U.S. Atlantic Spiny Dogfish Fishery

MSC Fishery Assessment Report

PCDR

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Glossary

AA	Access Area
ABC	Acceptable Biological Catch
ACE	Annual Catch Entitlements
ACL	Annual Catch Limit
AES	American Elasmobranch Society
AFS	American Fisheries Society
ALWTRP	Atlantic Large Whale Take Reduction Plan
ALWTRT	Atlantic Large Whale Take Reduction Team
AM	Accountability Measures
ASAP	Age Structured Assessment Program
ASMFC	Atlantic States Marine Fisheries Commission
B	Biomass
BMSY	Biomass calculated for Maximum Sustainable Yield
BDTRP	Bottlenose Dolphin Take Reduction Plan
BREP	Bycatch Reduction Engineering Program
BRP	Biological Reference Points
BO	Biological Opinions
CAB	Conformity Assessment Body
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CoP	Conference of the Parties
CR	Certification Requirements
CV	Coefficient of Variation
DAM	Dynamic Area Management
DPS	Distinct Population Segments
DFO	Fisheries and Oceans Canada
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
ESA	Endangered Species Act
ETP	Endangered, Threatened or Protected species
F	Fishing Mortality
FAO	Food and Agriculture Organization of the United Nations
FCM	Fisheries Certification Methodology
FCR	Fisheries Certification Requirements
FDSD	Fisheries Data Services Division
FG	Fixed Gear
FLIM	Limit Reference Point for Fishing Mortality
FMP	Fishery Management Plan
FREBUILD	Fishing mortality rate calculated to meet the requirements of a stock rebuilding plan
FREF	Fishing Mortality Reference Point
Fthreshold	Upper limit of allowable fishing mortality rate
GAO	Government Accounting Office
GARM	Groundfish Assessment Review Meeting
GB	Georges Bank
GOM	Gulf of Maine
GOMAC	Gulf of Maine Advisory Committee
GN	Gillnet
HL	Handline

IFMP	Integrated Fisheries Management Plan
IFQ	Individual Fishing Quota
ITQ	Individual Transferable Quota
ISBF	Introduced species based fisheries
IUNC	International Union for Conservation of Nature
IUU	Illegal, Unregulated, or Unreported
Kg	kilogram
Lb.	Pound, equivalent to roughly 2.2 kg
LL	Longline
LMOT	Large Mesh Otter Trawl
LOA	Length Over-All
LOF	List of Fisheries
LPUE	Landings per unit of fishing effort
M	Million (lbs.)
MA	Mid-Atlantic region of the US Atlantic Coast
MAB	Mid-Atlantic Bight
MADMF	Massachusetts Division Marine Fisheries
MAFMC	Mid-Atlantic Fishery Management Council
MG	Mobile Gear
MMPA	Marine Mammal Protection Act
MMR	Mark-Resight/Recapture
MOU	Memorandum of Understanding
MRIP	Marine Recreational Information Program
MSA	Alternative abbreviation for Magnuson-Stevens Fishery Conservation and Management Act
MSC	Marine Stewardship Council
MSE	Management Strategy Evaluation
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSP	Maximum Spawning Potential
MSY	Maximum Sustainable Yield
mt	metric ton, 1000 kg or 2204.62 pounds
NAFO	Northwest Atlantic Fisheries Organization
NE	New England
NEMSFMP	Northeast Multispecies Fisheries Management Plan
NEFMC	New England Fishery Management Council
NEFOP	Northeast Fishery Observer Program
NEFSC	New England Fisheries Science Center
nm	nautical mile
NMFS	National Marine Fisheries Service
NNCES	Northern NC estuarine system
NOAA	National Oceanic and Atmospheric Administration
OFL	Over-Fishing Level
OPR	Office of Protected Resources
PI	Performance Indicator
RBF	Risk-based Framework
SAM	Seasonal Area Management
SAFIS	Standard Atlantic Fisheries Information System
SARC	Stock Assessment Review Committee

SAW	Stock Assessment Workshop
SBRM	Standardized By-catch Reporting Methodology
SCS	SCS Global Services
SD	Spiny Dogfish
SDCSMB	Spiny Dogfish and Coastal Shark Management Board
SE	Southeast region of the US
SG	Scoring Guidepost
SI	Scoring Issue
SMB	Squid, Mackerel, and Butterfish
SNCES	Southern NC estuarine system
SNE	Southern New England
SSB	Spawning Stock Biomass
SSBmax	Spawning Stock Biomass at maximum (unfished) population size
SSC	Scientific and Statistical Committee
T	metric ton
TAC	Total Allowable Catch
TL	Total Length
TRAC	Transboundary Resource Assessment Committee
UoA	Unit of Assessment
UoC	Unit of Certification
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
VIMS	Virginia institute for marine science
VMS	Vessel Monitoring System
WNA	Western North Atlantic
VTR	Vessel Trip Report
WWF	World Wildlife Fund

1. Executive Summary

This report presents the Marine Stewardship Council (MSC) assessment of the spiny dogfish (Squalus acanthias) fishery, harvested by longlines, gill nets, and trawls in the U.S. exclusive economic zone (EEZ) from Cape Hatteras, NC to the U.S./Canadian boundary. Three Units of Assessment (UoAs) are considered, one for each gear type. Within the report, the UoAs are referred to more simply as the gear type, e.g., the bottom trawl fishery. SCS Global Services (SCS), an MSC-accredited, independent, third-party conformity assessment body (CAB), conducted the assessment and prepared the findings following the MSC Principles and Criteria for sustainable fishing. The assessment complies with the MSC Process Certification Requirements v2.0 and the default assessment tree and guidance to the Certification Requirements V1.3.

Table 1. Unit of Certification(s) and Unit of Assessment(s)

Stock/Species (FCR V2.0 7.4.7.1)	Method of Capture (FCR V2.0 7.4.7.2)	Fishing fleet (FCR V2.0 7.4.7.3)
Spiny Dogfish (*Squalus acanthias*)	Longline Gill Net Trawl	All state and federal spiny dogfish permit holders

1.1.1 Fishery Operations Overview

At the onset of the domestic commercial 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 lb.). 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). The spiny dogfish fishery management plan (FMP) was developed in 1998 and implemented in 2000 to halt the 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, rebuilding required elimination of that directed fishery. The rebuilding program was successful, and in 2010 the National Marine Fisheries Service (NMFS) communicated the rebuilt status of the stock to the Councils (MAFMC 2017a).

The current (May 1, 2016 – April 30, 2019) quotas are derived from the recommendations of the Council's Scientific and Statistical Committee (SSC) for Acceptable Biological Catch (ABC). How various components of fishing mortality are handled by the spiny dogfish fishery management plan, as described in the table below. The trip limit is 6,000 pounds in Federal waters however individual states may set more restrictive possession limits.

Table 2. Specifications for the spiny dogfish fishery for the years 2016-2018. Source: MAFMC 2017a.

Specifications	Basis	2016 (pounds)	2016 (mt)	2017 (pounds)	2017 (mt)	2018 (pounds)	2018 (mt)
OFL	Projected Catch at Fmsy	64,414,664	29,218	na	na	na	na
New ABCs	Council Risk Policy	52,066,572	23,617	50,805,528	23,045	49,901,633	22,635
Canadian Landings	= avg last 3 years (10,11,12)	143,300	65	143,300	65	143,300	65
Domestic ABC	= ABC – Canadian Landings	51,923,272	23,552	50,662,228	22,980	49,758,333	22,570
ACL	= Domestic ABC	51,923,272	23,552	50,662,228	22,980	49,758,333	22,570
Mgmt Uncert. Buffer	Ave pct overage since 2011	0	0	0	0	0	0
ACT	= ACL - mgmt uncertainty	51,923,272	23,552	50,662,228	22,980	49,758,333	22,570
U.S. Discards	=3 year average 12-13-14	11,494,167	5,214	11,494,167	5,214	11,494,167	5,214
TAL	ACT – Discards	40,429,105	18,338	39,168,060	17,766	38,264,165	17,356
U.S. Rec Landings	= 2014 estimate	68,343	31	68,343	31	68,343	31
Comm Quota	TAL – Rec Landings	40,360,761	18,307	39,099,717	17,735	38,195,822	17,325

OFL = Overfishing Level; ABC = Acceptable Biological Catch; ACL = Annual Catch Limit; ACT = Annual Catch Target; TAL = Total Allowable Landings; Rec = Recreational; Comm = Commercial.

Spiny dogfish (*Squalus acanthias)* is a commercial fishing operation with 2,057 federally permitted vessels in 2017, down from 2,666 federally permitted vessels in 2012. In 2015, 142 vessels landed more than 10,000 pounds of dogfish, compared to 297 vessels landing more than 10,000 pounds in 2012 (MAFMC AP Info 2016). 408 vessels landed at least one pound of dogfish in 2012. Most of the vessels have 3-5 fishers onboard. All vessels operate between North Carolina and Maine. The main commercial fishing gears used to catch dogfish are sink gillnets, bottom longlines, and trawls. Dogfish are frequently caught as bycatch and discarded during groundfish operations. Gillnets contribute the majority of landings (Table 3). Landings by state are shown by month in Table 4 and with percentages Landings by state are shown in pounds in Table 5.

Table 3. Landings by gear in pounds for 2013-2015. Source: MAFMC 2017 AP INFO document.

YEAR	Gillnet	Bottom Longline	Trawl	Handline	Other/ Unknown
2014	16,806,885	3,662,223	1,058,551	1,157,981	757,451
2015	13,767,454	2,939,522	1,228,404	846,502	287,453
2016	17,872,227	6,446,262	991,391	975,895	382,807
Total	48,446,566	13,048,007	3,278,346	2,980,378	1,427,711
Percentage of all landings	**70%**	**19%**	**4%**	**5%**	**2%**

Table 4. Spiny dogfish landings by month in short tons, 2014-2016.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2014	665	1,204	974	356	95	325	1,575	1,456	1,409	909	1,110	1,644	11,722
2015	1,075	940	521	332	109	94	1,526	1,440	930	406	869	1,293	9,535
2016	1,424	676	923	707	150	570	1,917	2,481	1,581	1,045	985	875	13,334

Table 5. Spiny dogfish landings by state in short tons and in overall percentage, 2014-2016.

YEAR	CT	MA	MD	ME+ Other	NC	NH	NJ	NY	RI	VA	Total
2014	17	4,711	526	115	2,698	852	1,101	35	345	1,321	11,722
2015	17	3,925	570	10	1,918	462	955	15	264	1,398	9,535
2016	17	7,183	691	0	1,160	378	1,804	20	335	1,748	13,334
Total	51	15,819	1,787	126	5,776	1,692	3,860	69	944	4,467	34,591
%	0%	46%	5%	0%	17%	5%	11%	0%	3%	13%	

In 2017 308 dealers possessed federal spiny dogfish dealer permits compared to 317 in 2012. In 2012, only 77 dealers actually reported buying spiny dogfish.

1.1.2 Assessment Overview

The team selected to undertake the assessment includes three team members that collectively meet the requirements for MSC assessment teams. More detailed information on the qualifications of the assessment team is included in the Surveillance Announcement published on the MSC web site on March 31, 2017 and is repeated in section 2.1 below. These are:

- Mr. Richard Allen, Team Leader and Principle 3 Expert
- Dr. John Musick, Principle 1 Expert
- Gabriela Anhalzer, Principle 2 Expert

The team met with fishery representatives, scientists, fishery managers, enforcement representatives, and stakeholders in North Dartmouth, MA, Woods Hole, MA, Gloucester, MA, and by conference call on May 30, May 31, and June 1, 2017. Documents were made available by fishery representatives and fisheries scientists. Client representatives provided the assessment team with supporting documents. The original announcement for the assessment indicated that the Risk based framework (RBF) would not need to be used and this was confirmed from information provided prior to and during the site visit. The re-assessment proceeded without the RBF.

