and information relevant to the spiny dogfish fishery. Marine Recreational Fisheries Statistical Survey (MRFSS) data were used to characterize the recreational fishery for this species.

The policy choices (i.e., management measures) proposed to be implemented by this specifications document are supported by the available scientific information and, in cases where information was unavailable, proxy reference points are based on observed trends in survey data. The management measures contained in the specifications document are designed to meet the conservation goals and objectives of the FMP, and prevent overfishing and rebuild overfished resources, while maintaining sustainable levels of fishing effort to ensure a minimal impact on fishing communities.

The supporting materials and analyses used to develop the measures in the proposed rule are contained in the specifications document and to some degree in previous specifications and/or FMPs as specified in this document.

The review process for this specifications package involves the Mid-Atlantic Fishery Management Council, the Northeast Fisheries Science Center, the Northeast Regional Office, and NOAA Fisheries headquarters. The Center's technical review is conducted by senior level scientists with specialties in population dynamics, stock assessment methods, demersal resources, population biology, and the social sciences. The Council review process involves public meetings at which affected stakeholders have opportunity to provide comments on the specifications document. Review by staff at the Regional Office is conducted by those with expertise in fisheries management and policy, habitat conservation, protected species, and compliance with the applicable law. Final approval of the specifications document and clearance of the rule is conducted by staff at NOAA Fisheries Headquarters, the Department of Commerce, and the U.S. Office of Management and Budget.

8.7 Paperwork Reduction Act

The Paperwork Reduction Act (PRA) concerns the collection of information. The intent of the PRA is to minimize the federal paperwork burden for individuals, small businesses, state and local governments, and other persons as well as to maximize the usefulness of information collected by the federal government. There are no changes to the existing reporting requirements previously approved under this FMP for vessel permits, dealer reporting, or vessel logbooks. This action does not contain a collection-of-information requirement for purposes of the Paperwork Reduction Act.

8.8 Impacts Relative to Federalism/E.O. 13132

This specifications document does not contain policies with federalism implications sufficient to warrant preparation of a federalism assessment under Executive Order (EO) 13132.

8.9 Environmental Justice/Executive Order (E.O.) 12898

This EO provides that "each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." EO 12898 directs each federal agency to analyze the environmental effects, including human health, economic, and social effects of federal actions 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 changes relative to the current opportunity to participate in this fishery, no negative economic or social effects are anticipated as a result (Section 7.0). Therefore, the proposed action under the preferred alternatives is not expected to cause disproportionately high and adverse human health, environmental or economic effects on minority populations, low-income populations, or Indian tribes.

8.10 Regulatory Flexibility Act/E.O. 12866

8.10.1 Regulatory Impact Review (RIR) 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 MSA 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.

8.10.2 Description of Management Objectives

The goals and objectives of the management plan for the spiny dogfish 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.

8.10.3 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.

8.10.4 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 review the best available stock and fishery data when developing specifications for the upcoming fishing year(s).

8.10.5 Description of the Alternatives

Alternative 1 – (Status Quo – Set quota to maintain current FY2010 level: 15.0 M lb): For FY2011, specify a commercial quota of 15.0 M lbs with trip limits of 3,000 lbs (vessels are prohibited from landing more than the specified amount in one calendar day). As per the FMP, the quota would be divided with quota Period 1 (May 1 through October 31) allocated 57.9% of the quota (8.685 M lbs), and quota Period 2 (November 1 through April 30) allocated 42.1% of the quota (6.315 M lbs).

According to CEQ regulations, the No Action Alternative should be used for the purposes of evaluating an environmental baseline. A "true" No Action Alternative for dogfish fishery management, however, is not equivalent to status quo or baseline conditions. If the actions proposed in this document are not taken, some current management measures will remain in place (i.e. 3,000 lb trip limit), but the overall management program will not be identical to that of 2010 (i.e. there would be no specified quota for FY 2011). The "true" No Action Alternative for this fishery is infeasible and inconsistent with the FMP which requires specifications, or quotas, to be established for the fishery. Therefore, the "true" No Action Alternative is not analyzed in this document.

