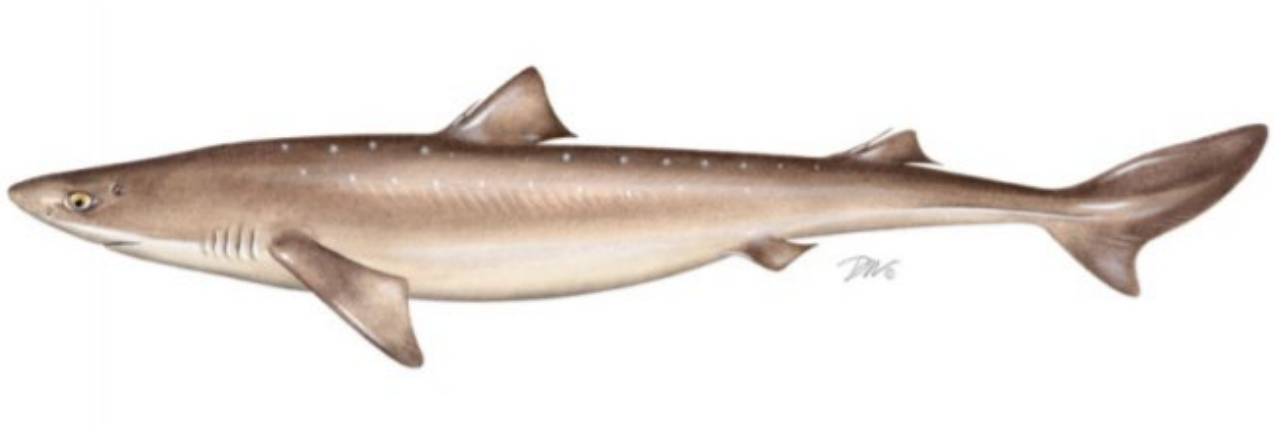
ATLANTIC STATES MARINE FISHERIES COMMISSION

REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN

FOR SPINY DOGFISH
(Squalus acanthias)

2009/2010 FISHING YEAR



Prepared by the Plan Review Team

Approved by the South Atlantic Management
Board August 2011

I. Status of the Fishery Management Plan

Date of FMP Approval:	November 2002
Amendments	None
Addenda	Addendum I (November 2005) Addendum II October 2008) Addendum III (April 2011)[1]
Management Unit:	Entire coastwide distribution of the resource from the estuaries eastward to the inshore boundary of the EEZ
States With Declared Interest:	Maine - Florida
Active Boards/Committees:	Spiny Dogfish and Coastal Shark Management Board, Advisory Panel, Technical Committee, and Plan Review Team

a) Goals and Objectives

The Interstate Fishery Management Plan for Spiny Dogfish (FMP) established the following goals and objectives.

2.2. GOALS
The goal of the Interstate Fishery Management Plan for Spiny Dogfish is:
"To promote stock rebuilding and management of the spiny dogfish fishery in a manner that is biologically, economically, socially, and ecologically sound."

2.3 OBJECTIVES
In support of this goal, the following objectives are recommended for the Interstate FMP:

1. *Reduce fishing mortality and rebuild the female portion of the spawning stock biomass to prevent recruitment failure and support a more sustainable fishery.*
2. *Coordinate management activities between state, federal and Canadian waters to ensure complementary regulations throughout the species range.*
3. *Minimize the regulatory discards and bycatch of spiny dogfish within state waters.*
4. *Allocate the available resource in biologically sustainable manner that is equitable to all the fishers.*
5. *Obtain biological and fishery related data from state waters to improve the spiny dogfish stock assessment that currently depends upon data from the federal bottom trawl survey.*

b) Fisheries Management Plan Summary

In 1998, NMFS declared spiny dogfish overfished and initiated the development of a joint fishery management plan (FMP) between the Mid-Atlantic (MAFMC) and New England Fishery

[1] Did not apply to 2009/2010 fishing season.

Management Councils (NEFMC) in 1999. NMFS partially approved the federal Fishery Management Plan in September 1999, but implementation did not begin until May 2000, the start of the 2000-2001 fishing year.

In August 2000, ASMFC took emergency action to close state waters to the commercial harvest, landing, and possession of spiny dogfish when the federal waters closed in response to the quota being fully harvested. With the emergency action in place, the Commission had time to develop an interstate FMP, which prevented the undermining of the federal FMP and prevented further overharvest of the coastwide spiny dogfish population. Needing additional time to complete the interstate FMP, the ASMFC extended the emergency action twice through January 2003. During that time, the majority of spiny dogfish landings were from state waters because states had either no possession limits or less conservative possession limits than those of the federal FMP. The Interstate FMP for Spiny Dogfish was approved by ASMFC in November 2002 and was implemented for the 2003-2004 fishing year. In general, the ASMFC and Council FMP's strive to promote stock rebuilding and management of the spiny dogfish fishery in a manner that is biologically, economically, socially, and ecologically sound.

Both the ASMFC and Council FMP's established an annual quota that gets allocated seasonally between two periods (57.9% from May 1 to October 31 and 42.1% from November 1 to April 30). The seasonal periods can have separate possession limits that are specified on an annual basis. Both the Council and ASMFC FMP's also include paybacks for quota overages, allow for a five percent quota rollover once the stock is rebuilt, and allow for up to 1,000 spiny dogfish to be harvested for biomedical supply.

In November 2005, the Spiny Dogfish and Coastal Sharks Management Board approved Addendum I to the Interstate FMP for Spiny Dogfish. Addendum I provides the Board with the authority, but not the requirement, to establish spiny dogfish specifications (quota and possession limits) for up to five years. The Mid-Atlantic and New England Fishery Management Councils took similar action under Framework 1, recommending the adoption of multi-year management measures without the requirement of annual review to NOAA Fisheries for final approval. Framework 1 to the federal Spiny Dogfish FMP, which will allow the specification of commercial quotas and other management measures for up to five years, became effective February 21, 2006.

Addendum II, approved October 2008, established regional quotas in place of the FMP's seasonal allocation. Under Addendum II, the annual quota is divided regionally with 58% allocated to the states of Maine to Connecticut, 26% allocated to the states of New York to Virginia, and the remaining 16% allocated to North Carolina. The Board allocated a specific percentage to North Carolina because spiny dogfish are not available to their fishermen until late into the fishing season when most of the quota has already been harvested. The North Carolina allocation will allow fishermen and processors to plan fishing operations based on a specific amount of dogfish. Regional overage paybacks were also included in Addendum II to maintain the conservation goals of the plan. Any overage of a region and/or state quota is subtracted from that region/state the subsequent fishing year.

The Commission's Spiny Dogfish and Coastal Sharks Management Board (Board) approved Addendum III to the Interstate Fishery Management Plan for Spiny Dogfish (Addendum III) in March 2011. **Addendum III did not apply to the 2009/2010 fishing season** and is not effective until the 2011/2012 fishing season. The Addendum divides the southern region annual quota of 42% into state-specific shares. It also allows for quota transfer between states, rollovers of up to five percent, state-specified possession limits, and includes a three-year reevaluation of the measures. The Addendum's provisions apply only to states in the southern region (New York through North Carolina) and do not modify the northern region allocation. The states of Maine to Connecticut will continue to share 58% of the annual quota as specified in Addendum II.

Addendum III's provisions were designed to give the southern states greater control of their spiny dogfish fisheries through state-specific quotas and to achieve consistent allocation for all states in the southern region. States were interested in lowering daily possession limits when demand and value are low and increasing them when demand and value are greatest—but Addendum II's southern region allocation did not allow them (with the exception of North Carolina) to do so without having less access to the regional quota.

II. Status of the Stocks/Status of Assessment Advice

Overfishing definition: *Ftarget = 0.207*; allows for the production of 1.5 female pups per female that will recruit to the spawning stock biomass (SSB).

Fthreshold = 0.325; allows for the production of one female pup per female that will recruit to the SSB.

Overfished Definition: *SSBtarget = 159,288 mt* (351 million pounds); level of biomass that would maximize recruitment to the population (100% SSBmax).

SSBthreshold = 79,644 mt (175 million pounds); 50% of SSBmax

Spiny dogfish are not overfished and overfishing is not occurring:

Spiny dogfish was declared 'rebuilt' in 2008 when SSB exceeded the target for the first time since the ASMFC began managing spiny dogfish in 2002. Prior to the 'rebuilt' status, quotas were based on the short term target Frebuild = 0.11. The FMP allows for quotas based on Ftarget (as opposed to the more conservative Frebuild) "once the mature female portion of the of the spawning stock has reached the target". Target and threshold F and SSB were updated in the 2010 Northeast Fisheries Science Center (NEFSC) Biological Reference Points for Spiny Dogfish (BRP) report. The updated fishing mortality target is 0.207 and the threshold is 0.325. The updated SSB target and threshold are 159,288 and 79,644 metric tons (mt), respectively.