Stakeholders were notified of the onsite visit by notice on the MSC web site published on March 29, 2017 and by direct contact through email. Stakeholders were invited to speak with the team regarding any concerns and time was scheduled during the onsite to meet with stakeholders. No stakeholder comments were received at this stage.

Peer Review of the assessment was conducted by Dr. Kristin Kleisner and Mr. Alexander “Sandy” Morison. Based on the peer review the following changes were made: additional context was included in the justifications of the Principal Indicators under Principle 1. In Principle 2 additional information for reference points of main species and context for management of bycatch species was added. For PI 2.2.3 scoring for all three UoAs was modified from an 85 to an 80. For PI 2.3.X sea birds were

included as a scoring element, for PI 2.3.2 score was modified from 90 to 85. The scoring por PI 2.2.3 changed from SG100 to SG80. In Principle 3 PI 3.2.5 score corrected from 85 to 90.

The report was posted for Public Comment to the MSC website on March 2, 2018 with the public comment period closing on April 1, 2018.

1.1.3 Summary of Findings

In this report, we provide detailed rationales for scores presented for each of the Performance Indicators (PIs) under Principle 1 (Stock status and Harvest strategy), Principle 2 (Ecosystem Impact) and Principle 3 (Governance, Policy and Management system) of the MSC Standard. No PIs failed to reach the minimum Scoring Guidepost (SG) of 60, and the average scores for the three Principles remained above SG80. The team issued **3 conditions** for PIs that did not meet SG80 level, all in Principle 2. Condition 2-1 was placed on the trawl UoA for PI 2.3.1 SIa for the small cetaceans scoring element, Conditions 2-2 and 2-3 were placed on the gillnet UoA for the large whales scoring elements in the PIs 2.3.1 and 2.3.3 respectively.

In this report we provide the rationales for all scores proposed, which support the assessment that the fishery is recommended for certification.

2. Authorship and Peer Reviewers

2.1 Audit Team

John Musick P1 Team member, Principle 1 Expert

John A. (Jack) Musick, Ph.D. is the Marshall Acuff Professor Emeritus in Marine Science at the Virginia Institute of Marine Science (VIMS), College of William and Mary, where he has served on the faculty since 1967. He earned his B.A. in Biology from Rutgers University in 1962 and his M.A. and Ph.D. in Biology from Harvard University in 1964 and 1969, respectively. While at VIMS he has successfully mentored 37 masters and 49 Ph.D. students. Dr. Musick has been awarded the Thomas Ashley Graves Award for Sustained Excellence in Teaching from the College of William and Mary, the Outstanding Faculty Award from the State Council on Higher Education in Virginia, and the Excellence in Fisheries Education Award by the American Fisheries Society. In 2008 Dr. Musick was awarded The Lifetime Achievement Award in Science by the State of Virginia. He has published more than 150 scientific papers and co-authored or edited 21 books focused on the ecology and conservation of sharks, marine fisheries management, and sea turtle ecology. In 1985 he was elected a Fellow by the American Association for the Advancement of Science. He has received Distinguished Service Awards from both the American Fisheries Society and the American Elasmobranch Society (AES), for which he has served as president. In 2009 the AES recognized him as a Distinguished Fellow. Dr. Musick also has served as president of the Annual Sea Turtle Symposium (now the International Sea Turtle Society), and as a member of the World Conservation Union (IUCN) Marine Turtle Specialist Group. Dr. Musick served as co-chair of the IUCN Shark Specialist Group for nine years, and has continued to serve as a member. Since 1979, Dr Musick has served on numerous Stock Assessment, and Scientific and Statistics committees for the Atlantic States Marine Fisheries Commission, the Mid-Atlantic Fisheries Management Council, the National Marine Fisheries Service, and the Chesapeake Bay Stock Assessment Program. He has chaired the Atlantic States Marine Fisheries Commission (ASMFC) Shark Management Technical Committee and ASMFC Summer Flounder Scientific and Statistics Committee. He has served on the ASMFC Technical Committee and Advisory Committee for Spiny Dogfish, and the MSMFC Monitoring Committee for Spiny Dogfish.

His recent work for the Marine Stewardship Council includes Assessments of the British Columbia Dogfish Bottom Longline Fishery, and the New England Groundfish Bottom Trawl Fishery (Redfish Pollock and Haddock), and several Peer Reviews of various Atlantic Swordfish Fisheries.

Gabriela Anhalzer P2 Team member– SCS Global Services– Principle 2 Expert

Gabriela Anhalzer received a Masters degree in coastal environmental management from Duke University. Ms. Anhalzer has several years of experience in marine conservation and fisheries, she has worked as an independent consultant conducting evaluations of fishery improvement projects and as a fisheries policy and stakeholder specialist. She has also worked as an associated researcher in Latin America for sea turtle population studies, sea bird census, and supporting stakeholder engagement in participatory management of marine protected areas. Ms. Anhalzer has provided technical support for numerous MSC assessment and possess a comprehensive understanding of MSC fisheries standard and stages; meeting MSC's team leader qualifications and competency criteria. Ms. Anhalzer has

received ISO 9001 auditor training, has completed the MSC training and has affirmed she has no conflict of interest.

Richard Allen P3 Team member– Independent Fishery Consultant – Principle 3 Expert

Richard Allen has 45 years of experience as a commercial fisherman, a representative of commercial fishermen, a fishery consultant, fishery conservationist, and as an active participant in the fishery management system. Allen holds an Associate in Science degree in Fisheries and Marine Technology, a Bachelor of Science degree in Natural Resource Development and a Master of Marine Affairs degree. Most recently, Allen returned to school and completed the course work for a Ph.D. in environmental sciences.

Allen began a parallel career in fishery consulting in 1972 with clients in the fishing industry, government and non-governmental organizations. He was a member of the New England Fishery Management Council from 1986 through 1995, and was a commissioner on the Atlantic States Marine Fisheries Commission from 1986 through 1997. Allen is a former member of the U.S. Department of Commerce National Sea Grant Review Panel, and served one term as its chairman. He has also served as a member of the U.S. Department of Commerce Marine Fisheries Advisory Committee.

Allen has also been an active fishery journalist, writing for Commercial Fisheries News and National Fisherman. He also compiled and edited the 1983 Atlantic Fisherman's Handbook. Allen was the recipient of the prestigious Pew Fellowship in Marine Conservation in 1998. He used his fellowship to translate an obscure lobster egg-per-recruit model into a user-friendly bio-economic model. Most recently, Allen has developed bio-economic models for the primary Cape Verdean fisheries as a consultant to the West African Fisheries Development Project. Commercial Fisheries News recently published Allen's "Searching for Tradition: a brief history of the New England groundfish fishery" as a 12-part series and as on online flip-book.

Allen has participated as a team member on three MSC full assessments and two pre-assessments. He has also served as a peer reviewer on two assessments. He has completed MSC training modules for P3 expert and for team leader.

2.2 Peer Reviewers

The peer reviewers were selected based on their qualifications and competencies.

Dr. Kristin Kleisner

Dr. Kristin Kleisner is a Senior Fisheries Scientist with EDF's Fisheries Solutions Center. Her work investigates the utility of applying spatial management in combination with rights-based management measures in fisheries around the world, applying bio-economic models to understand the potential for fisheries management to improve the biomass, harvest, and profits of fisheries, and understanding the implications of climate change on the distribution of fish stocks and the implications for fisheries management. Kristin worked previously as a joint research scientist for NOAA's Northeast Fisheries Science Center in Woods Hole and The Nature Conservancy working on ecosystem based fisheries

models and exploring the effect of climate change on fish stock distributions in New England. She also led research on the development of fisheries, food security, and ecosystem status indicators with indiSeas (www.indiseas.org), FAO, UNESCO, and the Sea Around Us project. She holds a PhD in Marine Biology and Fisheries from the Rosenstiel School of Marine and Atmospheric Science at the University of Miami

Mr Alexander "Sandy" Morison – Morison Aquatic Sciences – Principle 2 Expert

Mr. Morison is a consultant specializing in fisheries and aquatic sciences. He has over 30 years' experience in fishery science and assessment at state, national and international levels and has held senior research positions for state and national organizations in Australia. He is currently chair of the Ecologically Related Species Working Group of the Commission for the Conservation of Southern Bluefin Tuna and has been engaged in the Kobe process for harmonisation of measures across the tuna RFMOs.

Mr. Morison has participated as part of a team undertaking MSC pre-assessments for several fisheries and has been the Principle 1 expert for the MSC certification assessments or surveillance audits of assessments of the Heard Island and McDonald Islands (HIMI) Icefish Fishery, the HIMI Toothfish Fishery, the Macquarie Island Toothfish Fishery, the Kyoto Danish Seine Fishery, the Western Australian Rock Lobster Fishery, the Western Australia Peel Harvey Estuarine Fishery, the Western Australia Deep Sea Crab Fishery, the Lakes and Coorong Fishery, and the Northeastern Tropical Pacific Purse Seine Yellowfin and Skipjack Tuna Fishery. Mr. Morison is also trained as a lead auditor for MSC assessments by SCS.

Sandy is also contracted by the Australian Fisheries Management Authority to chair the Slope Fisheries Resource Assessment Group, the Shelf Fisheries Resource Assessment Group and is the Scientific Representative on the South East Fishery Management Advisory Committee. He has also been the scientific representative on other Resource Assessment Groups. Sandy has experience with the assessment of invertebrate, chondrichthyan and teleost fisheries including commercial and recreational fisheries in freshwater, estuarine and marine habitats and fisheries operating in tropical, temperate and polar environments.

He has particular expertise with fish age and growth and has been involved in the development and implementation of harvest strategies for several fisheries. He has over 20 publications in peer-reviewed scientific journals (8 as senior author), 8 book chapters, and over 100 project reports, technical reports, client reports and papers in workshop and conference proceedings.

3. Description of the Fishery

3.1 Unit(s) of Assessment (UoA) and Scope of Certification Sought

3.1.1 UoA and Proposed Unit of Certification (UoC) - Considered Final as Published in the Public Certification Report

The Unit of Assessment includes the U.S. Atlantic spiny dogfish stock caught by vessels that are licensed by individual states or permitted by the United States federal government using bottom longlines, gill nets, or otter trawls fishing within U.S. state and federal waters.

This fishery has been found to meet scope requirements (FCR v2.0 7.4) for MSC fishery assessments as it

- Does not operate under a controversial unilateral exemption to an international agreement, use destructive fishing practices, does not target amphibians, birds, reptiles or mammals and is not overwhelmed by dispute. (FCR 7.4.1.1, 7.4.1.2, 7.4.1.3, 7.4.2)
- The fishery does not engage in shark finning, has mechanisms for resolving disputes (FCR 7.4.2.1), and has not previously failed assessment or had a certificate withdrawn.
- Is not an enhanced fishery, is not based on an introduced species, and does not represent an inseparable or practically inseparable species (FCR 7.4.3, 7.4.4, 7.4.13-15)
- Does not overlap with another MSC certified or applicant fishery (7.4.16),
- And does not include an entity successfully prosecuted for violating forced labor laws (7.4.1.4)
- The Unit of Assessment, the Unit of Certification, and eligible fishers have been clearly defined, traceability risks characterized, and the client has provided a clear indication of their position relative to certificate sharing (7.4.6-7.4.12).