Alternative 2 – (Councils' Preferred Alternative – Set quota to achieve SSC recommendation - 75% of catch at Fmsy: 20.0 M lbs)
For FY2011, specify a commercial quota of 20.0 M lbs with trip limits of 3,000 lbs (vessels are prohibited from landing more than the specified amount in one calendar day). As per the FMP, the quota would be divided with quota Period 1 (May 1 through October 31) allocated 57.9% of the quota (11.580 M lbs), and quota Period 2 (November 1 through April 30) allocated 42.1% of the quota (8.420 M lbs).

Alternative 3 – (Set quota to achieve existing F_{target} (0.207): 31.4 M lbs)
For FY2011, specify a commercial quota of 31.4 M lbs with trip limits of 3,000 lbs (vessels are prohibited from landing more than the specified amount in one calendar day). As per the FMP, the quota would be divided with quota Period 1 (May 1 through October 31) allocated 57.9% of the quota (18.2 M lbs), and quota Period 2 (November 1 through April 30) allocated 42.1% of the quota (13.2 M lbs).

8.10.6 Economic Analysis

The economic impacts of the proposed actions are discussed in Section 7.0 of this document. Higher quotas and maintaining trip limits are expected to result in negative economic impacts. Higher quota and trip limits (Alternatives 2 and 3) are expected to

increase revenue from the dogfish fishery. In general, no significant economic impacts are expected because the alternatives are consistent with the goals of the FMP and are unlikely to result in significant deviation (negatively) from the status quo.

8.10.7 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.

8.10.8 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.

8.10.9 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.

8.10.10 Objectives and Legal Basis for the Action

The objective of the proposed action is to implement specifications for the spiny dogfish fishery, as required under the regulations implementing the Spiny Dogfish FMP, which are provided in 50 CFR 648, Subpart L.

8.10.11 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 2009 fishing year is given in Section 6.5.1 of this document.

8.10.12 Recordkeeping and Reporting Requirements

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

8.10.13 Duplication, Overlap, or Conflict with Other Federal Rules

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

8.10.14 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.

Additional (final) copies of this EA can be obtained via the NMFS NERO website:
http://www.nero.noaa.gov/nero/regs/com2011.html
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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 TABLES

Table 1. Landings of spiny dogfish (1,000s lbs) in the Northwest Atlantic Ocean for calendar years 1980 to 2009.

Year	US Comm	US Rec	US Total	Canada	Former USSR	Other Foreign	Total (NW Atl.Stock)
1980	9,006	-	9,006	1,477	774	547	11,804
1981	15,135	3,291	18,426	1,243	1,138	1,010	21,817
1982	11,928	154	12,082	2,101	60	743	14,986
1983	10,795	148	10,943	-	791	231	11,965
1984	9,811	201	10,012	9	642	220	10,883
1985	8,880	196	9,076	29	1,530	701	11,336
1986	6,057	401	6,459	46	472	340	7,316

1987	5,960	675	6,634	617	256	51	7,558
1988	6,846	791	7,637	-	1,265	161	9,063
1989	9,903	922	10,825	366	373	192	11,755
1990	32,475	395	32,870	2,901	844	22	36,637
1991	29,049	289	29,338	644	481	35	30,498
1992	37,165	474	37,639	1,828	57	90	39,614
1993	45,509	265	45,774	3,111	-	60	48,944
1994	41,447	340	41,786	4,010	-	4	45,801
1995	50,068	141	50,209	2,090	-	31	52,330
1996	60,055	57	60,112	917	-	520	61,550
1997	40,460	146	40,606	983	-	472	42,061
1998	45,476	134	45,609	2,379	-	1,338	49,326
1999	32,760	119	32,880	5,439	-	1,221	39,540
2000	20,407	10	20,418	5,902	-	1,089	27,408
2001	5,056	61	5,117	8,278	-	666	14,061
2002	4,839	452	5,290	6,614	-	-	11,904
2003	2,579	87	2,667	2,800	-	-	5,467
2004	2,160	244	2,404	5,150	-	-	7,554
2005	2,535	79	2,615	4,034	-	-	6,649
2006	5,212	-	5,212	5,185	-	-	10,397
2007	7,723	185	7.908	5,132	-	-	13,040
2008	9,057	471	9,528	3,466	-	-	12,994
2009	11,882	75	11,957	293			12,250

Source: unpublished NMFS Dealer Reports, South Atlantic General Canvass, MRFSS data, and NAFO data.