The most recent estimates of SSB are from the NEFSC Update on the Status of Spiny Dogfish in 2010 and Initial Evaluation of Alternative Harvest Strategies report. The 2010 NEFSC report estimates that SSB continued to exceed the target in 2010 (for the third year in a row) at 164,066 metric tons. Previously, the 2010 Transboundary Resource Assessment Committee assessment found SSB to exceed the target in 2008 and 2009 at 195,000 and 163,000 mt, respectively (Figure 1 & Table 1).

The NEFSC Update on the Status of Spiny Dogfish in 2010 and Initial Evaluation of Alternative Harvest Strategies report also provides the most recent estimate of F. F was 0.11 in 2009 and has ranged from a low of 0.09 and high of 0.12 between 2005 and 2009; and has been consistently below the fishing mortality target in recent years (Table 1 & Figure 2). As such, spiny dogfish are not overfished and overfishing is not occurring. Other positive trends include increases in pup biomass over the last few years and recruitment in 2009 that was the fifth highest in the 42-year NEFSC Spring Survey. Unfortunately, record low pup production from 1997 to 2003 has left a recruitment deficit that will cause SSB to drop around 2012 (Figure 3). The amplitude of this drop increases as fishing mortality increases and still occurs when fishing mortality is hypothetically zero.

Figure 1. Spiny dogfish SSB 1991 – 2010.

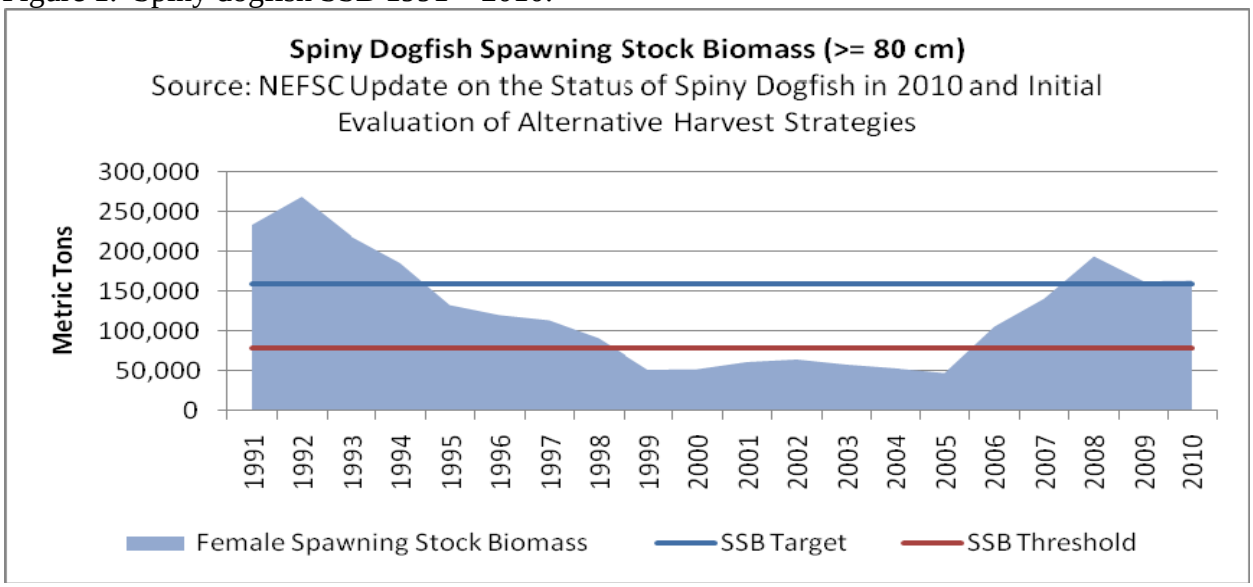


Table 1. SSB and F 1991 – 2010. Source: NEFSC Update on the Status of Spiny Dogfish in 2010 and Initial Evaluation of Alternative Harvest Strategies and 2009 TRAC.

Year	SSB	F rate
1991	234,229	0.088
1992	269,624	0.082
1993	220,002	0.177
1994	186,132	0.327
1995	133,264	0.465
1996	120,664	0.418
1997	114,091	0.355
1998	91,458	0.234
1999	51,821	0.306
2000	52,562	0.289
2001	61,552	0.152
2002	64,844	0.109
2003	58,376	0.165
2004	53,625	0.168
2005	47,719	0.474
2006	106,180	0.128
2007	141,351	0.088
2008	194,616	0.090
2009	163,256	0.110
2010	164,066	0.113

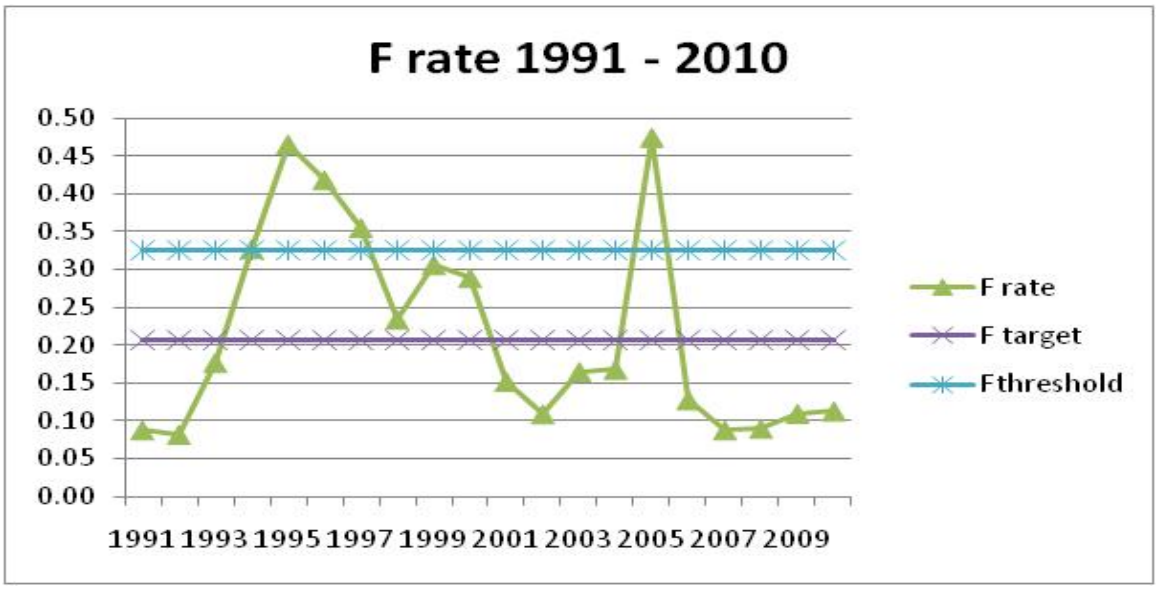


Figure 2. F rates 1991 – 2010. Source: NEFSC Update on the Status of Spiny Dogfish in 2010 and Initial Evaluation of Alternative Harvest Strategies.

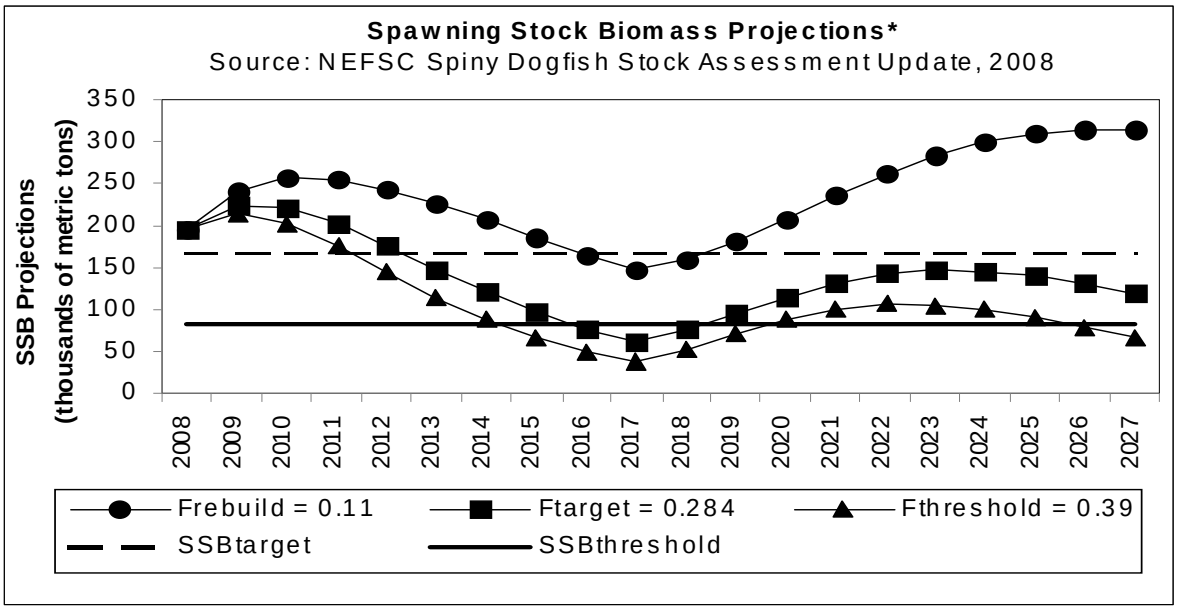


Figure 3. SSB projections 2008 – 2027.