Table 6. Unit of Assessment (UoA) and Unit of Certification (UoC).

Units of Assessment: Defined as the species, gear, and fleet assessed	
UoA: Species & Stock (FCR V2.0 7.4.7.1)	US Atlantic Spiny Dogfish (*Squalus acanthias*)
UoA: Gear Type (FCR V2.0 7.4.7.2)	1. Longline 2. Gill net 3. Bottom trawl
UoA: Vessels (FCR V2.0 7.4.7.3)	Vessels with state or federal permits to catch spiny dogfish
Further information: Geographic Area	State and federal waters off the Atlantic coast of the U.S.A.
Further information: Management System	Joint NEFMC & MAFMC with implementation by NMFS for federal waters and ASMFC with implementation by states for state waters
Unit of Certification: Defined as the vessels allowed to use the MSC ecolabel for catch from the Unit of Assessment (defined as the species, location and gear assessed against the MSC standard).	
Client Group	Sustainable Fisheries Association
Fishers in the UoC for the chosen stock	Vessels with state or federal permits to catch spiny dogfish
Other Eligible Fishers that may join the certificate for the chosen stock	N/A

The three proposed UoAs are defined based on broad categories of the gears used (gill net, otter trawl and bottom longline). Spiny dogfish fishery is part of multi-species fisheries, under which it is not possible to determine and identify the vessels/trips/hauls targeting and landing spiny dogfish, until the gear has been hauled. The assessment team evaluated the possibility of using discrete variations in the gear types and operations, such as mesh sizes, soak time or seasons, in order to further define the UoAs. After discussing this possibility at length with the client representative during the onsite meeting, the team concluded that this was not a viable option. Following MSC CR v2.0 clause 7.4.9, to avoid defining the UoAs/UoC based on the species caught as determined at the time of fishing, the assessment team continued to define the UoAs based on broad categories of the gears used.

The proposed UoAs cover all fishing activities of vessels that have commercial state and federal spiny dogfish permits and that are fishing with one of the three gears types: otter trawl, gill nets (Sink, Anchor, Drift Gillnet) and bottom longline. The fishing operators are not limited to any defined fleets.

3.1.2 Total Allowable Catch (TAC) and Catch Data

Table 7. TAC and Catch Data for Spiny Dogfish (*Squalus acanthias*) captured by all UoA Fishing year is May 1 through April 30. Source: ASMFC 2016. 2016 Review of the Atlantic States Marine Fisheries Commission Fishery Management Plan for Spiny Dogfish (*Squalus acanthias*)

TAC	**Year**	2015-16	**Amount**	53 M Lb.
UoA share of TAC	**Year**	2015-16	**Amount**	53 M Lb.
UoC share of total TAC	**Year**	2015-16	**Amount**	53 M Lb.
Total green weight catch by UoC	**Year (most recent)**	2015-16	**Amount**	22 M Lb.
	Year (second most recent)	2014	**Amount**	23 M Lb.

3.1.3 Scope of Assessment in Relation to Enhanced Fisheries

There is no evidence of enhancement in this fishery.

3.1.4 Scope of Assessment in Relation to Introduced Species Based Fisheries (ISBF)

There is no evidence of introduced species in this fishery.

3.2 Overview of the Fishery

3.2.1 Location and History of the Fishery

A comprehensive history of the spiny dogfish (SD) fishery is provided in the initial MSC certification report prepared by Intertek Moody and is reproduced here:

> Records of SD landings from the NW Atlantic date back to the 1880s. During World War II, a limited US fishery was prosecuted primarily to obtain liver oil, until the synthesis of vitamin A reduced the need for SD livers (Templeman, 1944, Castro 1983).
>
> Although SD was landed in Atlantic US by long liners and otter trawlers for many decades, due to limited commercial interest related to low domestic market demand, the average annual US harvest prior to 1960 was less than 100 mt In the 1960s, the catch increased slightly and averaged 359 mt between 1962 and 1978.
>
> From the mid-1960s, NW Atlantic catches of SD increased as distant water fleets targeting an array of groundfish expanded into the area off Canada and the US (Figure 1). SD catches, taken primarily by vessels of the former USSR, averaged 13,315 mt from 1966 to 1977, peaking at nearly 25,000 mt in 1974.
>
> The 1977 extension of fishery jurisdiction out to 200 miles brought a halt to fishing effort by foreign vessels in the USA EEZ. However, the US harvest of SD increased mainly due to a decline in groundfish stocks off the US which led the domestic fleet targeting alternative species. This development was encouraged by the opening of export markets for SD. A record 27,200 mt was landed by US vessels in 1996 (the annual average over the period 1990 to 1998 was 18,000 mt) declining to 14,908 mt in 1999 as resource abundance reduced. A substantial portion of this take was from otter trawls although many gears contributed (see section on gear sectors).
>
> Annual US recreational catches, monitored since 1980, have been less than 200 mt since 1990 and below 100 mt in most years (Trans-boundary Resources Assessment Committee (TRAC) 2010). The highest quantity (1,492 mt) was recorded in 1981, but from 1980 to date they have constituted only 2% of total US landings. From 1981 to 2009, 61% of the recreational catches originated in the area from NY to MA.
>
> An additional factor was that foreign fishing effort had been directed at all sizes and both males and females and there were minimal discards. In contrast, due to export market demand being for larger fish, US commercial fishermen targeted mature females and this led to a high discard of smaller specimens. Consequently, the abundance of the adult female portion of the stock dramatically declined and NMFS designated SD as overfished in April, 1998. This action mandated the development of a fisheries management plan (FMP) with the introduction of measures to end overfishing and to rebuild the stock.
>
> A joint FMP for Federal waters was developed by MAFMC and NEFMC and implemented in 2000.
>
> The objective was to halt large scale depletion of reproductively mature female SD and allow the stock to recover to a sustainable level. The recovery plan looked to constrain fishing mortality (F) on mature females at a rate (FREBUILD) that would grow the stock to 90 % of the nominal biomass target in five years (90 % of the 200,000 mt nominal target = 180,000 mt). This led to the demise of the directed fishery as an incidental catch quota (4 million lbs.) and low trip limits (initially 600 lbs. / 300 lbs. in the divided fishery year) were put in place. Subsequently, the biomass target was not approved by NMFS as the FMP was obliged to use the nominal target i.e. 200,000 mt
>
> As a short term action pending preparation of a FMP for State waters, in August 2000 the Spiny Dogfish and Coastal Shark Management Board (SDCSMB) of the ASMFC took emergency action to close state waters to the commercial harvest, landing and possession of SD when federal waters were closed due to the fishery landing its quota. Subsequently a State FMP was approved in 2002 that broadly followed the lead of the Federal FMP.
>
> As a result of these measures, SD was only landed as a by-catch in other fisheries. Under quota management, US commercial plus recreational landings of SD ranged from 2,322 mt in 2001 to 1,087 mt in 2004 before increasing to 5,411 mt in 2009.

In 2004, due to population declines in several Northern Hemisphere stocks, the Shark Working Group established by the Convention on International Trade in Endangered Species (CITES) agreed that SD worldwide met the requirements for Appendix II listing.1 SD in other parts of the world is in a depressed state, particularly in the northeast Atlantic, This is not now the case in the area fished by the USA. The proposal to include SD in appendix II failed to receive the required support at the 13th Conference of the Parties (CoP13) and subsequently at CoP 14 (2007) and CoP 15 (2010).

In 2006, SD in the NW Atlantic population was listed by the International Union for Conservation of Nature (IUCN) as Endangered. However, that assessment was based on data from the early 2000s when the U.S. SD stock was at a much lower level than at present. The report cites Northwest Atlantic SD biomass as decreasing. As shown by the analysis in this report this is not the case.

The rebuilding program was successful and in 2010 NMFS communicated the rebuilt status of the stock to the Councils. (MAFMC 2016)

3.2.2 Description of Fishing Practices: Gear

The principal commercial fishing gears used to catch dogfish are sink/drift/float gillnets, bottom longlines and trawls. A description of each gear type from the Northeast Fisheries Science Center Fisheries Sampling Branch Observer Operations Manual (2016) is included in this section:

Gillnet:

Gillnet: One net, or a series of nets (a.k.a. panels, bundles or shots), tied together (a.k.a. “the string”), made of monofilament nylon stretched between a weighted leadline and floatline creating a vertical barrier of netting in the water column.

Anchor vs drift:

An anchored gillnet uses a burying type of anchor (e.g., Danforth-style), or deadweight (e.g., railroad tie, battleship chain, cement blocks), to hold the gear in place.

A drift net does not use anchors, and may move freely with the water currents. A net with only a heavy leadline and/or sash weights is not considered anchored.

Sink vs float:

A sink net is set on the sea floor and targets demersal and semi-pelagic fish species.

Float gillnets can be fished anywhere within the water column, typically at or near the water’s surface. If a net covers the entire water column, the categorization is determined by whether the net would sink or float in deeper water

Bottom (Demersal) longline:

Demersal longline: A line that fishes at, or near, the ocean bottom, uniquely configured to target specific demersal species. Generally, gear is a single mainline with pre-baited hooked gangions.

Otter Trawl

The otter trawl is an active fishing gear that is towed through the water column, targeting benthic and pelagic species. It is constructed of twine webbing, so that when fully assembled and rigged, it will take the shape of a funnel while being towed along the bottom of the ocean (bottom otter trawl), or in the water column (midwater otter trawl). Floats on the headrope and a weighted footrope are used to keep the mouth of the net opened vertically. For nets being towed by a single vessel, the mouth of the net is held open horizontally by attaching each wing to an otter board or trawl door. Each door is fitted with chains that attach to the ground cables, which lead to the net. The doors are also attached to the towing vessel via steel cables, referred to as wires or warps. The resistance created by the forward motion of the

doors in the water forces them to pull apart, opening in opposite directions, thus keeping the mouth of the net open.

The codend is the bag at the terminus of the net, comprised of heavy twine netting. The targeted fish collect in the codend, as the net is towed along the bottom at a typical speed of 2–5 knots. The depth of the net is controlled by increasing or decreasing the wire lengths. After a period of time spent fishing, the net is hauled back using hydraulic winches. The length of a tow depends on the vessel size, target species, fishing gear, and area fished, and is typically 30 minutes to several hours in duration. Once the net is hauled on to the fishing vessel, the catch is dumped on deck by releasing the codend via a slip knot or a pucker clip, which holds the codend closed as it is being towed.

Specialized gears may be used and/or required in certain fishing areas. Examples of specialized gear are Haddock Separators, Flounder Trawls, and Eliminator Trawls, to name a few…]

3.2.3 Seasons

"Previously, under the federal FMP, the annual commercial quota was allocated seasonally to two half-year periods. Period 1 (May 1 – Oct 31) was allocated 57.9% of the quota and Period 2 was allocated 42.1% of the quota. This allocation scheme was implemented during rebuilding in order to match seasonal availability of the resource with the historic geographic landings patterns." (MAFMC, 2014). Amendment 3 (2014) to the FMP removed the seasonal allocation of the spiny dogfish commercial quota. Spiny dogfish are landed throughout the year with peak landings occurring in July-September (MAFMC, 2014).