Table 2. Commercial landings (1,000s lbs) of spiny dogfish by state from calendar years 1980 through 2009.

Year	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	NC	Total
1980	1,365	15	6,161	1	0	229	580	0	11	641	3	9,006
1981	1,138	0	9,972	4	4	110	204	8	1,533	2,156	4	15,135
1982	623	0	6,361	3	3	104	5	3	1,974	2,846	6	11,928
1983	496	1	9,987	0	9	57	1	4	213	27	0	10,795
1984	1,247	0	8,164	24	5	77	9	6	259	19	0	9,811
1985	903	0	7,636	2	10	137	8	0	170	14	1	8,880
1986	770	0	4,774	5	19	295	53	0	129	12	0	6,057
1987	598	0	5,148	31	6	156	4	0	8	10	0	5,960
1988	482	1	5,828	1	94	86	10	0	24	19	302	6,846
1989	4,880	0	4,925	4	1	48	23	0	4	19	0	9,903
1990	6,366	185	17,807	1,301	24	18	4,544	0	2,182	7	41	32,475
1991	2,016	0	14,489	3,160	9	77	2,716	6	4,939	174	1,463	29,049
1992	1,719	402	18,376	2,028	22	156	2,535	0	3,063	229	8,635	37,165
1993	3,525	1,642	26,831	1,924	15	95	770	0	1,796	105	8,806	45,509
1994	1,813	2,598	23,214	530	170	237	1,130	0	1,429	447	9,878	41,447
1995	1,664	2,106	28,760	574	294	934	2,389	63	3,117	810	9,357	50,068
1996	911	1,080	26,959	1,129	706	1,328	4,635	0	7,151	2,483	13,674	60,055
1997	449	1,009	21,665	1,015	347	488	3,950	0	4,227	4,275	3,035	40,460
1998	274	1,893	24,911	1,769	267	1,457	6,305	2	2,399	3,190	3,008	45,476
1999	35	1,239	14,915	1,338	88	1,453	3,925	0	2,134	5,018	2,617	32,760
2000	8	2,335	5,762	306	30	1,906	5,222	0	450	1,545	2,845	20,407
2001	0	536	3,913	394	7	63	17	0	0	126	0	5,056
2002	1	349	3,799	438	0	50	1	0	2	196	3	4,839
2003	0	175	2,006	123	1	38	0	0	1	236	0	2,579
2004	3	0	1,208	149	50	53	7	0	6	261	423	2,160
2005	29	153	1997	147	84	48	1	0	6	63	8	2,535
2006	184	620	2797	549	81	15	0	0	21	941	4	5,212
2007	109	185	2,795	525	23	25	14	0	23	3,895	129	7,723
2008	49	1,374	3,578	237	10	22	50	0	111	3,491	134	9,057
2009	594	2,073	3,880	940	92	194	1,342	14	169	1,448	1,136	11,882

Source: unpublished NMFS Dealer Reports, South Atlantic General Canvass data.

Table 3. Ex-vessel value and price per pound of commercially landed spiny dogfish, Maine - North Carolina combined, 1996-2009.

Calendar Year	Value ($1,000)	Price ($/lb)	Fishing Year	Value ($1,000)	Price ($/lb)
1996	10,877	0.18	1996	10,371	0.18
1997	6,781	0.15	1997	5,717	0.14
1998	7,833	0.17	1998	8,338	0.17
1999	5,400	0.16	1999	5,510	0.17
2000	4,342	0.21	2000	1,989	0.24
2001	1,137	0.22	2001	1,147	0.23
2002	989	0.20	2002	970	0.20
2003	364	0.14	2003	415	0.12
2004	311	0.14	2004	260	0.17
2005	479	0.19	2005	545	0.21
2006	1,188	0.23	2006	1,434	0.22
2007	1,508	0.20	2007	1,360	0.20
2008	2,207	0.24	2008	2,157	0.24
2009	2,544	0.21	2009	2,360	0.22

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

Table 4. Spiny dogfish landings (lbs) by month in FY2009.