III. Status of the Fishery

Specifications

The spiny dogfish commercial fishery runs from May 1 – April 30. The coastwide quota was set at 12 million pounds with a maximum of 3,000 pound possession limits for the 2009/2010 fishing season (May 1, 2009 – April 30, 2010); following recommendations from the ASMFC TC and MAFMC Monitoring Committee (Appendix A).

Quotas

Prior to reductions for overages in the 2008/2009 fishing season, the 2009/2010 12 million pound coastwide quota was allocated with 6,960,000 pounds (58%) to states from Maine – Connecticut (Northern Region), 3,120,000 pounds (26%) to New York – Virginia (Southern Region), and 2,080,000 pounds (16%) to North Carolina. Addendum II specifies that when the quota allocated to a region or state is exceeded in a fishing season, the amount over the allocation will be deducted from the corresponding region or North Carolina in the subsequent fishing season. There was a 575,129 pound overage in the Northern Region, 555,918 pound overage in the Southern Region, and 136,272 pound overage in North Carolina during the 2008/2009 fishing season. Table 2 shows the final 2009/2010 quotas after being adjusted for the previous year's overages.

Table 2. Regional quotas for May 1, 2009 – April 30, 2010 fishing season. Source: SAFIS dealer reports.

Region	2009/2010 Regional Quotas	2008/2009 Regional Overages	2009/2010 Adjusted Regional Quotas
Northern	6,960,000	575,129	6,384,871
Southern	3,120,000	555,918	2,564,082
North Carolina	1,920,000	136,272	1,783,728

Landings

There was a 1.1 million and 595,570 pound overage in the Northern and Southern Region, respectively, during the 2009/2010 fishing season (Table 3). Overages from the 2009/2010 fishing season were primarily the result of late reports and an increased rate of landings at the end of the season. North Carolina landed 75,654 pounds less than their allocation during the 2009/2010 fishing season (Table 3).

Table 3. 2009/2010 quotas, landings, and overharvest by region and North Carolina. Source: ACCSP Data Warehouse.

Region/State	2009/2010 Adjusted Regional Quotas	Regional Landings	2009/2010 Quota Overages (negative value indicates under harvest)
Northern	6,384,871	7,576,889	1,192,018
Southern	2,564,082	3,159,652	595,570
North Carolina	1,783,728	1,708,084	-75,654

Commercial landings totaled 12,444,625 pounds during the 2009/2010 fishing season (Table 4, Figure 4). Massachusetts (3,878,697 pounds), New Hampshire (2,072,937 pounds), North Carolina (1,708,084 pounds), Virginia (1,437,330 pounds), and New Jersey (1,341,616 pounds) had the most significant commercial landings (Table 4, Figure 4) during the 2009/2010 fishing season.

Table 4. State Commercial landings 2009/2010 fishing season. Source: ACCSP Data Warehouse.

State	2009/2010 Commercial Landings (Pounds)
ME	593,980
NH	2,072,937
MA	3,878,697
RI	939,415
CT	91,860
NY	191,575
NJ	1,341,616
DE	14,347
MD	174,785
VA	1,437,330
NC	1,708,084
Total	12,444,625

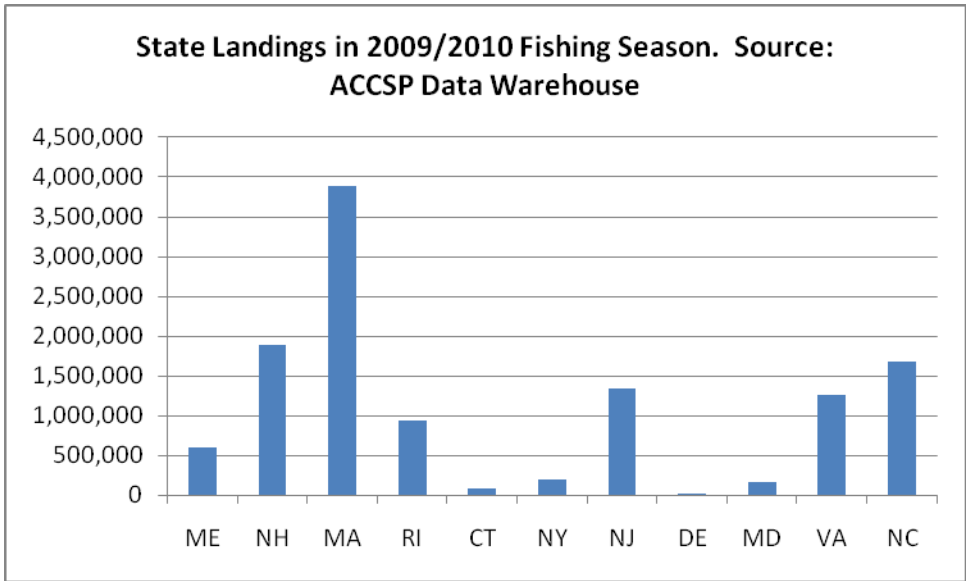


Figure 4. State Commercial Landings 2009/2010 fishing season. Source: ACCSP Data Warehouse.

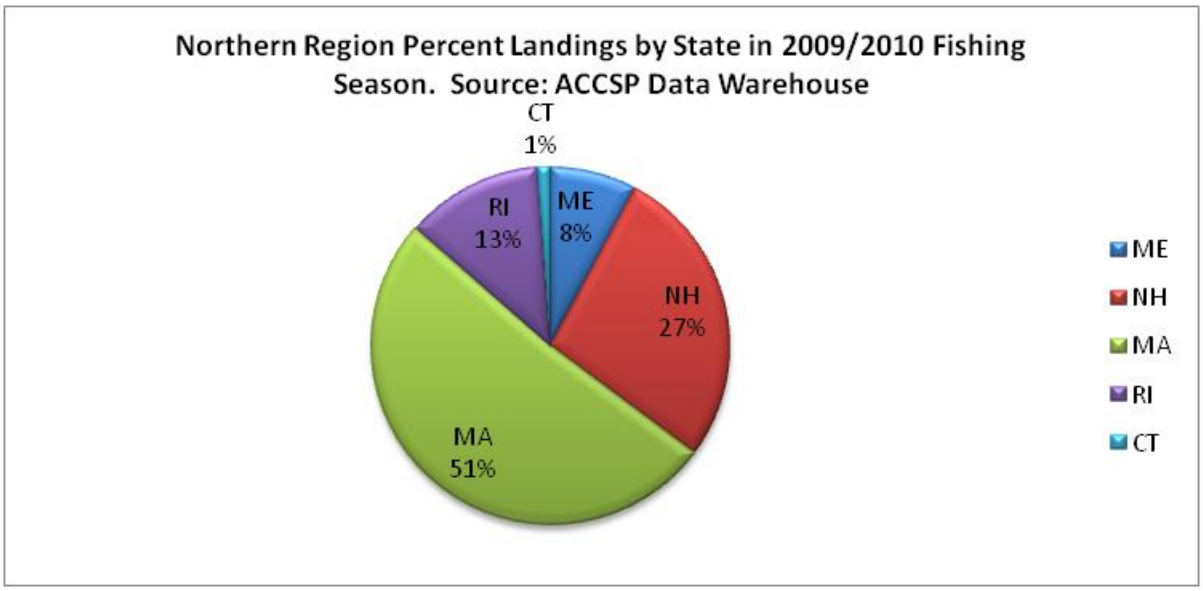


Figure 5. Northern Region percent landings by state. Source: ACCSP Data Warehouse

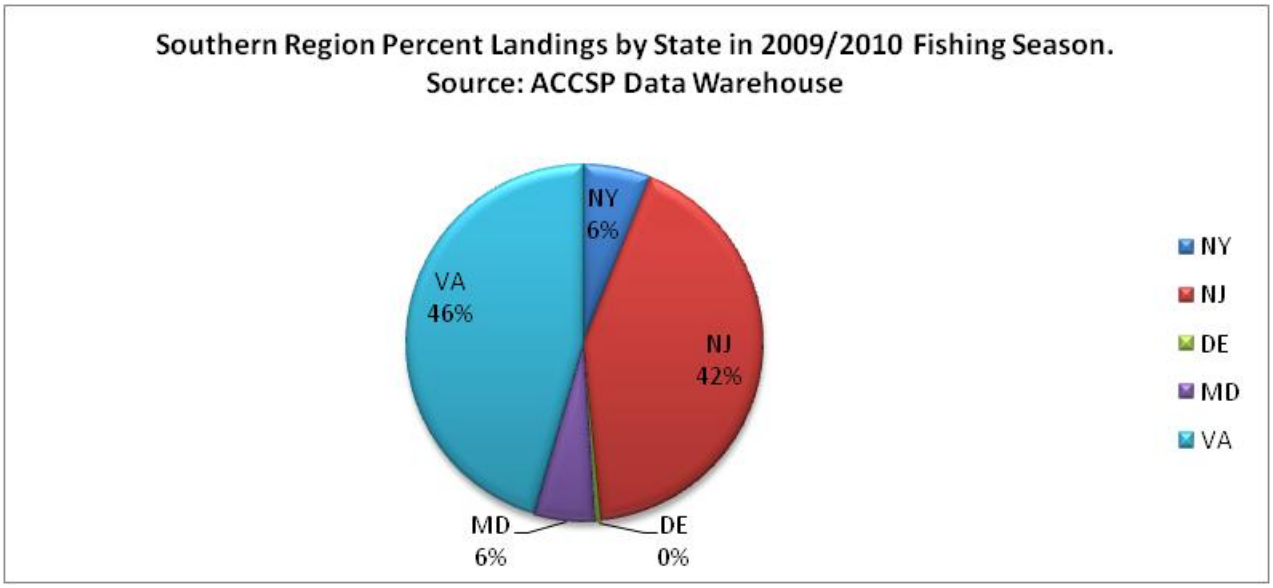


Figure 6. Southern Region percent landings by state. Source: ACCSP Data Warehouse