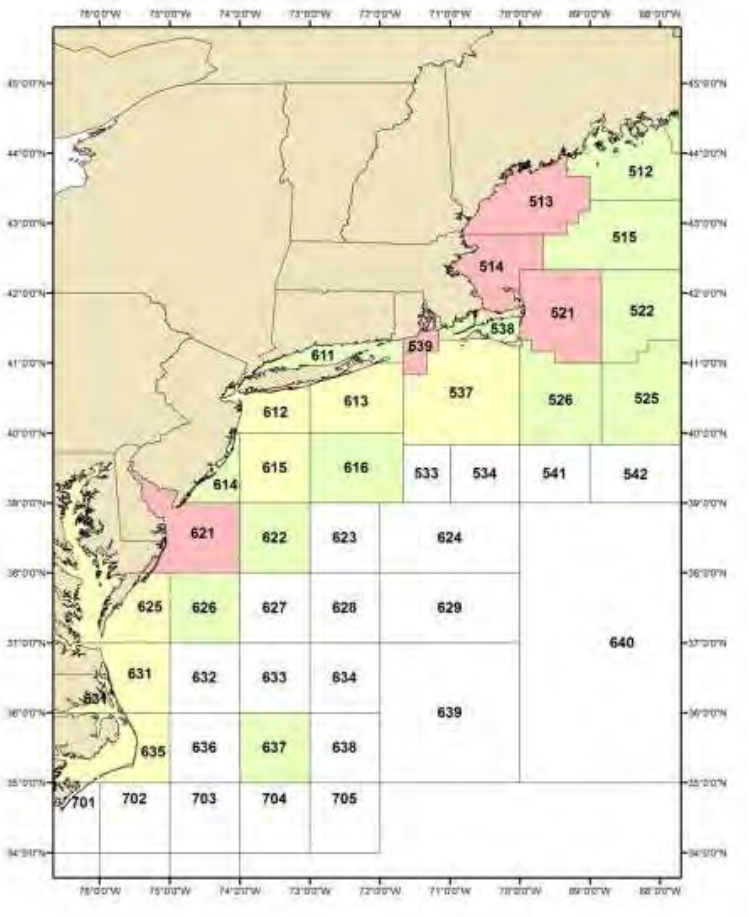

Figure 1. Reproduced from (MAFMC, 2014): Figure 12. NMFS Northeast statistical areas. Shaded areas indicate where spiny dogfish harvest occurred in 2012. Red areas comprise 5% or more of harvest, yellow areas 1% to 5% of harvest, and green areas less than 1%.

3.2.4 Areas

According to vessel trip report (VTR) data, fishing areas accounting for ~75% of spiny dogfish landings in 2012, correspond to five NMFS Northeast statistical areas: 514, 521, 513, 621 and 539 (MAFMC, 2014).

3.3 Principle One: Target Species Background

Spiny dogfish, *Squalus acanthias*, are distributed in the western North Atlantic from Labrador to Florida and are considered to be a unit stock in this region (Burgess 2002). During the colder months, spiny dogfish occur in coastal waters between North Carolina and Southern New England. In summer, dogfish migrate northward to the Gulf of Maine Georges Bank region and into Canadian waters (Jensen 1965). They tend to school by size and, when mature, by sex. Dogfish feed on many species of fish and crustaceans, but generally target the most abundant species (Link et al. 2002). In the Northwest Atlantic, maximum reported ages for males and females are 35 and 40 years, respectively (Nammack et al. 1982). The species bears live young, with a gestation period of about 18 to 22 months, and produce between 2 to 15 pups with an average of 6. Size at maturity for females is around 80 cm, but can vary from 78 cm to 85 cm depending on the abundance of females. (Natanson et al 2017, Sosebee 2005).

3.3.1 Taxonomic classification

Class: Chondrichthys
Order: Squaliformes
Family: Squalidae
Genus: *Squalus*
Species: *acanthias*

3.3.1 Biology

Distribution and Stock Structure

Spiny Dogfish (SD) is a cold water, coastal species found in all boreal and austral waters except the North Pacific where a closely related species *Squalus suckleyi* occurs (Compagno et.al. 2005, Ebert et al. 2013). In the western North Atlantic SD ranges from Labrador to Florida, but is most common from Nova Scotia to North Carolina (Burgess 2002, Castro 2011). Tagging experiments indicate that there is limited mixing of SD between the SW Scotian Shelf / Bay of Fundy off Canada and the Gulf of Maine off the U.S., and two largely separate stocks exist delineated by the Canada/USA border (Campana *et al*. 2007, TRAC Proceedings 2010). Consequently SD in US waters have been managed as a unit stock (MAFMC 1999). Recent satellite tracking studies of SD suggest that there may be two over-lapping stocks, one summering in the Gulf of Maine and wintering there and off southern New England, and another summering off southern New England and wintering off Virginia and North Carolina (Carlson et.al. 2014). These potential stocks have not been defined genetically, nor is it clear how this information might be used to improve the existing FMP.

Behavior

Spiny Dogfish are highly migratory, migrating from north to south in winter, and returning north in summer off the US (Nammack et. al. 1985, Rulifson 2010), and migrating offshore in winter and onshore in summer off Canada (Campana et.al.2007). The species occurs in large schools and exhibits

strong sexual segregation. Whereas juvenile males and females occur together, mature males and females are segregated with complex distribution patterns by depth and latitude which vary seasonally (Dell'Apa et. al. 2014, 2017, Sagarese et.al. 2014a, and 2014b). The species has been collected near shore to as deep as 730 m, although it is most commonly observed at depths of 50 m - 200 m; generally deeper in the winter. Primarily epibenthic, it is not known to associate with any particular bottom type or benthic habitat (McMillan &Morse 1999). Spiny Dogfish are also commonly observed throughout the water column, including often at the surface (Bigelow and Schroeder 1953, Carlson et.al. 2014), and may venture beyond the shelf edge over deep water (Carlson et.al. 2014).

Age and Growth

Growth in SD is slow and sexually dimorphic. Principle studies on age and growth of SD have been conducted by Nammack et al. (1985), Campana et.al. (2009), and Bubley et.al. (2011). Growth parameters from the von Bertalanffy growth equation from these three studies were summarized by Bubley et.al and are reproduced below in Table 8. Note the Nammack and Campana studies used the second dorsal spine as the aging structure, whereas the Bubley study (labeled Present) used the spine, but also used stained vertebral centra. The values for $L\infty$ for males ranged from 82.49 to 94.23 cm, and for females from 100.50 to 133.3 cm. These values are within the range of large SD and are reasonable with the exception of the high 133.35 value. The values for *k* for males ranged from 0.099 to 0.148, and for females from 0.042 to 0.121. These growth coefficients are low but typical for slower growing elasmobranchs (Goldman et. al. 2012). Observed longevity for sexes combined was 24-40 yrs. calculated longevity was 38.6 to 104 yrs. The latter value probably is excessive (Bubley et.al. 2011).

Table 8. Age and growth parameters from three studies in the western Atlantic (from Bubley et.al. 2011).

Study	Present		Nammack *et al*. (1985)	Campana *et al*. (2009)
Location	North-east U.S.A.	North-east U.S.A.	North-east U.S.A.	Eastern Canada
Structure	Vertebrae	Spines	Spines	Spines
Male				
L_∞	94·23	91·46	82·49	88·12
k	0·110	0·106	0·148	0·099
Female				
L_∞	100·76	107·17	100·50	133·35
k	0·121	0·081	0·107	0·042
Male and Female				
Observed longevity	24	28	40	31
Calculated longevity	38·6	53·4	40·5	104
L_{ST} at birth (cm)	25	25	24·9	30·35

Natural Mortality

Natural Mortality of SD was discussed and estimated in the 26th Stock Assessment Workshop at the NEFSC and is reproduced below (NEFSC 1998):

> As for most elasmobranchs, natural mortality (M) rates have not been estimated directly for spiny dogfish. Indirect estimates have been derived by analogy from life history parameters, notably, maximum longevity T"""". Assuming a 50-yr maximum age for spiny dogfish implies a natural mortality rate M of 0.083 in Hoenig's (1983) equation (In Z = 1.46 - 1.01 Tmax)... Silva (1993) solved for M by assuming a variety of density dependent mechanisms and derived the

natural mortality rate necessary to balance the population growth rate. Tmax was assumed to be 50 yr and M was computed as the level of mortality necessary to reduce the recruited population to 1% of its initial value. The derived M = 0.092, for spiny dogfish greater than 30 cm, agrees well with the empirical value from Hoenig's (1983) equation. The smoothing parameter from Equation 1 of 0.06 is consistent with most approaches that natural mortality is less than 0.1 for spiny dogfish.

Reproduction

Spiny dogfish reproduce with yolksac viviparity; the entire development of the embryos is supported by the yolk contained in the egg (Musick 2010). Gestation lasts from 19-24 months and is among the longest known in vertebrates. Litters range from 1-15, and are correlated in number with the size of the mother (Namack et.al. 1985). Females become pregnant immediately after parturition implying that sperm storage might occur in the oviducal gland (Hamlett et.al. 2005). Sperm storage is widespread among chondrichthyans and is an adaptation that uncouples the female reproductive cycle from the male spermatogenic and mating cycle, and is particularly valuable for species like SD that have strong sexual segregation (Conrath and Musick 2013). Regardless of sexual segregation SD also exhibit multiple paternity, another widespread feature in chondrichthyans (Verissimo et.al. 2011). Pupping occurs off southern New England from January to April (Natanson et.al. 2017).

Nammack et. al. (1985) found the median lengths and ages of maturity to be 79.9 cm and 12.1 years for females 59.9 cm and 6.0 years for males. Given the relatively late age to maturity and small litter sizes SD have a limited population increase rate and are vulnerable to rapid population decline in the face of high fishery mortality (Musick 1999). This fact was amply demonstrated by the rapid decline of the female stock in this fishery during the 1990s.

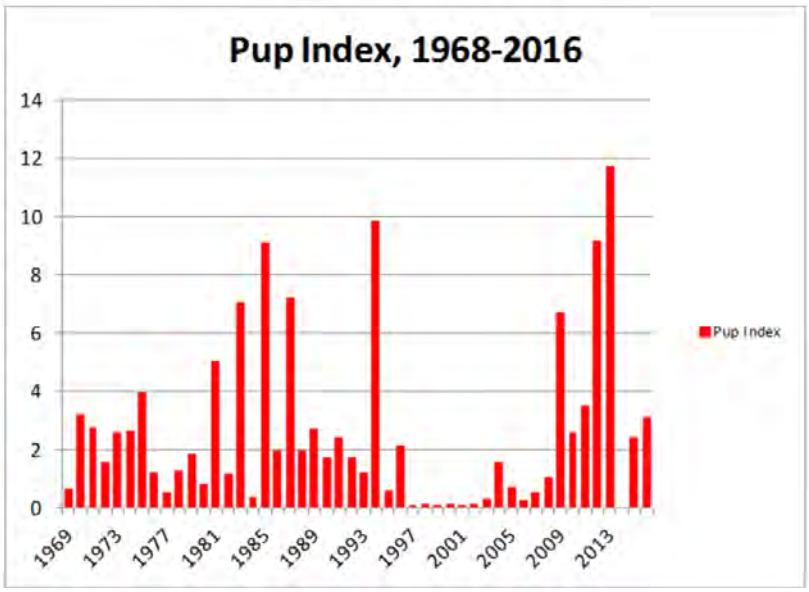

Figure 2. Index of abundance for neonate Spiny Dogfish, based on the NEFSC trawl surveys. *(MAFMC 2017a*)

Recruitment

Most females pup in late winter offshore, and the pup's nursery extends on the shelf edge from southern Georges Bank southwest into the southern Mid Atlantic Bight (Sagarese 2014a). As with most chondrichthyans there is a close female stock/recruit relationship. Thus when the fishery severely overfished mature female dogfish during the 1990s there was a concomitant collapse in recruitment Figure 2.