	Month	Landings(lbs)	Pct of Total
Period 1	May	305,198	2.56%
	Jun	1,079,892	9.07%
	Jul	2,170,299	18.24%
	Aug	1,637,876	13.76%
	Sep	2,690,215	22.61%
	Oct	1,615	0.01%
	Total	**7,885,095**	66.26%
Period 2	Nov	2,174,762	18.27%
	Dec	671,127	5.64%
	Jan	1,168,370	9.82%
	Feb	591	0.00%
	Mar	0	0.00%
	Apr	885	0.01%
	Total	**4,015,735**	33.74%
	Grand Total	**11,900,830**	100.00%

Source: Unpublished NMFS dealer reports

Table 5. Commercial gear types associated with spiny dogfish harvest in FY2009.

Commercial Gear Type	Landings (lbs)	Pct Total
GILL NET	8,002,251	67.24%
TRAWL, OTTER, BOTTOM	1,562,292	13.13%
HOOK AND LINE	1,420,297	11.93%
UNREPORTED	687,731	5.78%
OTHER	228,259	1.92%
GILL NET	11,900,830	100.00%

Source: 2009 vessel trip reports

Table 6. Recreational landings (N) of spiny dogfish by state for 2009.

State	Landings (N)	Pct of Total
NEW JERSEY	4,995	34.42%
MASSACHUSETTS	4,968	34.24%
DELAWARE	1,621	11.17%
NEW HAMPSHIRE	1,088	7.50%
GEORGIA	751	5.18%
MARYLAND	316	2.18%
OTHER	771	5%
TOTAL	14,510	100.00%

Source: NMFS Marine Recreational Fisheries Statistical Survey

Table 7. Discards associated with the dominant gear types used to harvest spiny dogfish in FY2009 as reported in northest fisheries observer program (NEFOP) data when spiny dogfish were landed. Species comprising 1% or more of the discards by gear are shown. Stock status for each discard species is also indicated (see below)

Hook and Line			Gill Net, Sink			Trawl, Otter, Bottom		
Discard Species	**Discards (lbs)**	**Pct Of Total for this Gear**	**Discard Species**	**Discards (lbs)**	**Pct Of Total for this Gear**	**Discard Species**	**Discards (lbs)**	**Pct Of Total for this Gear**
DOGFISH, SPINY[a,b]	12,516	95.94%	DOGFISH, SPINY[a,b]	47,808	71.89%	DOGFISH, SPINY[a,b]	41,672	22.98%
SKATE, LITTLE[a,b]	408	3.13%	LOBSTER, AMERICAN	4,380	6.59%	SKATE, LITTLE[a,b]	25,658	14.15%
OTHER (4 sp.)	121	0.93%	COD, ATLANTIC[d,e]	4,035	6.07%	HAKE, SILVER[a,b]	13,477	7.43%
			RAVEN, SEA [n/a]	2,153	3.24%	SPONGE, NK [n/a]	11,922	6.57%
			SKATE, LITTLE[a,b]	1,694	2.55%	BUTTERFISH[c,b]	11,055	6.10%
			FLOUNDER, SUMMER[a,b]	860	1.29%	SCUP[a,b]	10,493	5.79%
			SKATE, THORNY[d,b]	730	1.10%	COD, ATLANTIC[d,e]	9,481	5.23%
			OTHER (59 sp.)	3,445	5.18%	HAKE, RED[a,f]	6,622	3.65%
						SKATE, WINTER[a,b]	6,276	3.46%
						FLOUNDER, WINTER[d,e]	3,948	2.18%
						FLOUNDER, SUMMER[a,b]	3,158	1.74%
						FLOUNDER, FOURSPOT [n/a]	2,832	1.56%
						FLOUNDER, AMERICAN PLAICE[a,b]	2,678	1.48%
						SCALLOP, SEA[a,b]	2,482	1.37%
						STARFISH, SEASTAR,NK [n/a]	2,419	1.33%
						ALEWIFE[c,f]	2,350	1.30%
						LOBSTER, AMERICAN[a,b]	2,301	1.27%
						FLOUNDER, YELLOWTAIL[d,c]	2,122	1.17%
						DEBRIS, FISHING GEAR [n/a]	1,991	1.10%
						OTHER (71 sp.)	10,882	2.88%
Total	**13,045**	**100%**	**Total**	**377,886**	**100%**	**Total**	**173,818**	**93%**