US commercial landings of spiny dogfish totaled 11.8 million pounds in 2009[2] which is the most since 2002 (Figure 7, Table 5). The increase in commercial landings coincides with the increased quota (12 million pounds) set by the Board for the 2009/2010 fishing season.

Recreational landings remain insignificant, and are less than 1% of total commercial landings (Table 5). While the 2009 recreational estimate of 74,940 pounds is noticeably less than the 2008 estimate (490,870 pounds), large interannual variation in recreational estimates are common with the time series.
Canadian landings decreased significantly in 2009 to 249,165 pounds and were roughly 5 million

[2] Note that these are for the 2009 calendar year and not the 2009/2010 fishing season.

pounds per year from 2004 – 2008 (Table 5). Reasons for the decline in Canadian landings are thought to be a result of market issues related to reduced European demand. Industry representatives have stated that there are too few processing facilities left in Canada to allow for a large increase in landings. If the European demand increases, it will likely take several years before Canadian processors are able to process large amounts of dogfish. As such, a large increase in Canadian landings is unlikely in 2010+.

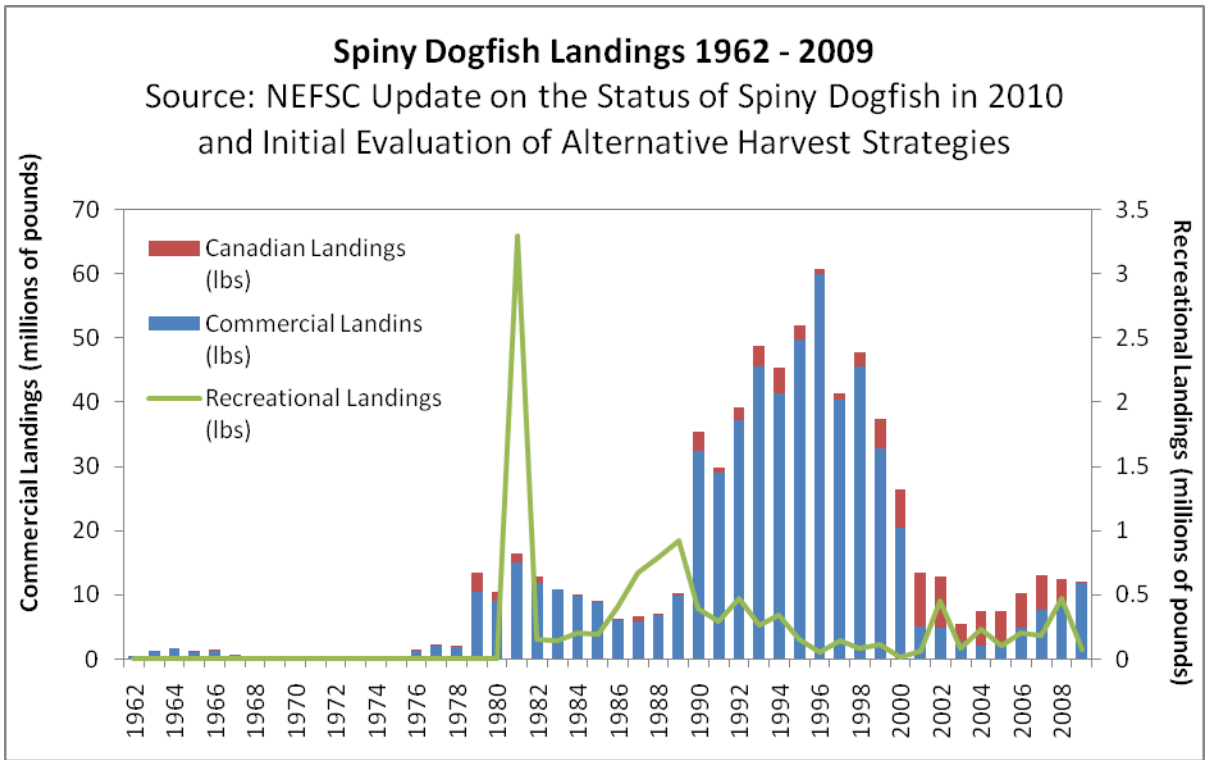


Figure 7. Spiny dogfish commercial (U.S.), recreational, and Canadian landings 1962 – 2009.

Table 5. U.S. Commercial Landings, Canadian Landings, and U.S. Recreational Landings 1981 – 2009. Source: NEFSC Update on the Status of Spiny Dogfish in 2010 and Initial Evaluation of Alternative Harvest Strategies.

Year	U.S. Commercial Landings (lbs)	Canadian Landings (lbs)	U.S. Recreational Landings (lbs)
1981	15,137,325	1,243,620	3,292,065
1982	11,931,255	857,745	154,350
1983	10,797,885	0	147,735
1984	9,812,250	4,410	200,655
1985	8,881,740	28,665	196,245
1986	6,059,340	44,100	401,310
1987	5,960,115	619,605	674,730
1988	6,846,525	2,205	791,595
1989	9,904,860	368,235	921,690
1990	32,481,855	2,886,345	394,695
1991	29,055,285	676,935	288,855
1992	37,171,890	1,913,940	474,075
1993	45,517,815	3,164,175	264,600
1994	41,449,590	4,013,100	341,775
1995	49,784,490	2,107,980	149,940
1996	59,834,880	950,355	55,125
1997	40,463,955	983,430	145,530
1998	45,484,740	2,326,275	85,995
1999	32,755,275	4,610,655	116,865
2000	20,411,685	6,043,905	11,025
2001	5,058,270	8,423,100	61,740
2002	4,848,795	7,902,720	452,025
2003	2,579,850	2,870,910	88,200
2004	2,165,310	5,208,210	231,525
2005	2,529,135	5,005,350	99,225
2006	4,959,045	5,377,995	207,270
2007	7,724,115	5,256,720	185,220
2008	9,058,140	3,466,260	471,870
2009	11,856,285	249,165	74,970

Total dead discards were 5,898 metric tons (13 million pounds) in 2009. Total dead discards have been between 5,000 and 6,000 pounds since 1996 (Table 6) despite significant management changes and large fluctuations in annual landings (Table 5).

Table 6. Estimated dead discards of spiny dogfish from commercial and recreational US fisheries. Discard mortality rates are 0.50 for otter trawl, 0.30 for sink gill net, 0.75 for scallop dredge, 0.10 for line gear, and 0.20 for the recreational fishery. Source: NEFSC Update on the Status of Spiny Dogfish in 2010 and Initial Evaluation of Alternative Harvest Strategies.

Dead Discards (MT)						
Year	Otter Trawl	Sink Gill Net	Scallop Dredge	Line Gear	Recreational	Total
1981	18,180	1,608	na	na	59	19,847
1982	21,455	1,336	na	na	70	22,861
1983	21,094	1,213	na	na	108	22,415
1984	19,813	1,475	na	na	85	21,373
1985	16,677	1,362	na	na	193	18,232
1986	15,873	1,465	na	na	237	17,575
1987	14,525	1,459	na	na	211	16,195
1988	14,476	1,540	na	na	175	16,190
1989	14,143	1,608	na	na	269	16,020
1990	17,121	1,819	na	na	234	19,174
1991	9,661	3,309	24	10	270	13,274
1992	16,309	1,786	620	65	204	18,983
1993	8,642	2,944	157	4	222	11,969
1994	6,954	866	542	na	194	8,556
1995	8,499	2,019	284	na	131	10,932
1996	4,701	1,167	91	na	66	6,025
1997	3,352	698	149	na	167	4,366
1998	2,634	590	90	na	122	3,436
1999	3,843	602	31	na	106	4,581
2000	1,364	1,405	11	na	137	2,917
2001	2,460	2,161	23	na	420	5,063
2002	2,770	1,499	44	402	335	5,049
2003	1,927	1,624	77	0	597	4,225
2004	4,150	1,209	40	50	698	6,146
2005	3,758	1,001	11	118	702	5,589
2006	3,887	1,011	11	13	768	5,689
2007	4,058	1,540	46	7	860	6,510
2008	2,802	1,459	178	26	623	5,088
2009	3,505	1,462	273	84	574	5,898

Total commercial landings are estimated to be 95.9% female in 2008. Catch composition is

unavailable for 2009 onward. Females composed an average of 95% of commercial catch since 2000 (Figure 8).