Catches

At the onset of the domestic commercial fishery in the early 1990's, population biomass for the Northwest Atlantic stock of spiny dogfish was at its peak (approx. 1.2 billion lb.). 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. The Spiny Dogfish FMP was developed in 1998 and implemented in 2000 in order to halt further reduction of mature female spiny dogfish and allow the stock to recover to a sustainable level. Because the directed commercial fishery concentrated on mature females, rebuilding required elimination of that directed fishery. The rebuilding program was successful and in 2010 NMFS declared the stock to be rebuilt (Figure 3) (MAFMC 2017a). Spiny Dogfish are a low value product, and the landings reflect market conditions. Note recent quotas have not been filled.

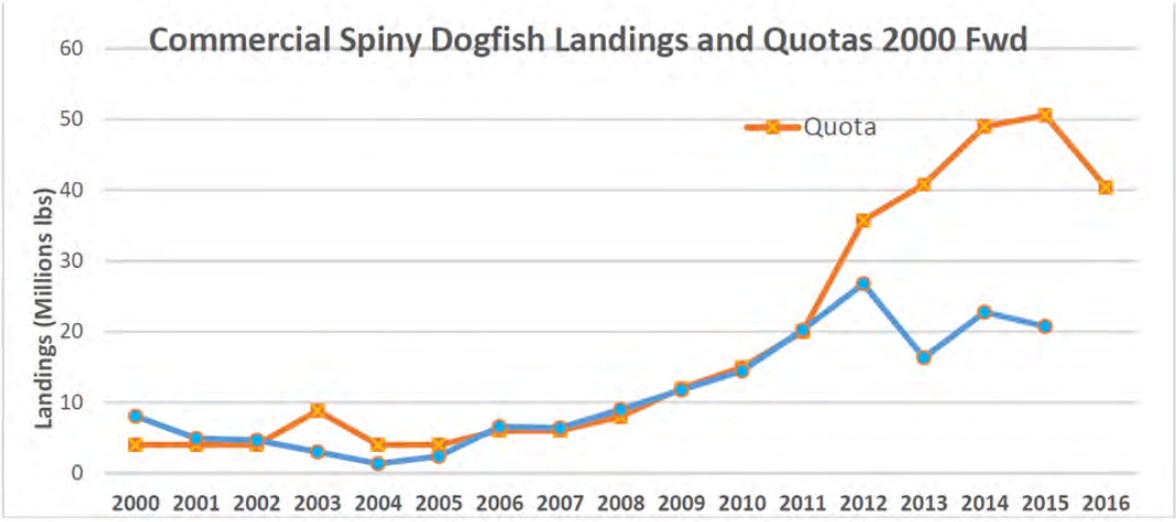

Figure 3. Commercial Spiny Dogfish Landings and quotas. The fishery was confined to bycatch quotas until 2010 to allow the stock to rebuild (MAFMC 2017a.)

Landings by UoC are given in Table 9 and were derived from MAFMC 2017a, table 4. UoC Gillnets includes Sink Gill Nets, Set Stake Gillnets, Drift Gillnets, and Runaround Gillnets. UoC Longlines includes Bottom Longline, Handlines Pelagic Longlines, but the last make only a minor contribution to the catch. UoC trawls include Bottom Otter Trawls of several mesh sizes.

Table 9. Landings (lbs) of UoCs by year

UOC	Gillnets	Longlines	Trawls
2013	12,123,902	1,413,175	1,202,915
2014	16,791,787	4,730,126	1,157,981
2015	13,741,559	4,182,896	846,502

Gillnets contribute the most to SD landings followed by longlines and trawls. Trawls were the most important gear during the 90s when SD were so severely overfished. The trawl fishery has been discouraged from participating in the present SD fishery by using restrictive trip limits.

Discarded bycatch of SD has been reported by Wigley et.al. (2016) (Fig 3.3.2.3) based on data from the Northeast Fisheries Observer Program (NEFOP), supplemented with Vessel Trip Reports (VTRs), Northeast Fisheries Science Center (NEFSC) commercial landings database, and the National Oceanic and Atmospheric Administration (NOAA) Marine Recreational Information Program (MRIP) database. The NEFOP collects a broad range of data including information on all species, by disposition (retained and discarded), that are encountered during a fishing trip as well as gear characteristics, economic information, and biological samples. The VTR data are used as a basis for defining the sampling frame, since most federally permitted vessels are required to file a VTR for each fishing trip. These self-reported data constitute the basis of the fishing activity of the commercial fleets. Whereas dealer data are the preferred data to use because of more accurate weights, VTR data are used as a surrogate because dealer data do not contain mesh size and area fished information. The VTR data were used to expand the NEFOP discard ratios to total discards. Wigley et al. (2016) found that the majority (over 93%) of observed trips both originated and fished in the same region and exhibited the same general pattern as in the VTR data. The variances and standard errors (SE) of the discard estimates were also derived. The CV was defined as the ratio of the standard error of the total discards divided by the total discards (Wigley et.al. 2016).

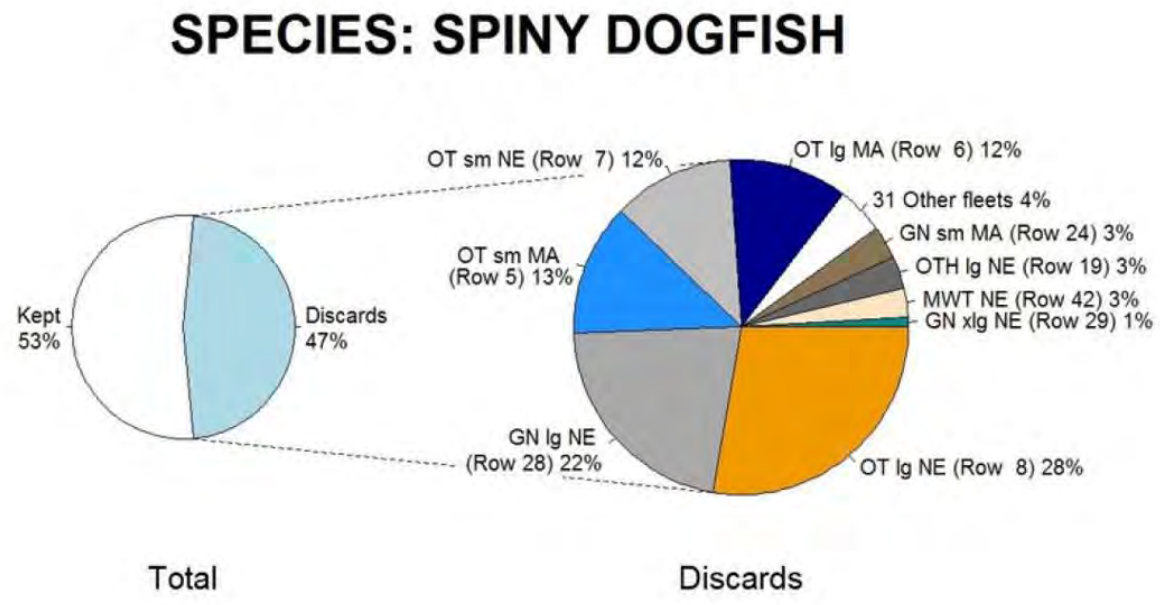

Figure 4. Bycatch (discards) of spiny dogfish by "fishing fleet" (gear type and area).

In Figure 4 row numbers refer to table 5a for SD in Wigley et.al. (2016) which contains the data upon which the figure is based. These will not be discussed further herein. The fleet abbreviations refer to: GN - gillnet, OT- otter trawl, MWT- midwater trawl, sm - small mesh (<5.50 in), lg- large mesh (5.50-7.99 in), xlg-extra-large mesh (> 7.99 in), MA- Mid Atlantic, NE- New England. Of an estimated catch of 30,770,625 lbs. between June 30 2014 and July 1 2015, 53% was retained and 47% was discarded. Of the discards 46 % were attributed to New England trawl fleets, 25% were attributed to Mid Atlantic

trawl fleets, 23% to New England gillnet fleets and 3% to Mid Atlantic gillnet fleets. These high discard rates are attributable to the low market value of SD and their high abundance.

3.3.3 Stock Assessment

Assessments of spiny dogfish are based on Northeast Fisheries Science Center (NEFSC) spring survey indices expanded to swept area biomass estimates. Uncertainty of the biomass estimates incorporates the sampling variability of the individual surveys, uncertainty in the area swept per tow, and inter-annual variation over a 3-year moving average. Reference points for spiny dogfish are based on the female spawning stock biomass (i.e., ≥ 80 cm) and the rate of fishing mortality applied to the fully vulnerable stock (Rago and Sosebee 2010). The biomass target is based on the relationship between indices of recruitment (≤ 36 cm) and spawning stock biomass (females ≥ 80 cm). A Ricker stock-recruitment relationship was used to estimate the relative biomass at which recruitment is maximized. The relative biomass can be rescaled to swept area biomass using a conversion factor based on the nominal average area swept per tow (Rago and Sosebee 2006, 2010). Because 2014 survey data were unavailable (research vessel problems) the Council's SSC utilized an alternative smoothing approach (Kalman filter) for survey data in 2015 (Figure 5) (MAFMC 2017a).

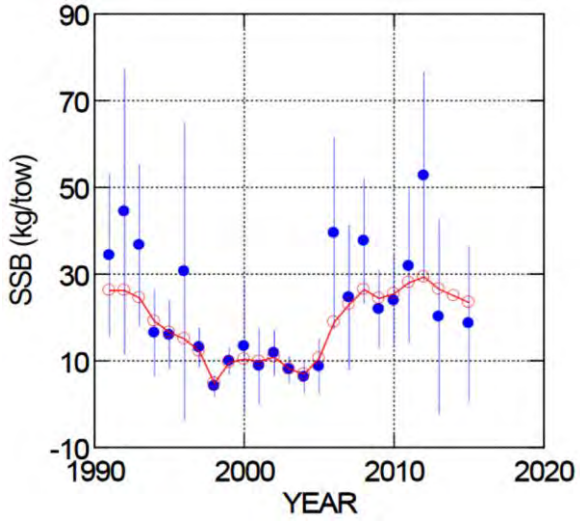

Figure 5. Spawning stock biomass estimates from NEFSC surveys. Blue dots are observed values. The redline connects the values derived from the Kalman Filter smoothing function

Biological reference points for fishing mortality are based on joint effects of size at entry into the fishery and the rate of fishing mortality applied to the fully-recruited size class. A life history model is used to estimate the size specific fishing mortality rate corresponding to a lifetime female production of 1.0—the rate at which each female is expected to replace itself in the next generation. Size-specific estimates of fishing mortality are based upon the relationship between the composite length-frequency distribution of landings and discards and the length frequency of the NEFSC spring trawl survey. The size-specific pattern of selectivity varies annually resulting such that the fishing mortality applied to the fully recruited size classes will also vary annually (Rago and Sosebee 2006).

A review by the NEFMC's Statistics and Scientific Committee (SSC) in 2011 was conducted to establish its endorsement of a fishing mortality reference point that defines when overfishing is occurring (Fmsy). The updated fishing mortality reference point provided by the NEFSC is Fmsy = 0.2439. All accountable sources of removals contribute to the estimate of fishing mortality (F) under the current assessment. For the most recent assessment year (2010), these include U.S. commercial landings (12.346 M lb), Canadian commercial landings (6 mt), U.S. dead discards (8.997 M lb), and U.S. recreational landings (46,297 lb). Total removals in 2010 were approximately 21.330 M lb corresponding to an F estimate of 0.09, well below Fmsy = 0.2439. In

updating the assessment, the NEFSC estimated a *100% probability that overfishing was not occurring* (F2010 < Fthreshold) (MAFMC 2017a).