[a] not overfished, [b] overfishing not occurring, [c] overfished vs. not overfished is unknown, [d] overfished, [e] overfishing is occurring, [f] overfishing unknown, [n/a] not applicable

Source: Northeast Fishery Observer Program, 4th Quarter NMFS Fish Stock Sustainability Index

Table 8. Federally permitted dogfish vessel activity by home port state in FY2009. Active vessels are defined as vessels identified in the dealer reports as having landed spiny dogfish in FY2009.

State	Permitted Vessels	Pct of Total	State	Active Vessels	Pct of Total
MA	1,113	36.9%	MA	142	35.7%
NJ	427	14.1%	NJ	62	15.6%
ME	360	11.9%	RI	47	11.8%
NY	295	9.8%	NH	37	9.3%
RI	202	6.7%	NY	30	7.5%
NC	157	5.2%	VA	24	6.0%
NH	145	4.8%	ME	23	5.8%
VA	142	4.7%	NC	13	3.3%
CT	53	1.8%	MD	11	2.8%
MD	50	1.7%	CT	6	1.5%
DE	32	1.1%	DE	3	0.8%
PA	22	0.7%	TOTAL	398	100.0%
FL	16	0.5%			
All other states (5)	6	0.2%			
TOTAL	3,020	100.0%			

Source: NMFS permit database, Dealer weighout data

Table 9. Federally permitted spiny dogfish dealers by state in FY2009. Active dealers are defined as dealers identified in the federal dealer reports as having bought spiny dogfish in FY2009.

State	Permitted Dealers	Pct of Total	State	Active Dealers	Pct of Total
MA	124	26.8%	MA	20	26.0%
NY	91	19.7%	NY	16	20.8%
RI	42	9.1%	RI	11	14.3%
NC	32	6.9%	NC	8	10.4%
NJ	61	13.2%	NJ	7	9.1%
VA	32	6.9%	VA	6	7.8%
MD	17	3.7%	MD	3	3.9%
NH	13	2.8%	NH	3	3.9%
ME	33	7.1%	All others (2)	3	3.9%
CT	5	1.1%	Total	77	100.0%
DE	4	0.9%			
FL	3	0.6%			
All others (4)	5	1.1%			
Total	462	100.0%			

Source: NMFS permit database, Dealer weighout data

Table 10. Commercial landings (lbs) and value of spiny dogfish by port for fishing year 2009.

Port	Landings (lbs)	Pct of Total	Value ($)	Pct of Total	Total Port Value ($)	Dogfish Value / Port Value
GLOUCESTER, MASSACHUSETTS	1,621,777	13.8%	353,307	14.1%	51,794,606	0.7%
CHATHAM, MASSACHUSETTS	1,349,527	11.5%	293,866	11.7%	12,549,241	2.3%
SEABROOK, NEW HAMPSHIRE	802,759	6.9%	228,339	9.1%	2,415,856	9.5%
BARNEGAT LIGHT/LONG BEACH, NEW JERSEY	864,842	7.4%	186,760	7.4%	21,480,869	0.9%
RYE, NEW HAMPSHIRE	522,692	4.5%	149,695	6.0%	2,117,372	7.1%
PORTSMOUTH, NEW HAMPSHIRE	535,649	4.6%	130,779	5.2%	3,859,063	3.4%
All Others (75)	6,015,436	51.4%	1,169,139	46.5%	570,188,776	0.2%
TOTAL	**11,712,682**	**100.0%**	**2,511,885**	**100.0%**	**664,405,783**	**n/a**

Source: Unpublished NMFS dealer reports

Table 11. All Atlantic Sturgeon Encounters Expanded By VTR Landings By Division, Mesh Size and Year for Sink Gillnets (2006 Across Top Row to 2010 Across Bottom Row).