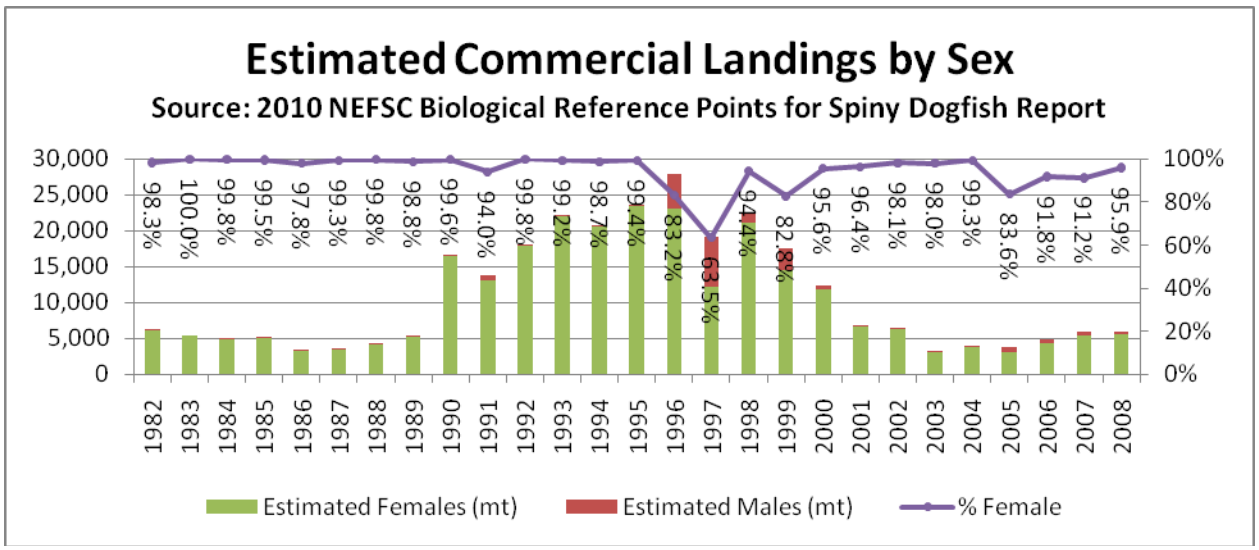


Figure 8. Commercial landings (millions of pounds) of spiny dogfish by sex 1982 – 2008.

The average weight of females in the commercial fishery has increased slightly since 1997. However, these average weights are significantly lower than those during the first part of the time series (Figure 9). Average female weight is unavailable past 2008.

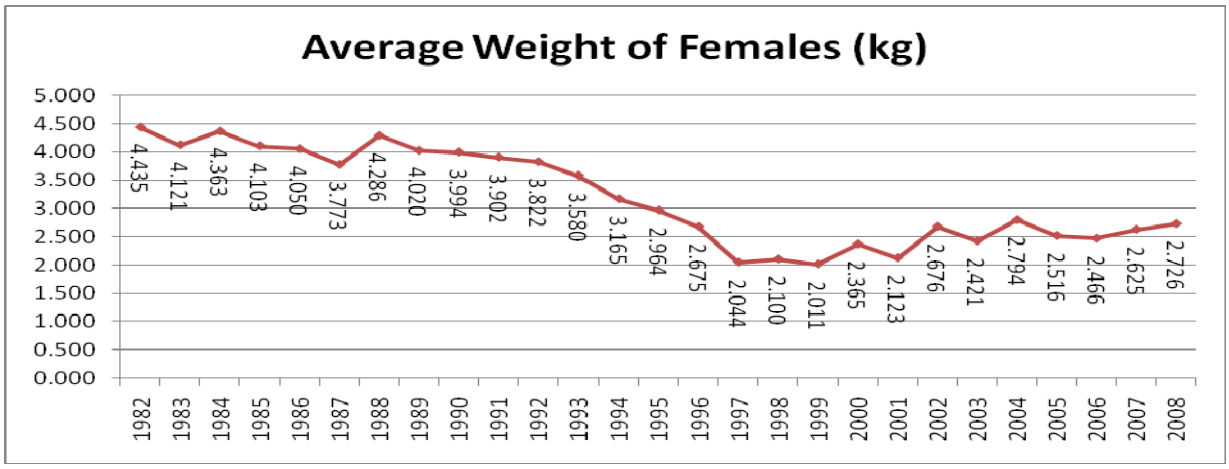


Figure 9. Average weight of female spiny dogfish caught in US and Canadian commercial fisheries 1982 – 2008. Source 2010 NEFSC Biological Reference Points for Spiny Dogfish Report.

Recruitment from was highly variable from 1968 – 1996. Pup production hit record lows from 1997 – 2003 but has improved in recent years with 2009 recruitment the fifth highest in the NEFSC spring trawl survey time series.

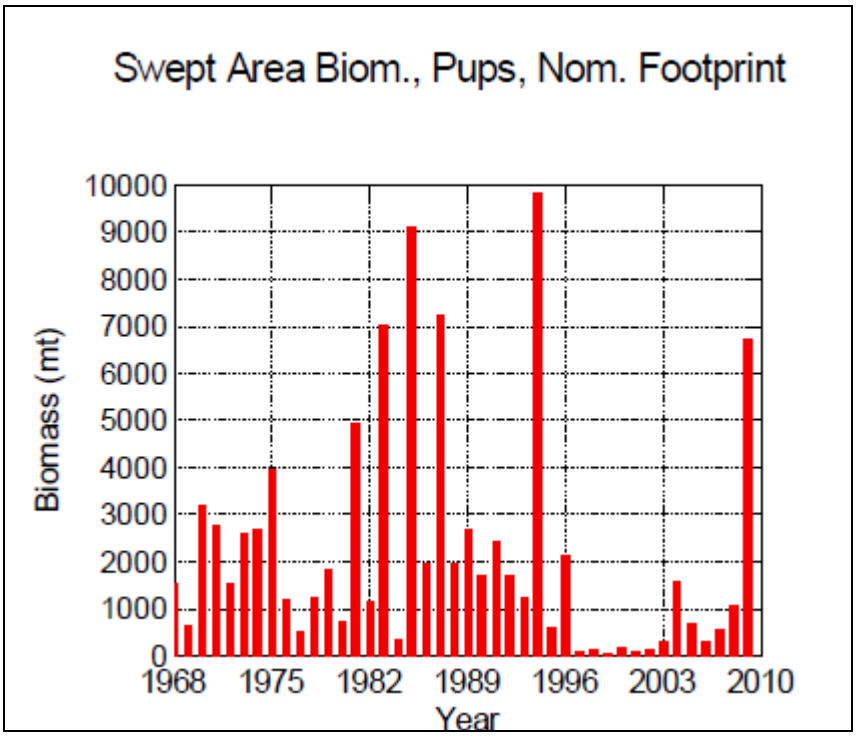


Figure 10. Biomass of spiny dogfish pups (<= 25 cm) from the US spring survey from 1968 – 2009. Source: 2009 TRAC.

IV. Status of Research and Monitoring

Under the Interstate Fishery Management for Spiny Dogfish, the states are not required to conduct any fishery dependent or independent studies. The Interstate FMP requires an annual review of recruitment, spawning stock biomass, and fishing mortality. The annual review relies heavily on the NEFSC's spring trawl survey data to determine the annual status of the stock.

States are encouraged to submit any spiny dogfish information collected while surveying for other species. Research and monitoring information from state reports follows. States that did not include research/monitoring information in their reports are not listed below. Please see individual reports for more information.

Maine:
During two Department of Marine Resources inshore trawl surveys in 2009, a total of 4,974 spiny dogfish were collected from Maine coastal waters. The spring survey caught one female measuring 47 centimeters in length. The fall survey caught 4,973 spiny dogfish. Of these, 2468 were females and 2505 were males. The female length distribution ranged from 23 to 98 centimeters and the male length distribution ranged from 24 to 89 centimeters. All dogfish were returned to sea.

New Jersey:
There are currently no fishery independent monitoring programs in New Jersey specific to the spiny dogfish. However, all spiny dogfish collected during the Department's Ocean Stock Assessment Program trawl survey are weighed, measured and sexed (sexed since 2007). This

data was forwarded to the National Marine Fisheries Service for inclusion in the April 2009 Transboundary Resources Assessment Committee Workshop on spiny dogfish.