The Bmsy reference point defines when the stock is rebuilt (above Bmsy) and overfished (below ½ Bmsy). For spiny dogfish, Bmsy (proxy) is the spawning stock biomass that maximizes recruitment (SSBmax) in a Ricker type (dome-shaped) stock-recruitment model. SSBmax is estimated to be 159,288 mt (351 M lb) with ½ of that target corresponding to the biomass threshold (79,644 mt; 175.5 M lb). In September 2011, the NEFSC updated their assessment of the spiny dogfish stock using catch data (2010), and results from the 2011 trawl survey. The updated estimate of SSB for 2011 was 169,415 mt (373.496 M lb), about 6% above SSBmax (159,288 mt). In updating the assessment, the NEFSC estimated a 100% probability that the stock is not overfished.

Spiny Dogfish stock assessments are conducted at Northeast Regional Stock Assessment Workshops (SAW). "SAW" is a formal scientific peer review process for evaluating and presenting stock assessment results to managers. The SAW protocol is used to prepare and review assessments for fish and invertebrate stocks in the offshore US waters of the northwest Atlantic. Assessments are prepared by SAW working groups (federally led assessments) or Atlantic States Maine Fisheries Commission technical assessment committees (state led assessments) and peer reviewed by an independent panel of stock assessment experts called the Stock Assessment Review Committee or "SARC". The SAW/SARC process began in 1985 and the SARC panel may accept or reject an assessment. Final SAW documents include a Stock Assessment Report, a Stock Assessment Summary Report and the SARC panelist reports. Final SAW assessment reports are published by the NEFSC online at http://www.nefsc.noaa.gov/publications/ and http://www.nefsc.noaa.gov/nefsc/saw/.

3.3.4 Management

In federal waters, Spiny Dogfish are managed jointly by the Mid-Atlantic and New England Fishery Management Councils under a single fishery management plan. An open access commercial dogfish permit is required to possess, land, or sell dogfish. The primary management tool is the specification of an annual catch limit (ACL). Under the Magnuson-Stevens Act, the Annual Catch Limit must be set less than or equal to the Acceptable Biological Catch (ABC) (to account for management uncertainty), which must be set less than or equal to the Overfishing Level (OFL) (to account for any scientific uncertainty in the stock assessment) (MAFMC 2017a). The current (May 1, 2016 – April 30 2019) quotas are derived from the recommendations of the Council's Scientific and Statistical Committee (SSC) for Acceptable Biological Catch (ABC), and how various components of fishing mortality are handled by the spiny dogfish fishery management plan. Note that Canadian Landings which were a concern in the original MSC Assessment (Kulka et. al. 2012) are negligible presently (Table 10).

Table 10. May 2016 to April 2019 Spiny Dogfish Specifications (MAFMC 2017a).

Specifications	Basis	2016 (pounds)	2016 (mt)	2017 (pounds)	2017 (mt)	2018 (pounds)	2018 (mt)
OFL	Projected Catch at Fmsy	64,414,664	29,218	na	na	na	na
New ABCs	Council Risk Policy	52,066,572	23,617	50,805,528	23,045	49,901,633	22,635
Canadian Landings	= avg last 3 years (10,11,12)	143,300	65	143,300	65	143,300	65
Domestic ABC	= ABC – Canadian Landings	51,923,272	23,552	50,662,228	22,980	49,758,333	22,570
ACL	= Domestic ABC	51,923,272	23,552	50,662,228	22,980	49,758,333	22,570
Mgmt Uncert. Buffer	Ave pct overage since 2011	0	0	0	0	0	0
ACT	= ACL - mgmt uncertainty	51,923,272	23,552	50,662,228	22,980	49,758,333	22,570
U.S. Discards	=3 year average 12-13-14	11,494,167	5,214	11,494,167	5,214	11,494,167	5,214
TAL	ACT – Discards	40,429,105	18,338	39,168,060	17,766	38,264,165	17,356
U.S. Rec Landings	= 2014 estimate	68,343	31	68,343	31	68,343	31
Comm Quota	TAL – Rec Landings	40,360,761	18,307	39,099,717	17,735	38,195,822	17,325

OFL = Overfishing Level; ABC = Acceptable Biological Catch; ACL = Annual Catch Limit; ACT = Annual Catch Target; TAL = Total Allowable Landings; Rec = Recreational; Comm = Commercial.

3.4 Principle Two: Ecosystem Background

All species that are affected by the fishery and that are not part of the Unit of Certification are considered under Principle 2. This includes species that are retained for sale or personal use (assessed under Performance Indicator 2.1), bycatch species that are discarded (Performance Indicator 2.2), and species that are considered endangered, threatened or protected by the government in question or are listed by the Convention of International Trade of Endangered Species (CITES) (Performance Indicator 2.3). This section contains an evaluation of the total impact of the fishery on all components in P2 and includes both observed and unobserved fishing mortality. Unobserved mortality may occur from illegal, unregulated or unreported (IUU) fishing, biota that are injured and subsequently die as a result of coming in contact with fishing gear, ghost fishing, waste, or biota that are stressed and die as a result of attempting to avoid being caught by fishing gear. This section also considers impacts on marine habitats (Performance Indicator 2.4) and the ecosystem more broadly (Performance Indicator 2.5).

3.4.1 Overview of Non-target Catch

Retained species

These are species retained due to their commercial value or due to management rules controlling discard of catch. When these species are commercially important they tend to be harvested under some management regime, sometimes there are also available reference points.

Bycatch species

Bycatch species are those that have been taken incidentally and are returned to the water, usually because they have no commercial value. Bycatch species are also considered to be all species that are out of scope of the standard (birds/ mammals/ reptiles/ amphibians) and that are not ETP species. These types of species could in some cases represent incidental catches that are undesired but somewhat unavoidable in the fishery. Given the often unmanaged status of these species, there are unlikely to be reference points for biomass or fishing mortality in place, as well as a general lack of data availability.

Main species

For Primary and Secondary species, species may be considered “Main” based on either resilience/ vulnerability and catch volume. Species that are not “Main” are Minor. Main and Minor species must meet different Performance Indicators (PIs) in P2.

Resilience/vulnerability: If the species is considered "less resilient" and it is ≥ 2% of the catch, then it is considered Main, otherwise it is considered Minor.

Following SA3.4.2.2 (MSC CR v2.0) one or both of the following criteria were used to determine whether a species should be classified as ‘Less resilient’:

i. The productivity of the species indicates that it is intrinsically of low resilience, for instance, if determined by the productivity part of a PSA that it has a score equivalent to low or medium productivity; or

ii. Even if its intrinsic resilience is high, the existing knowledge of the species indicates that its resilience has been lowered due to anthropogenic or natural changes to its life-history.

Resilience is assessed based on the species "life history characteristics and the risk to the stock from anthropogenic activities, not the actual impact of the UoA on the stock. The latter is assessed instead under the respective Outcome PIs."

In addition, the productivity part of the PSA may be used as both a precautionary and robust method of quickly determining the intrinsic resilience of a species, in cases where it scores either low or medium productivity (MSC CR V2.0 GSA3.4.2.2)

Catch volume: If the species is not considered "less resilient" and it is ≥ 5% of the catch, then it is considered Main, otherwise, it is considered Minor.

Designation of Species

The analysis for P2 is made considering that the UoAs and the UoCs are the same for the three UoA: US Northeast and Mid-Atlantic gill net fleet, US Northeast and Mid-Atlantic bottom trawl fleet and Northeast bottom longline fleet.

The information for the P2 species designation was obtained from two main sources: the Standardized Bycatch Reporting Methodology (SBRM) annual report and the Northeast Fisheries Observer Program (NEFOP) database. The SBRM provides estimated discards for 14 federally managed species for fleets grouped broad gear types and in New England (NE) and Mid-Atlantic (MA) regions. The SBRM reports provide estimated total discards by the fleets; NEFOP discard ratios are expanded to the grouped fleets using Vessel Trip Report (VTR) (Wigley and Tholke, 2017). A complete description of the methodology may be found in the 'Methods' section of the report (https://www.nefsc.noaa.gov/publications/crd/crd1707/crd1707.pdf).

The team also requested information directly from the NEFOP database, in order to evaluate species that were not included in the group of the 14 federally managed species found in the SBRM reports. Information was requested for five years (2012 to 2016) to take into account the variability of the catch composition. Information provided included gear code, catch retained and discarded and fishing region (NE/MA). The team used the average catch composition from the 5 years of available data to designate 'main' species, based on the 5% or 2% weight thresholds. Since the NEFOP database only provides information for the observed trips, the team also used the SBRM reports that contain information at the fleet level to crosscheck the species designation and to assess impact of the fishery on the P2 species.

The NEFOP database recorded close to 50 different species for bottom longline, over 130 species for gill net and ~145 for bottom trawl. Those species for which all or part of the catch was retained were categorized as 'Retained', species for which all catch was discarded were categorized as 'Bycatch'. For retained species with large volumes of discards, the team used estimated discard mortality according to gear type to calculate estimated catch/mortality.

Table 11 summarizes species under the 'Retained' class that were above the 5% and 1.5% catch thresholds, and indicates which species were categorized as 'main' for the assessment; on basis of

catch volume and resilience/vulnerability. Across the three UoA there was a total of nine 'main' retained species. Winter skate was categorized as 'main' on both gillnet and otter trawl UoAs. Species categorized as main in the gill net UoA included: monkfish and pollock; the otter trawl UoA included: little skate, scup, silver hake, and redfish; and the bottom longline UoA included; tilefish and haddock.

Table 11. Summary of Non-target Species Categorized for Evaluation by UoA, based on averages of catch from 2012-2016. Only species representing an average of >1.5% of catch of the UoA are included.

Common name	Scientific name	RBF	Less Resilient	Avg. % UoA Catch	MSC Classification
Gill net UoA					
Winter Skate	*Leucoraja ocellata*	No	Yes	25.5%	Retained - main
Monkfish	*Lophius americanus*	No	No	4.0%	Retained - main
Pollock	*Pollachius virens*	No	No	6.2%	Retained - main
Atlantic Cod	*Gadus morhua*	No	No	3.9%	Retained-minor
White Hake	*Urophycis tenuis*	No	No	1.4%	Retained-minor
American Lobster	*Homarus americanus*	No	No	1.9%	Retained-minor
Otter Trawl UoA					
Skate, Little	*Leucoraja erinacea*	No	Yes	10.7%	Retained - main
Scup	*Stenotomus chrysops*	No	No	6.1%	Retained - main
Skate (Not Known)[1] Either Little skate or Winter Skate	*Rajidae*	No	Yes	5.9%	Retained - main
Winter Skate	*Leucoraja ocellata*	No	Yes	4.8%	Retained - main
Silver Hake	*Merluccius bilinearis*	No	No	5.9%	Retained - main
Acadian Redfish	*Sebastes fasciatus*	No	Yes	5.2%	Retained - main
Atlantic Herring	*Clupea harengus*	No	No	2.5%	Retained-minor
Longfin Squid	*Doryteuthis (Amerigo) pealeii*	No	No	2.8%	Retained-minor
Monkfish	*Lophius americanus*	No	No	3.5%	Retained-minor
Butterfish	*Peprilus triacanthus*	No	No	2.0%	Retained-minor
Red Hake	*Urophycis chuss*	No	No	3.5%	Retained-minor
Summer Flounder	*Paralichthys dentatus*	No	No	3.3%	Retained-minor
Winter Flounder	*Pseudopleuronectes americanus*	No	No	2.4%	Retained - minor
Atlantic Cod	*Gadus morhua*	No	No	1.9%	Retained-minor
Bottom Longline					
Tilefish	*Lopholatilus chamaeleonticeps*	No	Yes	33%	Retained - main

[1] The assessment team scored skates not identified to the species level, as either skate Little or Winter skate. Based upon NMFS port sampling data, over 98 percent of skate wing fishery landings are composed of Winter Skate. Similarly, approximately 90 percent of skate bait landings are composed of Little Skate.