small mesh sink gillnet
All sturgeon
expanded to VTR landings

division	1	2	3	4	
51					
52	0				
53			0		
61		157	9	0	
62		4	0	9	
63	0	14	0	6	198
51	0	0	0	0	
52			0	0	
53		12	0	0	
61	0	0	24	0	
62	0	15	0	0	
63	83	0	0	0	135
51	0	0	0	0	
52	0			0	
53		0	0	0	
61	0	0	0	0	
62	0	0	0	0	
63	0	0	0	0	0
51	0		0		
52	0		0		
53	0	0			
61	0	0	0	0	
62	0	0	0	0	
63	98	0	0	0	98
51			0		
52					
53				0	
61			0	0	
62		0	0	0	
63	81	13	0	0	94

large mesh sink gillnet
All sturgeon
expanded to VTR landings

division	1	2	3	4	
51	54	0	0	0	
52	0	0	0	0	
53		11	0	0	
61		638	72	0	
62	206	114	0	20	
63	0	0		3	1117
51	29	0	0	0	
52	0	0	0	0	
53	0	27	0	0	
61		0	184	87	
62	0	15		0	
63	34	17		24	416
51	47	0	0	65	
52	0	79	0	0	
53	0	17	0	0	
61		0	0		
62	189	22		20	
63	17	0	0	22	478
51	34	0	0	0	
52	0	0	0	0	
53		0	0	0	
61		0	453	0	
62		193		22	
63	0	0		0	702
51	39	12	0	0	
52	0	0	0	0	
53		0	0	0	
61	0	46	0	0	
62	0	24			
63	0	0	0	0	121

x-large mesh sink gillnet
All sturgeon
expanded to VTR landings

division	1	2	3	4	
51	0	0	63	0	
52	0	0	22	44	
53	0	14	0	0	
61	17	62	0	0	
62	0	54		0	
63	13	10			299
51	0	0	0	0	
52	0	0	23	14	
53	0	47	0	14	
61	0	131	0	0	
62	41	128		28	
63	51	17			493
51	0	0	0	0	
52	0	0	0	0	
53	10	0	0	0	
61	0	67	0	84	
62	0	14		0	
63	15	11		0	200
51	0	0	0	0	
52	0	0	0	13	
53	10	104	0	40	
61	40	66	0	136	
62	9	8		26	
63	18	158			628
51	0	0	0	0	
52	12	0	0		
53	0	0			
61	28	66	0	0	
62	0	6			
63		20			132

Table 12. All Atlantic Sturgeon Encounters Expanded By VTR Landings By Division, Mesh Size, and Year for Otter Trawls (2006 Across Top Row to 2010 Across Bottom Row).

small mesh otter trawl
All sturgeon
Expanded by ratio to VTR landings

	1	2	3	4	
51	0		0	0	
52	0	0	0	0	
53	0	0	0	0	
56					
61	0	996	0	184	
62	29	0	8	309	
63	20	0	0	0	1546
51	0		0	0	
52	0	0	0	0	
53	0	0	0	0	
56					
61	0	0	0	0	
62	0	0	0	449	
63	47			40	536
51	0	0	0	0	
52	0	0	0	0	
53	0	0	0	0	
56					
61	0	279	80	0	
62	0	21	0	19	
63	19		0	36	454
51	0		0	22	
52	0	0	0	0	
53	0	0	17	0	
56					
61	0	336	9	0	
62	0	9	48	24	
63	435	0	0	6	907
51	0		0	0	
52	0	0	0	0	
53	0	39	0	0	
56					
61	0	317	0	0	
62	0	0	0	0	
63	41	36	0	0	433

Large mesh otter trawl
All sturgeon
Expanded by ratio to VTR landings

	1	2	3	4	
51	33				
52	0	0	0	0	
53	0	0	0	0	
61		0	0		
62	0	28	0	0	
63	0	0	0		61
51	19	0	0	0	
52	0	0	0	0	
53	0	0	0	0	
56					
61	0	0	0	0	
62	0	0	252	0	
63	0			0	271
51		0		0	
52	0	0	0	0	
53	0	0	0	0	
61	44	218	108	22	
62	0	12	0	0	
63	0	0	0	0	404
51	0	0		0	
52	0	0	0	0	
53	0	0	0	0	
56		0		0	
61	0	113	23	0	
62	0	0	7	0	
63	0				143
51	0	0	0	0	
52	0	0	0	0	
53	0	0	0	0	
56		0	0		
61	0	437	601	0	
62	0	0	0	0	
63	172			0	1211