Delaware:
Delaware has two fisheries independent surveys that have the potential for taking spiny dogfish. The first is a 30-foot bottom trawl that was deployed monthly in Delaware Bay at nine fixed stations from March through December in 2008. These surveys have been conducted annually since 1990, and before that from 1966-1971 and 1979-1984 using essentially the same gear type. A total of 172 spiny dogfish was taken in 2009 in 90 tows of this gear, and most of these were taken in November (51) and December (67) with the others being taken in April (42), May (9) and October (3). Spiny dogfish catches per tow and catch per nautical mile since 1966 are included in Table 1. Sex-based indices were generated at the request of the ASMFC and are presented in Tables 2 and 3. Note that sex-specific data are not available prior to 1990.

The second fishery independent survey that has the potential for taking spiny dogfish is the 16-foot bottom trawl which is deployed monthly at 39 fixed stations in Delaware River and Delaware Bay and at 12 fixed stations in Delaware's Inland Bays. This survey is conducted from April through October. This gear includes a 0.5-inch mesh liner in the cod end of the trawl and it targets primarily juvenile fishes. There were no spiny dogfish taken with this gear in 2009 from either the Delaware Bay or Delaware's Inland Bays.

Maryland:
There is no specific at sea sampling program for spiny dogfish in Maryland. There was limited biological sampling of catch onboard commercial offshore trawlers. On November 15, 2009 and January 1, 2010, samples were collected on board a commercial trawler targeting horseshoe crabs and striped bass, respectively. The November 24 m (80 foot) trawl had a 15.24 cm (5.5 inch) mesh body with a 13.97 cm (5.5 inches) cod end. The December 30 m (100 ft) trawl had a 41 cm (16 inch) mesh body with a 5 cm (2 inches) cod end. Dogfish were measured and sexed if present in the sub-sampled catch.

In November 2009, three spiny dogfish were measured and sexed from catches in state waters. Females accounted for two dogfish and one was not sexed. Lengths ranged in size from 884 mm TL (35 in.) to 951 mm TL (37 in.) and averaged 921 mm TL (±20; 36 in.).

In January 2010, four spiny dogfish were measured and sexed from catches in state waters. All dogfish in the subsample were females. Lengths ranged in size from 764 mm (30 in.) to 898 mm TL (35 in.) and averaged 829 mm (±34; 33 in.).

Virginia
The intercept component of the MRFSS program interviews anglers to collect demographic information and individual catch data. The raw intercept files demonstrate few spiny dogfish have been encountered during surveys of anglers intercepted in Virginia. In 2009, MRFSS interviewers observed only two spiny dogfish of Type A catch and no spiny dogfish of Type B1 catch in Virginia (NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD, pers. comm.). There were 81 spiny dogfish of Type B2 recorded.

The MRFSS program also conducts at-sea sampling surveys of headboat fishing trips. These surveys are the only source of biological data characterizing discarded catch (Type 9 records) that are collected by the MRFSS. MRFSS observers reported there were 10 spiny dogfish discarded during headboat surveys in Virginia in 2009 (NMFS, pers. comm.). All were discarded alive.

North Carolina

Fishery dependent sampling of North Carolina commercial fisheries has been ongoing since 1982 (conducted under Title III of the Interjurisdictional Fisheries Act and funded in part by the US Department of Commerce, National Marine Fisheries Service). Predominate fisheries sampled included the ocean gill net fishery, estuarine gill net fishery, winter trawl fishery, long haul seine/swipe net fisheries, beach haul seines and pound net fisheries. The ocean gill net fishery is responsible for the majority of the spiny dogfish landings in North Carolina. Spiny dogfish were sampled from 18 ocean gill net and 1 beach seine catches in the 2009 fishing year. The majority of the fishing efforts ranged from northeast of Oregon Inlet to Hatteras and Ocracoke Inlets. A total of 1,049 fish were measured and ranged in lengths from 704 to 1080 mm total length (TL) with a mean of 864 mm TL. Catches were constrained by trip limits and low demand due to limited market opportunities.

Spiny dogfish were sampled on the February 18 - February 25, 2010 SEAMAP Cooperative Striped Bass Tagging Cruise. Sampling occurred generally in near shore ocean waters from Ocracoke Inlet, NC to Southeast Virginia. Spiny dogfish captured in each tow were enumerated by sex and a subsample was measured. A total of 11,371 spiny dogfish were observed which were 8,769 more than what was caught last year. The male to female ratio was 99% females. A total of 27,274 have been tagged off Northeast NC and Southeast VA since spiny dogfish sampling began in 1996. No spiny dogfish were tagged during this year's cruise. The spiny dogfish work conducted on this cruise was in cooperation with the Mid-Atlantic Fishery Management Council, the National Marine Fisheries Service-Northeast Fisheries Science Center, the North Carolina Division of Marine Fisheries and East Carolina University. No other fishery-independent sampling by the NCDMF catches a significant number of spiny dogfish.

NCDMF initiated a fisheries independent gill net survey in 2001. The objective of this project is to provide annual, independent, relative-abundance indices for key estuarine species in the Pamlico Sound. These indices can also be incorporated into stock assessments and used to improve bycatch estimates, evaluate management measures, and evaluate habitat usage. Results from this project will be used by the NCDMF and other Atlantic coast fishery management agencies to evaluate the effectiveness of current management measures and to identify additional measures that may be necessary to conserve marine and estuarine stocks. Developing fishery independent indices of abundance for target species allows the NCDMF to assess the status of these stocks without relying solely on commercial and recreational fishery dependent data. The survey employs a stratified random sampling design and utilizes multiple mesh gill nets (3.0 inch to 6.5 inch stretched mesh, by ½ inch increments). Catches of spiny dogfish in this survey are minimal. During the 2009/2010 fishing year, a total of 90 spiny dogfish were captured in the survey. They ranged from 774 to 942 mm TL with an average of 867 mm TL in 2009 and 685 to 968 mm TL with an average of 841 mm TL in February and March of 2010.

South Carolina
The South Carolina Department of Natural Resources on-going Nearshore Bottom Longline Survey Program documents the annual presence of spiny dogfish in South Carolina's nearshore coastal waters, typically beginning in mid-November. Relative abundance and residence time of spiny dogfish along the coast in general may be related primarily to winter water temperatures along the east coast, with colder winters resulting in larger spiny dogfish populations and longer residence times in South Carolina waters than in more temperate years. Adult females, many being pregnant, seem to make up a majority of the fish taken by sampling gear in this program, suggesting that South Carolina waters may play a role as valuable over-wintering grounds for this species.

Georgia
Each month, a 40-foot flat otter trawl with neither a turtle excluder device nor bycatch reduction device is deployed at 42 stations across six estuaries in the Ecological Monitoring Survey. During this report period, 509 tows/observations were conducted, totaling 127.42 hours of tow time. Twenty seven spiny dogfish were observed, weighing a collective 84,259g. Lengths ranged from 782mmTL - 940mmTL, averaging 859.56mmTL).

The Marine Sportfish Population Health Survey (MSPHS) is a multi-faceted ongoing process used to collect information on the biology and population dynamics of recreationally important finfish. Currently two Georgia estuaries are sampled on a seasonal basis using entanglement gear. During the June to August period, young-of-the-year red drum in the Altamaha/Hampton River and Wassaw estuaries are collected using gillnets to gather data on relative abundance and location of occurrence. In 2009, a total of 216 sets of this gear produced no bycatch of spiny dogfish.

VI. Status of Management Measures and Issues

Interstate Specifications for the 2009/2010 fishing season (See III Status of the Fishery on page 7 of this report for more details):
Coastwide quota: 12 million pounds
Maximum possession limit: 3,000 pounds

The Northern Region (MA – CT) was closed on September 27, 2009.
The Southern Region (NY – VA) was closed on December 6, 2009.
The North Carolina Fishery was open from January 1 – May 5, 2010.

Federal specifications
Coastwide quota: 12 million pounds; Maximum possession limit: 3,000 pounds; Regional allocation; Period 1 (May – October) closed on September 26, 2009; Period 2 (November – April) closed on January 22, 2010.

Canadian Regulations

Spiny dogfish is listed as a "groundfish" in the Canada Department of Fisheries and Oceans (DFO) Atlantic Fishery Regulations and managed under their groundfish plan. In the Canadian Maritimes region (New Brunswick, Nova Scotia, and Prince Edward Island), a total allowable catch (TAC) of 2,500 mt has been established for a directed spiny dogfish using fixed gears (longline, handline and gillnet) and Canadian landings have been significantly below this level for the past few years.

Other groundfish fleets are permitted bycatch only. The inshore and offshore dragger fleets are permitted to retain bycatch in the amount of 25 mt for vessels less than 65 feet and vessels larger in size have an annual cap of 10 mt. With the re-opening of the US east coast fishery and the subsequent reduction in market demand from US buyers, there is very little targeting of spiny dogfish in Canadian waters at this time.

CITES

Germany submitted the first proposal for an Appendix II Convention on International Trade of Endangered Species (CITES) in December 2003. Several Appendix II listing proposals have been submitted since 2003 but none have received the necessary support for a listing.

An Appendix II listing does not prohibit trade, and the species can be exported commercially under a system of international permits, sustainability determinations, and cooperative law enforcement. The purpose of such a listing is to ensure that a species does not become endangered because of international trade.