All species classified as 'Bycatch' are caught in volumes at <2% of total UoA catch by weight, and thus were categorized as 'minor'. A complete list of main and minor species assessed can be found in Appendix 8.7.1 Catch Summary.

Species categorized as "Less Resilient" in Table 11 was assessed using the productivity pat of the MSC Productivity Susceptibility Analysis (PSA). Species that score equivalent to low or medium productivity were categorized as "Less Resilient" (MSC CR v2.0 SA3.4.2.2). Information to evaluate species was obtained from FishBase (Froese and Pauly Eds.)

Species categorized as 'minor' automatically achieve SG80, and are only required to meet requirements at the 100 SG levels. Since there were a high number of 'minor' species, the team elected not to score minor species at SG100 as individuals, but instead used an 'all or none' approach to scoring. If any of the minor species, didn't achieve 100, then all of the minor species stay at SG80. For minor species the team recorded whether the minor species achieved SG80 as a group.

3.4.2 Management of Retained Species

Management

Management of main P2 species falls under the same management system as for the P1 species. In federal waters, retained species are managed by the Mid-Atlantic or New England Fishery Management Councils under various fishery management plans. In state waters species are managed by the ASMFC under complimentary FMPs. Commercial permits are required to possess, land, or sell managed species. The primary management tool is the specification of an annual catch limit (ACL). The ACL is determined through periodic stock assessments conducted at Northeast Regional Stock Assessment Workshops (SAW). "SAW" is a formal scientific peer review process for evaluating and presenting stock assessment results to managers. The SAW protocol is used to prepare and review assessments for fish and invertebrate stocks in the offshore US waters of the northwest Atlantic. Assessments are prepared by SAW working groups (federally led assessments) or Atlantic States Maine Fisheries Commission technical assessment committees (state led assessments) and peer reviewed by an independent panel of stock assessment experts called the Stock Assessment Review Committee or "SARC". The SAW/SARC process began in 1985 The SARC panel may accept or reject an assessment. Final SAW documents include a Stock Assessment Report, a Stock Assessment Summary Report and the SARC panelist reports. Final SAW assessment reports are published by the NEFSC online at http://www.nefsc.noaa.gov/publications/ and http://www.nefsc.noaa.gov/nefsc/saw/.

Under the Magnuson-Stevens Act, the Annual Catch Limit (ACL) must be set less than or equal to the Acceptable Biological Catch (ABC) (to account for management uncertainty), which must be set less than or equal to the Overfishing Level (OFL) (to account for any scientific uncertainty in the stock. Quotas are derived from the recommendations of the Council's Scientific and Statistical Committee (SSC) for Acceptable Biological Catch (ABC), and how various components of fishing mortality are handled by the various FMPs

Information

Fishery Dependent Monitoring (VTR, Dealer Data)

From the 3rd MSC surveillance report for the U.S. Atlantic Spiny Dogfish Fishery (Mateo et al. 2016)

> The primary responsibility for the collection of fishery dependent information from commercial fishery operations for most federally managed species from Maine through Virginia lies with The Fisheries Data Services Division (FDSD) in the Northeast Region of NMFS. For some species this responsibility extends throughout the entire range of the commercial fisheries on the Atlantic and Gulf coasts of the United States. In addition, the FDSD has responsibility for establishing quality standards for fisheries dependent data collections that are managed by the Northeast Regional Office, improving the quality of fishery dependent data and the collection of biological information from commercial catches.
>
> The FDSD acquires data through mandatory reporting programs to provide timely and accurate landings and effort data on the federally regulated fisheries in the northeast for in-season management and analysis. Tasks include dockside collection of catch data, biological samples from commercial fishing trips, and producing finished data products to support fisheries management and scientific analyses (NMFS FDSD 2015).

NMFS has the authority to close fisheries should quotas be exceeded. In addition each FMP includes Accountability Measures that may be invoked to offset overages from previous years.

Observer Programs

Catch and discard data in the fishery are collected by onboard NMFS Fisheries Observers. The (current) Standardized Bycatch Reporting Methodology has been effective for the NEFMC as of July 20 2015. An annual "Discard Estimation, Precision, and Sample Size Analyses for 14 Federally Managed Species Groups in the Waters off the Northeastern United States" is produced. Sea turtles are additionally considered within scope of the SBRM reporting and observer needs evaluation. The annual report describes analyses associated with discard estimation from July -June of the previous year for the 14 federally managed fish and invertebrate species groups. It also provides the expected coverage needed by at-sea observers for the following year (April -March) using the SBRM, where coverage needed is that that can provide for a precision-based performance standard (30% coefficient of variation of the discard estimate). The sea day analyses use a standardized protocol to account for the importance of the discarded species relative to the amount of discards by each fleet and total fishing mortality. (Wigley & Tholke 2017):

Data sources used in the SBRM report include (Wigley & Tholke 2017):

- Northeast Fisheries Observer Program3 (NEFOP) database
- Observed hauls with a 'complete' sampling protocol: includes species weights for both kept and discarded portions of all species in the catch.
- Vessel Trip Report (VTR; including logbooks from the surfclam [*Spisula solidissima*] and ocean quahog [*Arctica islandica*] fishery) database
- Northeast Fisheries Science Center (NEFSC) commercial landings database
- National Oceanic and Atmospheric Administration Marine Recreational Information Program (MRIP) database.

Trips are partitioned into non-overlapping fleets based on 5 variables:

- Geographic region:
  - New England (NE): departure ports from Maine to Rhode Island
  - Mid-Atlantic (MA): departure ports from Connecticut to northern North Carolina
  - (Note: previous studies have found that >93% of observed trips demonstrate that trips originate and fish in the same region, and VTRs align with this finding.
- Gear type
- Mesh size groups are defined for otter trawl and gillnet only
  - Otter trawls: small mesh (<5.5in) and large mesh (>5.5in)
  - Gillnets: small (mesh less than 5.50 in), large (mesh from 5.50 to 7.99 in), and extra-large (mesh 8.00 in and greater)
- Access area: access area (AA) and open (OPEN)
- Trip category: the sea scallop fishery was divided into general (GEN) and limited (LIM) category trips; All other fisheries were combined into a category called “all.”

The analysis also uses calendar quarters to analyze seasonal variations in fishing activity and discard rates.

VTRs form the basis for the sampling frame definitions and are used to extrapolate NEFOP discard ratios to total discard estimates, as these are required for all federal commercial fishing trips (with the exclusion of the commercial lobster fishery). The clam fishery has an additional logbook system separate from the VTR- this was used to augment the VTR data for the clam dredge fishery. Dealer data is understood to have more accurate weights, but lacks detail such as mesh size and area fished.

Observer coverage representativeness is evaluated both temporally and spatially based on a kept weight ratio. Discard ratios are calculated and there are no survival ratios applied. Data from adjoining strata are pooled to develop estimates for cells with <3 trips. 3 trips for fleet-quarter are considered a minimum threshold for allocating observer coverage. At-sea observers record fish dispositions, and the SBRM considers 6 discard categories: no market, regulation (size), regulation (quota), regulation (other), poor quality, and other. (Wigley & Tholke 2017)

Observer Day Allocation under the SBRM

The SBRM determines the sea days needed for fish/invertebrates and loggerhead turtles combined for the following April-March. This is calculated based on integration of sea turtle and fish/invertebrate sea day determinations using VTR days. Sea turtle days (loggerhead) are determined on a more general gear basis, so in order to arrive at a fleet-specific allocation comparative to the fish/invertebrate allocation, overall VTR days are used to arrive at proportionate allocation of sea turtle days amongst the fish/invertebrate gear classification. Then, the larger of the 2 sea day needs (adjusted fish/invertebrate versus loggerhead) for each fleet is used to arrive at a total number of observer sea days needed. The calculated days needed are then compared to funding availability. If there isn’t sufficient funding available, prioritization of days occurs. According to the 2017 report, funding is sufficient and no prioritization is necessary (NEFSC 2017e)

Agency funders are comprised of five categories: Atlantic Coast Observers, National Observer Program, Northeast Fisheries Observers, Marine Mammal Protection Act (MMPA), and Reducing Bycatch. Agency funded days that are considered applicable to protected species (MMPA, sea turtles, and ESA-listed fish) only- require specific sampling protocols for protected species such that information collection on finfish and shellfish is not practicable. Some "day" funding is also allocated to support data analysis. The remaining agency-funded days are then subject to prioritization across all fleets. Industry funded days are dedicated to the scallop fishery (NEFSC 2017e).

3.4.3 Status of Main Retained Species

Skate Complex

Skate landings have two components, one focused on larger skates to cut wings, and the other focused on small skates for bait in other fisheries. Based upon NMFS port sampling data, over 98 percent of skate wing fishery landings are composed of Winter Skate. Similarly, approximately 90 percent of skate bait landings are composed of Little Skate, with the remainder being largely comprised of juvenile Winter Skates.

Winter and little skates are managed as part of a skate complex with six other species under the New England Fishery Management Council's Skate Fishery Management Plan. The proposed overfishing definitions included in the northeast skate FMP proposes establish fishing mortality thresholds for all seven skate species based on a percentage decline in the NEFSC trawl survey. The status of skate overfishing is determined based on a rate of change in the three year moving average from NEFSC Groundfish Survey biomass. Overfished definition for both Little and Winter skate is "When the 3-year moving average of the spring survey mean weight per tow is less than one-half of the 75th percentile of the mean weight per tow observed in the spring trawl survey from the selected reference time series." (NEFSC 2016, NMFS 2017c, NEFMC 2017a).

Table 12. Overfishing Definition Reference Points and status for Winter skate and Little skate (Modified from Northeast Skate Complex)

Skate Species	B/BMSY or B/BMSY Proxy	Biomass Threshold (kg/tow)	Biomass (2016) (kg/tow)	Overfished/Overfishing
Winter	5.66	2.83	5.35	No/No
Little	6.15	3.07	5.64	No/No

Winter Skate (Big Skate)

Winter Skate (*Leucoraja ocellata*) occurs from the south coast of Newfoundland and the southern Gulf of St. Lawrence to Cape Hatteras Its center of abundance is on Georges Bank and in the northern section of the Mid-Atlantic Bight (Packer et.al. 2003a). As with all skates (Rajiformes), Winter Skates lay benthic, leathery egg cases, usually two at a time. Incubation extends over several weeks (Musick and Ellis 2005). Egg deposition occurs during summer and fall off Nova Scotia and probably in the Gulf

of Maine as well. Egg deposition continues into December and January off southern New England. Winter skates are one of the larger skates in the Gulf of Maine, with a maximum known size of 150 cm TL size and age at maturity is ca. 78 cm and seven years (Packer et.al. 2003). Winter Skate is not overfished nor is overfishing occurring (NEFSC 2016, NMFS 2017c, NEFMC 2017a).