Table 13. Dead Atlantic Sturgeon Encounters Expanded By VTR Landings By Division, Mesh Size, and Year for Sink Gillnets (2006 Across Top Row to 2010 Across Bottom Row).

small mesh sink gillnet
dead sturgeon expanded by VTR

		1	2	3	4	
2006	51					
	52	0				
	53			0		
	61		0	0	0	
	62		0	0	0	
	63	0	0	0	0	0
2007	51	0		0		
	52	0	0	0	1	
	53	0	0		0	
	61		0	0	0	
	62	0	0		0	
	63	0	0		0	1
2008	51	0		0		
	52	0	0	0	0	
	53		0			
	61		0	0		
	62	0	0		0	
	63	0	0	0	0	0
2009	51	0		0	0	
	52	0		0		
	53		0			
	61		0	0	0	
	62		0		0	
	63	0	0		0	0
2010	51			0	0	
	52			0	0	
	53					
	61		0	0	0	
	62		0			
	63	0	0	0	0	0

large mesh sink gillnet
dead sturgeon expanded

		1	2	3	4	
2006	51	0	0	0	0	
	52	0	0	0	0	
	53		0	0	0	
	61	0	28	0	0	
	62	0	38	0	0	
	63	0	0		0	66
2007	51	15	0	0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	61		0	20	0	
	62	0	0		0	
	63	0	0		0	35
2008	51	16	0	0	0	
	52	0	79	0	0	
	53	0	0	0	0	
	61		0	0		
	62	0	0		0	
	63	6	0	0	0	100
2009	51	0	0	0	0	
	52	0	0	0	0	
	53		0	0	0	
	61		0	0	0	
	62		0		0	
	63	0	0		0	0
2010	51	0	0	0	0	
	52	0	0	0	0	
	53		0	0	0	
	61	0	0	0	0	
	62	0	24			
	63	0	0	0	0	24

x-large mesh sink gillnet
dead sturgeon expanded

		1	2	3	4	
2006	51	0	0	63	0	
	52	0	0	22	44	
	53	0	0	0	0	
	61	17	31	0	0	
	62	0	0	0	0	
	63	0	3		0	180
2007	51	0	0	0	0	
	52	0	0	0	0	
	53	0	31	0	14	
	61	0	112		0	
	62	0	107		9	
	63	0	0		0	273
2008	51	0	0	0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	61	0	67	0	42	
	62	0	14		0	
	63	4	4		0	131
2009	51	0	0	0	0	
	52	0	0	0	13	
	53	10	69	0	0	
	61	0	33	0	82	
	62	0	8		0	
	63	0	11		0	226
2010	51	0	0	0	0	
	52	0	0	0	0	
	53	0	0			
	61	0	0	0	0	
	62	0	6			
	63		0			6

Table 14. Dead Atlantic Sturgeon Encounters Expanded By VTR Landings By Division, Mesh Size, and Year for Otter Trawl (2006 Across Top Row to 2010 Across Bottom Row).

small mesh otter trawl
Expanded by ratio to VTR landings
dead sturgeon expanded

		1	2	3	4	
2006	51	0		0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	56					
	61	0	0	0	61	
	62	29	0	0	0	
	63	0	0	0	0	90
2007	51	0		0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	56					
	61	0	0	0	0	
	62	0	0	0	0	
	63	4			0	4
2008	51	0	0	0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	56					
	61	0	0	0	0	
	62	0	0	0	0	
	63	0		0	0	0
2009	51	0		0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	56					
	61	0	0	0	0	
	62	0	0	0	0	
	63	19	0	0	0	19
2010	51	0		0	0	
	52	0	0	0	0	
	53	0	0	0	0	
	56					
	61	0	0	0	0	
	62	0	0	0	0	
	63	7	0	0	0	7