In 2009, Sweden (acting on behalf of the European Union) and Palau submitted an Appendix II listing proposal at Convention of the Parties (COP 15) in March 2010. The proposal was rejected as there were insufficient votes to place controls on the trade of spiny dogfish.

VII. Implementation of FMP Compliance Requirements

The mandatory components of the Interstate Fishery Management Plan are:

- There are no management measures for the recreational fishery.
- States must close the fishery when the commercial quota is projected to be harvested in their region. (*4.1.2 Semi-Annual Quota Allocation* of FMP*)*
- Possession limits cannot exceed the maximum specified by the Board during the annual specification setting process. (*4.1.2.1 Annual Process for Setting Fishery Specifications* of FMP)
- States may issue exempted fishing permits for the purpose of biomedical supply not to exceed 1,000 spiny dogfish per year. States must report the amount of dogfish harvested under special permits annually. (*4.1.6 Biomedical Supply* of FMP)
- Up to 1,000 spiny dogfish may be taken for biomedical harvest per year.
- Finning is prohibited. (*4.1.7 Prohibition of Finning* of FMP)
- State permitted dealers must report weight weekly. (*4.1.4 Data Collection and Reporting Requirements* of FMP)
- States must report weight weekly to NMFS. (*4.1.4.2 Quota Monitoring* of FMP)

Table 11 summarizes the states' compliance with the Interstate Fishery Management Plan for spiny dogfish during the 2009/2010 fishing year and provides an update on the regulations for the current fishing year.

Biomedical Harvest

No spiny dogfish were taken for biomedical harvest during the 2009/2010 fishing season. Maine was the only state with biomedical harvest in the 2008/2009 fishing season.

Scientific/Educations Permits

Maine Department of Marine Resources (ME DMR) operates a public aquarium at its Boothbay Harbor laboratory facility. The Marine Resources Aquarium received 5 spiny dogfish during the 2009 season from two different sources as listed below.

Three spiny dogfish were obtained from the Marine Biological Lab in Woods Hole.
Specimens: Female – 32" in length
Female – 36" in length
Female – 40" in length

Two spiny dogfish were obtained from NOAA.
Specimens: Female -24" in length
Male – 32.5" in length

Five scientific or educational collection permits were issued in North Carolina during the 2009-2010 fishing season. Of those five permit holders, only one caught spiny dogfish (38, combined weight 115.234 kg).These sharks were caught using a bottom trawl in the near shore area North of Cape Hatteras.

VIII. PRT Recommendations

State Compliance
All of the states with a declared interest in the management of spiny dogfish, have submitted reports, and have regulations in place that meet or exceed the requirements of the Interstate Fisheries Management Plan for Spiny Dogfish.

There were some landings and late reports that came in during the two weeks after the Northern Region and Southern Region were closed (Table 7 & 8). The closure lag and/or landings during these closed periods are thought to be a result of federal waters remaining open while state waters were closed (Table 9). Some states regulations stipulate possession limits and open seasons that mirror federal regulations or require federal permits (whose conditions control fishing in state waters) to meet the requirements of the FMP. The 2009/2010 fishing season was the first time that state waters were closed while federal waters remained open.

Table 7. Late reports and landings in Northern Region during 2009/2010 fishing season. Source: NOAA Fisheries Weekly Quota and Landings website quota report archives.

	Sept 27 - Oct 3		Oct 4 - 10	
Northern Region (Closed on September 27, 2009)	Previous Weeks Updates	Weekly Landings	Previous Weeks Updates	Weekly Landings
ME	677	5,944	0	0
NH	0	0	0	0
MA	231,934	10,100	5,085	0
RI	3,715	0	0	0
CT	0	0	0	0
Total	236,326	16,044	5,085	0

Table 8. Late reports and landings in Southern Region during 2009/2010 fishing season. Source: NOAA Fisheries Weekly Quota and Landings website quota report archives.

	Dec 6 - 12		Dec 13 - 19	
Southern Region (Closed on December 6, 2009)	Previous Weeks Updates	Weekly Landings	Previous Weeks Updates	Weekly Landings
NY	2,970	622	0	0
NJ	15,161	4,012	6,000	0
DE	0	0	0	0
MD	18,389	0	0	0
VA	0	0	0	0
Total	36,520	4,634	6,000	0

Table 9. ASMFC and NMFS open and closed dates for the 2009/2010 fishing season by 2 week period.

Jurisdiction		**ASMFC**			**NMFS**
Region		**Northern**	**Southern**	**NC**	**EEZ**
May	**1**	O	O	C	O
	15	O	O	C	O
June	**1**	O	O	C	O
	15	O	O	C	O
July	**1**	O	O	C	O
	15	O	O	C	O
Aug	**1**	O	O	C	O
	15	O	O	C	O
Sep	**1**	O	O	C	O
	15	O	O	C	O
Oct	**1**	C	O	C	C
	15	C	O	C	C
Nov	**1**	C	O	C	O
	15	C	O	C	O
Dec	**1**	C	O	C	O
	15	C	C	C	O
Jan	**1**	C	C	O	O
	15	C	C	O	O
Feb	**1**	C	C	O	C
	15	C	C	O	C
Mar	**1**	C	C	O	C
	15	C	C	C	C
Apr	**1**	C	C	C	C
	15	C	C	C	C

De minimis Status

The ASMFC Interstate Fisheries Management Program Charter defines *de minimis* as "a situation in which, under the existing condition of the stock and scope of the fishery, conservation, and enforcement actions taken by an individual state would be expected to contribute insignificantly to a coastwide conservation program required by a Fishery Management Plan or amendment" (ASMFC 2000).

Under the Spiny Dogfish FMP, a state may be granted *de minimis* status if a state's commercial landings of spiny dogfish are less than 1% of the coastwide commercial total. If a state meets this criterion, the state will be exempt from biological monitoring of the commercial spiny dogfish fishery. All states, including those granted *de minimis* status, will continue to report any spiny dogfish commercial or recreational landings within their jurisdiction.

When the spiny dogfish Interstate FMP was implemented in 2003, Maine, Delaware, South Carolina, Georgia, and Florida were granted *de minimis* status. To achieve *de minimis* status the FMP requires, "a state's commercial landings of spiny dogfish to be less than 1% of the coastwide commercial total." When given *de minimis* status, a state is exempted from biological monitoring of the commercial spiny dogfish fishery, but must continue to report both commercial and recreational spiny dogfish landings.

Delaware, South Carolina, Georgia, and Florida are requesting *de minimis* status for the 2010/2011 fishing season and meet the FMP requirements for achieving this status. The PRT recommends granting all of these states *de minimis* status (Table 7).

Table 10. Percent landing by state during 2009/2010 fishing season. * indicates a state that qualifies for *de minimis.* Source: ACCSP Data Warehouse.

State	Landings	Coastwide Landings	% of Coastwide Landings
ME	593,980	12,444,625	4.77%
NH	2,072,937		16.66%
MA	3,878,697		31.17%
RI	939,415		7.55%
CT	91,860		0.74%
NY	191,575		1.54%
NJ	1,341,616		10.78%
DE*	14,347		0.12%
MD	174,785		1.40%
VA	1,437,330		11.55%
NC	1,708,084		13.73%
SC*	0		0.00%
GA*	0		0.00%
FL*	0		0.00%

Table 11. State-by-state compliance with the Interstate Fishery Management Plan for Spiny Dogfish.

	Report Submitted (Due July 1)	De Minimis Request	Biomedical Permit Harvest	Finning Prohibition	Possession limits
Maine	Yes	No	Yes: 5 Collected	Yes	3,000 lb
New Hampshire	Yes	No	No	Yes	3,000 lb
Massachusetts	Yes	No	No	No	600 lb: May 1 – Aug. 30 2,000 lb: Sep. 1 – Dec 31
Rhode Island	Yes	No	No	Yes	3,000 lb
Connecticut	Yes	No	No	Yes	3.000 lb
New York	Yes	No	No	Yes	3,000 lb
New Jersey	Yes	No	No	Yes	3000 lb
Delaware	Yes	Yes, recommended	No	Yes	3,000 lb
Maryland	Yes	No	No	Yes	3,000 lb
Virginia	Yes	No	No	Yes	3,000 lb
North Carolina	Yes	No	No	Yes	3,000 lbs N. of Browns Inlet and 500 lbs S. of Browns Inlet
South Carolina	Yes	Yes, Recommended	No	Yes	3,000 lb
Georgia	Yes	Yes, Recommended	No	Yes	1 fish bag limit / 30" min size
Florida	Yes	Yes	Prohibit harvest, possession, purchase, sale, or exchange of spiny dogfish.		

Research Recommendations[3]

1) Attempt to allocate landings to statistical area (i.e. attempt proration) using Vessel Trip Report data for 1994 and later years.
The Working group successfully completed work to address this RR.

2) Evaluate the utility of length frequency for spiny dogfish sampled in the NEFSC Observer Program in the most recent years (2001 and later).
The Working group successfully completed work to address this RR.

3) Ensure the inclusion of recent (2000 and later) MADMF Observer sample data for spiny dogfish in the NEFSC database, for more efficient use in future assessments.
The Working group successfully completed work to address this RR.

4) Conduct tagging and genetic studies of spiny dogfish in U.S. and Canadian waters to clarify current assumptions about stock structure.
The Working Group reviewed an ongoing tag project conducted by East Carolina University.

5) Conduct discard mortality studies for spiny dogfish, with consideration of the differences in mortality rates among seasons, areas, and gear types.
The Working Group reviewed a discard mortality study in North Carolina near-shore trawl and gillnet fisheries conducted by East Carolina University, and took these results into consideration in updating assumed discard mortality rates for the coast-wide trawl, gillnet, and hook fisheries.

6) Conduct experimental work on NEFSC trawl survey gear performance, with focus on video work to study the fish herding properties of the gear for species like dogfish and other demersal roundfish.
The Working Group made no progress on this RR.

7) Investigate the distribution of spiny dogfish beyond the depth range of current NEFSC trawl surveys, possibly using experimental research or supplemental surveys.
The Working Group made no progress on this RR.
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8) Initiate aging studies for spiny dogfish age structures (e.g., fin spines) obtained from NEFSC trawl surveys and other sampling programs. These studies should include additional age validation and age structure exchanges. The WG notes that other aging methodologies (e.g., Canadian studies on radiometry) are also in development.
The Working Group reviewed preliminary results of NEFSC aging work for spiny dogfish. Preliminary results agree more with validated ages for Pacific dogfish, then with current estimates used for Northwest Atlantic dogfish.

9) Additional analyses of the effects of environmental conditions on survey catch rates should be conducted.

[3] Taken Verbatim from the 43rd SAW section 11.0 "SPINY DOGFISH RESEARCH RECOMMENDATIONS".

The Working Group investigated the associations of temperature and depth with trawl survey densities. Examination of dogfish distributions in trawl surveys indicates greater concentrations closer to shore over the last five years.

10) Additional work on the stock-recruitment relationship should also be conducted with an eye toward estimation of the intrinsic rate of population increase.
The Working Group used the results from a new analytical model (LTM) to estimate parameters of a stock-recruitment relationship.

11) The SARC noted that the increased biological sampling of dogfish should be conducted and research trawl surveys. Maturation and fecundity estimates by length class will be particularly important to update. Additional work on the survey database to recover and encode information on the sex composition prior to 1980.
The Working group notes that a sampling program to collect aging structures (2003) and maturity data (1998) for dogfish has been implemented on NEFSC surveys. The WG examined sex composition data from NEFSC spring and fall surveys from 1968 to 1972, and this historical information has been included in this assessment.

New:

1) Incorporate Canadian commercial fishery sample data into the assessment when it is made available (expected in 2008).

2) Conduct an aging workshop for spiny dogfish, encouraging participation by NEFSC, NCDMF, Canada DFO, other interested state agencies, academia, and other international investigators with an interest in dogfish aging (US and Canada Pacific Coast, ICES).

3) Examine observer data to calculate a weighted average discard mortality rate based on an assumption that the rate increases with catch size.

4) Develop experimental estimates of discard mortality in the New England and Mid-Atlantic commercial fisheries.

5) Develop experimental estimates of discard mortality in the New England and Mid-Atlantic recreational fisheries.

6) Conduct a coast-wide tagging study for spiny dogfish to explore stock structure, migration patterns, and mixing rates.

APPENDIX A.

Atlantic States Marine Fisheries Commission
Spiny Dogfish Technical Committee
Providence, RI
October 16, 2008

Present: Chris Vonderweidt (ASMFC), Matt Cieri (ME DMR), Jim Armstrong (MAMFC), Angel Bolinger (MD DNR), Chris Batsavage (NC DMF), Scott Newlin (DE DNR), Claire McBane (NHFGD); Paul Rago (NEFSC), Russ Babb (NJ DEP), Jack Musik (VIMS), Kathy Sosobee (NEFSC), Hannah Goodall (NMFS)

Call in: Matt Gates (CT DEP), Wilson Laney (FWS), Jamie Goen (NMFS)

Observers: Eric Brazer (CCCHFC), Louie last name inaudible (Processor), Jim Fletcher (NC)

The Spiny Dogfish Technical Committee (TC) met on October 16, 2008 to review the 2008 NEFSC spawning stock biomass (SSB) update and recommend a quota and possession limit for the 2009/2010+ fishing season(s).

At the beginning for the meeting, Dr. Rago gave the TC a detailed presentation of the 2008 SSB update report. The SSB estimate for 2008 suggests that the spiny dogfish population exceeds the target biomass of 167,800 mt and is rebuilt based on the definition in the FMP. The updated assessment which uses the NEFSC spring bottom trawl data from 2006-2008 estimates SSB to be 194,600 mt with 75% of the computed values exceeding the target biomass. The most recent stochastic estimate of fishing mortality for spiny dogfish stock indicates that *overfishing is not occurring*. Fishing mortality in 2007 is estimated to be 0.1104 a value approximately equal to the rebuilding fishing mortality rate. The fishing mortality threshold, defined as a value that allows for the production of 1.5 female pups per female that will recruit to the spawning stock biomass, was updated to Fthreshold = 0.284.

Dr. Rago pointed out that the determination of rebuilt status is not without problems for several reasons.

- The size frequency of the female population is concentrated between 75 and 95 cm with very few fish above 100 cm or below 70 cm.
- The low numbers of juvenile female and male dogfish imply that the population will oscillate over time.
- The decline will be induced by the sequence of poor recruits from the last ten years. In other words the recruitment deficit will have to be paid back.
- SSB should increase again IF pup survival rates begin to increase. Recruitment in the past 5 years has been modest but well below expectations.
- The consequences of the skewed sex ratio of 4:1 for mature males to mature females has unknown implications for future reproductive success.
- All projection scenarios assume that survival of pups is at average long term values. All of the projections will be optimistic if this assumption is not true.

After questions and a long discussion, the TC unanimously agreed that the Board should take a precautionary approach and continue to use the rebuilding F value of 0.11 rather than a value between Fthreshold = 0.39 and Ftarget = 0.28 as the 'rebuilt' status might allow. Allowing for a target or threshold fishing mortality rate would cause the stock to decline below the threshold SSB (i.e overfished) around 2017 because of the lack of strong year classes beginning in 1997. TC members do not believe that the stock is truly rebuilt because the size structure is so heavily truncated. The size frequency of the female population is concentrated between 75 and 95 cm with very few fish above 100 cm or below 70 cm.

They also agreed that the quota should only be set for one fishing season because a new Transboundary Resource Assessment Committee (TRAC) assessment will happen in 2009. The TC should review the 2009 TRAC before recommending specifications for the 2010/2011 fishing season. If the 2009 TRAC is not available before specifications need to be set for the 2010/2011 fishing season then a SSB update based on the 2009 NEFSC spring bottom trawl survey can be used to recommend specifications.

The TC recommends a 12 million pound quota for the 2009/2010 fishing season for the following reasons.

- 12 million pounds coincides with F = 0.11 after taking into account discards and Canadian landings.
- Setting a quota at F = 0.11 allows NMFS to set an identical quota. Higher quotas in state waters concentrate catch on the state water population where fishermen are guaranteed to land primarily females.
- Projections show that an F = 0.11 will not cause the population to drop below threshold SSB (i.e overfished) when the recruitment deficit is paid back around 2017.
- Assumptions about pup survivorship may be overestimating SSB projections.

The TC found no strong biological reasoning for choosing a possession limit value. There is no quantitative projection that directly relates various possession limits to the F target or discard rates. Several members noted that setting the possession limits value is more of a management decision because it can impact regional quota allocation.

Possession limits of both large and small values have discard problems associated with them. There is no evidence that a large trip limit will cause more discards than a small trip limit or vice versa. A large trip limit will cause the quota to be harvested early forcing fishermen to discard all dogfish caught after the quota is taken. A small trip limit may discourage a certain portion of the fishing fleet from retaining any dogfish because the value of such a small quantity of dogfish does not give enough incentive to keep any bycaught dogfish.

The TC recommends that possession limits for the 2009/2010 fishing season are set at a maximum of 3,000 lbs. The 2008/2009 possession limit of 3,000 lbs did not cause F to exceed 0.11 while allowing fishermen to harvest the entire quota. Several members also stated that it may be beneficial for NMFS to set possession limits at 3,000 lbs to help shift fishing pressure away from inshore state waters.

The TC also briefly discussed the impact of a male only fishery on the stock in response to a question that one of the observers asked. Although increased removals of male dogfish would not in itself threaten the health of the stock, the Committee expressed concern about how such a fishery (the perennially proposed male-only fishery) would operate: If regulations are adjusted to allow for either a directed or an unrestricted bycatch fishery for males, how will that affect discard F on females? It is expected that the discard F would increase because of the tendency for males and immature females to form schools and thus violate assumed discards used to project total catch.