large mesh otter trawl
dead sturgeon expanded
to VTR all kept

51	0	0	0	0	
52	0	0	0	0	
53	0	0	0	0	
61	0	0	0	0	
62	0	0	0	0	
63	0	0	0	0	0
51	0	0	0	0	
52	0	0	0	0	
53	0	0	0	0	
56	0	0	0	0	
61	0	0	0	0	
62	0	0	59	0	
63	0	0	0	0	59
51	0	0	0	0	
52	0	0	0	0	
53	0	0	0	0	
61	0	36	108	0	
62	0	0	0	0	
63	0	0	0	0	145
51	0	0	0	0	
52	0	0	0	0	
53	0	0	0	0	
56	0	0	0	0	
61	0	0	0	0	
62	0	0	0	0	
63	0	0	0	0	0
51	0	0	0	0	
52	0	0	0	0	
53	0	0	0	0	
56	0	0	0	0	
61	0	0	0	0	
62	0	0	0	0	
63	0			0	0

Table 15. Summary of Atlantic Sturgeon Encounters of All Fish and Total Dead, By Gear Type and Year.

expanded encounters

	sink gillnet	otter trawl	
2006	1614	1606	3221
2007	1044	807	1851
2008	678	857	1536
2009	1428	1050	2478
2010	347	1644	1991

expanded dead encounters

	sink gillnet	otter trawl	
2006	246	90	336
2007	309	63	373
2008	231	145	376
2009	226	19	245
2010	30	7	37

	Total encounters	dead
2006	3221	336
2007	1851	373
2008	1536	376
2009	2478	245
2010	1991	37

Table 16. 2006 - 2010 Estimated Atlantic Sturgeon Encounters in Gillnet Gear and Otter Trawl Gear based upon NEFOP data

	Total Encounters	Dead Encounters	% Dead
2006	3221	336	10%
2007	1851	373	20%
2008	1536	376	24%
2009	2478	245	10%
2010	1991	37	2%

Table 17. Yearly Atlantic Sturgeon Encounters Expanded by VTR Landings for the Northern Region (500 Series of Statistical Areas) and Southern Region (600 Series of Statistical Areas) from 2006 Through 2010 for All Sink Gillnet Gear

Year	*Northern Region*		*Southern Region*		Total Estimated Encounters
	Period 1 (Q 2 & 3)	*Period 2 (Q 1 & 4)*	*Period 1 (Q 2 & 3)*	*Period 2 (Q 1 & 4)*	
2006	**110**	98	1134	**274**	1616
2007	**109**	57	531	**348**	1045
2008	**96**	122	114	**347**	679
2009	**104**	97	878	**349**	1428
2010	**12**	51	175	**109**	347
Total Estimated Encounters Per Region and Period	**431**	425	2832	**1427**	5115
AverageEncounters	**86.2**	**85**	**566.4**	**285.4**	1023

Table 18. Yearly Atlantic Sturgeon Encounters Expanded by VTR Landings for the Northern Region (500 Series of Statistical Areas) and Southern Region (600 Series of Statistical Areas) from 2006 Through 2010 for All Otter Trawl Gear

Year	*Northern Region*		*Southern Region*		Total Estimated Encounters Per Year
	Period 1 (Q 2 & 3)	*Period 2 (Q 1 & 4)*	*Period 1 (Q 2 & 3)*	*Period 2 (Q 1 & 4)*	
2006	**0**	33	1032	**542**	1607
2007	**0**	19	252	**536**	807
2008	**0**	0	718	**140**	858
2009	**17**	22	545	**465**	1049
2010	**39**	51	1391	**213**	1694
Total Estimated Encounters Per Region and Period	**56**	125	3938	**1896**	6015
Average Encounters	**11.2**	**25**	**787.6**	**379.2**	**1203**

APPENDIX 1

Relevant Port and Community Descriptions

(The contents of this appendix are taken from the NEFSC's "Community Profiles for the Northeast US Fisheries" for Seabrook, NH; Rye, NH; Portsmouth, NH; and Chatham, MA, for which spiny dogfish comprised greater than 1% of total port ex-vessel revenue according to the federal dealer report database. They are also available on the internet at: http://www.nefsc.noaa.gov/read/socialsci/community_profiles/)

Port	**Page**
Seabrook, NH	59
Rye, NH	69
Portsmouth, NH	79
Chatham, MA	90