Little Skate

Little Skate (*Leocoraja erinaces*): (formerly *Raja erinacea*), occurs from Nova Scotia to Cape Hatteras and is one of the dominant members of the demersal fish community of the northwest Atlantic (Bigelow and Schroeder 1953, McEachran and Musick 1975). Its center of abundance is in the northern section of the Mid- Atlantic Bight and on Georges Bank, where it is found year-round over almost the entire range of temperatures recorded for those areas (McEachran and Musick 1975). The egg cases are laid in pairs. Development takes 6-12 months depending on water temperature. Maximum observed length from NEFSC surveys was 62 cm TL, and length and age at maturity were estimated at 50 cm TL and 4 years (Packer et al. 2003b). Skate landings have two components, one focused on larger skates to cut wings, and the other focused on small skates for bait in other fisheries. Little skate are not overfished nor is overfishing occurring (NEFSC 2016, NMFS 2017c, NEFMC 2017a).

Monkfish (Goosefish)

The Monkfish (*Lophius americanus)* is a member of the family Lophiidae or anglerfishes. It is a widely distributed benthic fish that occurs in the Northwest Atlantic Ocean from the northern Gulf of St. Lawrence southward to Cape Hatteras, North Carolina. The species inhabits waters from the tide-line to depths as great as 840 m (Markle and Musick 1974). Maximum ages observed based on examination of vertebral annuli were 9 and 11 years for males and females, respectively. Males and females exhibited similar growth patterns up to age four, thereafter females were slightly larger than males with the difference becoming more pronounced at the oldest ages observed (Armstrong et al. (1992). The length and age of 50% maturity (L50) is 36.9 cm and three years for males and 48.7 cm (4-5 years) for females. Spawning occurs in May and June from Cape Hatteras to Southern New England.

Monkfish are managed through the NEFMC Monkfish FMP. They are neither overfished nor is overfishing occurring (NEFMC 2017b).

Table 13. Overfishing Definition Reference Points and status for Monkfish (Modified from https://www.greateratlantic.fisheries.noaa.gov/sustainable/species/monkfish/index.html=

Stock	Overfishing?	Overfishing Definition	Overfished?	Overfished Definition	Rebuilding Program Progress	F/F_{MSY}	Fishing Mortality Rate (F)	B/B_{MSY} or B/B_{MSY} Proxy	Biomass
Monkfish Northern	No	When F exceeds $F_{THRESHOLD}$, which is set equal to F_{MAX}, which is currently estimated at F=0.43	No	When total stock biomass is less than 1/2 Bmax	None, declared rebuilt	.44	.10	1.29	66,062 mt

Monkfish Southern	No	When F exceeds $F_{THRESHOLD}$, which is set equal to F_{MAX}, which is currently estimated at F=0.46	No	When total stock biomass is less than 1/2 Bmax	None, declared rebuilt	.37	.07	1.11	131,218 mt

Pollock

Pollock (*Polachius virens*) is closely related to both cod and haddock and is part of the Gadid family of fish. It is found throughout a similar range to both cod and haddock, occurring throughout the coastal and continental shelf region of the North Atlantic. In the Northwest Atlantic it ranges from Greenland to North Carolina, in both inshore and offshore areas, typically forming shoals (Collette and Klein-MacPhee 2002). Average fecundity is 220,000 eggs per female, but large fish may lay up to 4,000,000 eggs (Cohen et al. 1990). Pollock typically reach complete sexual maturity by age six. Spawning occurs from November through February with a peak in December. There is a major spawning area in the western Gulf of Maine and on Georges Bank, and several areas on the Scotian Shelf. The von Bertalanffy growth coefficient (k) for Atlantic Pollock ranges between 0.07 and 0.17 (Fishbase 2017). Polllock can grow to over 3-1/2 feet long and 35 pounds and can live up to 23 years. The species is managed through the NEFMC Northeast Multispecies FMP (NEFMC 2017c). Pollock was recently certified by the MSC in the US Gulf of Maine and Georges Bank haddock, pollock and redfish trawl fishery (DeAlteris and Allen, 2018). Pollock is neither overfished nor is overfishing occurring (NFSC 2015).

Table 14. Comparison of biological reference points for pollock estimated in the 2014 assessment and from the current base model and flat sel sensitivity model. An FMSY proxy of F40% was used for the overfishing threshold, and was based on long-term stochastic projections. FMSY is reported as the age 5 to 7 average F. Recruits represent the median of the predicted recruits. Intervals shown are 5th and 95th percentiles. Table reproduced from NEFSC 2015

	2014 base	2014 flat sel sensitivity	base	flat sel sensitivity
FMSY	0.273	0.245	0.277	0.252
SSBMSY (mt)	76,879	51,140	105,226	54,900
MSY (mt)	14,791	10,491	19,678	10,995
Median recruits (age 1) (000s)	17,622	10,806	25,299	12,879
Overfishing	No	Yes	No	No
Overfished	No	No	No	No

Scup (Porgy)

Scup (*Stenotomus chrysops*) is a demersal, schooling species distributed in the Mid Atlantic Bight from Cape Cod, MA to Cape Hatteras, NC. Previous tagging studies have indicated the possibility of two

stocks, one in Southern New England waters and the other extending south from New Jersey. However, the lack of definitive tag return data from these studies, coupled with distributional information from NEFSC trawl surveys, support the concept of a single unit stock from New England to Cape Hatteras. Scup undertake extensive migrations between coastal waters in summer and offshore waters in winter, migrating north and inshore to spawn in spring. Sexual maturity is essentially complete by age 3 at a total length of 21 cm (MAFMC 2017b). Scup attain a maximum fork length of about 40 cm, and ages of up to at least 14 years. U.S. commercial and recreational fisheries for scup are managed under the under the Summer Flounder, Scup and Black Sea Bass Fishery Management Plan (FMP) administered jointly by the Atlantic States Marine Fisheries Commission (ASMFC) and the Mid-Atlantic Fishery Management Council (MAFMC). The principal gear used in commercial fishing for scup is the otter trawl. The recreational rod-and-reel fishery for scup harvests a significant proportion of the total catch. The most recent scup benchmark stock assessment took place in 2015 and found that scup were not overfished and overfishing was not occurring in 2014 (ASMFC 2016):

> The reference points are F MSY =F40% = 0.220. F40% is the rate of fishing that will result in 40% of the spawning potential of an unfished stock. The spawning stock biomass target is equal to SSB40% = 87,302 mt or 192.47 million pounds. The 2015 stock assessment indicates the 2014 F was 0.127 and SSB was 403 million pounds, therefore overfishing is not occurring and the stock is rebuilt

Spawning stock biomass was estimated to be about 210% of the target biomass. Fishing mortality in 2014 was estimated to be about 57% of the overfishing threshold. A data update with information on scup fishery catch, landings, and discards, as well as Northeast Fisheries Science Center (NEFSC) and state survey catches indicated that through 2015 scup biomass continued to be high, relative exploitation ratios remained low, and the 2015 year class appeared to be large (MAFMC 2017b).

Silver Hake (Whiting)

Silver Hake (*Merluccius bilinearis*) occurs on the Northwest Atlantic coast from southern Newfoundland to South Carolina. Length at maturity = 23.2 cm, Max length = 76.0 cm T, common length = 37.0 cm TL (male), common length = 65 cm TL (female), max. published weight = 2.3 kg , max. reported age = 12 years (Fish Base 2017). Silver Hake exhibit seasonal onshore-offshore migrations. Spawning takes place from June-July in the mid-Atlantic region; July-August in the Gulf of Maine and to the north of Georges Bank, and August-September on the Scotian Shelf. Silver Hake are managed by the NEFMC under the Small Mesh Multispecies FMP as two stocks; a Northern Stock in the Gulf of Maine and on northern Georges Bank, and a Southern Stock on southern Georges Bank and the Mid-Atlantic. The norther stock silver hake overfishing definition uses a relative exploitation index (total landings divided by NEFSC autumn survey biomass index) as a proxy for fishing mortality. The stock is overfished nor is overfishing occurring (NEFMC 2013):

> In both stocks of silver hake , the three year average fall biomass index (15.72kg/tow in the north vs 1.70kg/tow in the south) are both well above the overfished management threshold (3.21 kg/tow in the north vs 0.83kg/tow in the south), influenced by the recent observed increases in the fall survey trends. The exploitation index measured as the ratio of catch to survey has remained consistently low since the previous benchmark assessment and well below (0.14 kt/kg in the north vs 3.86 kt/kg in the south) the management overfishing

definition thresholds (2.78 kt/kg in the north vs 34.17 kt/kg in the south). Hence both stocks of silver hake are not overfished and overfishing is not occurring

Acadian Redfish

The Northwest Atlantic redfish consists of a complex of three species identified *as Sebastes mentella*, *S. fasciatus* and S. *marinus*. This assessment refers to Acadian Redfish (*S. mentella*), with a distribution ranging from the Gulf of Maine, northwards off Nova Scotia and southern Newfoundland Banks, in the Gulf of St. Lawrence and along the continental slope and deep channels from the southwestern Grand Bank to areas as far north as Baffin Island. Acadian Redfish are also present in the area of Flemish Cap and west of Greenland. Acadian Redfish is the species most common along the coast of New England and in the Gulf of Maine. Redfish mature at a late age (5 to 6 years) and have low reproductive rates. Acadian Redfish mate in late autumn and early winter. Redfish give birth to live young, and fertilization, incubation, and hatching of eggs all occur within the female's body. Eggs are not fertilized until spring and then incubate for 45 to 60 days. Females release their hatched larvae in late spring through July and August. Females generally produce between 15,000 and 20,000 larvae per spawning cycle. Redfish is long-lived (the oldest recorded age is 58 years (NEFSC 2017c), slow growing and believed to have a 50% maturity rate at five years old when it is about eight inches long (O'Brien et al. 1993). Females typically grow larger and live longer than males (NEFSC 2017c). Acadian Redfish are managed by the NEFMC under the Northeast Multispecies Large mesh FMP and are not overfished nor is overfishing occurring.

Table 15. Comparison of biological reference points for Acadian redfish estimated in the 2012 assessment and from the current assessment update. An FMSY proxy of F50% was used for the overfishing threshold, and was based on long-term stochastic projections. Recruits represent the median of the predicted recruits from 1969 to the final assessment year. Intervals shown are 5th and 95th percentiles. Table reproduced from NEFSC 2015

	2012	Current
FMSY proxy	0.038	0.038
SSBMSY (mt)	238,480	238,480 (201,740-376,533)
MSY (mt)	8,891	10.466(7,458-14,081)
Median recruits (age 1) (000s)	22,477	31,391
Overfishing	No	No
Overfished	No	No

Golden Tilefish

Golden tilefish (*Lopholatilus chamaeleonticeps)* is found along the outer continental shelf and slope from Nova Scotia, Canada to Surinam on the northern coast of South America in depths of 250 to 1500 feet. In the southern New England/mid-Atlantic area, tilefish generally occur at depths of 250 to 1200. feet and at temperatures from 48°F to 62°F or 8.9°C to 16.7°. The oldest fish reported was a 46 year old female of 33.5 inches, while the oldest male was 41.3 inches and 29 years. Both sexes are sexually mature at about 19-26 inches FL and 5-7 years of age (MAFMC 2016b). The golden tilefish fishery is managed from Virginia through Maine, with most fishing activity occurring in Southern New England and Mid-Atlantic waters. The majority of tilefish are caught with bottom longline gear with only a small amount of tilefish being caught incidentally in otter trawl gear. There is also a small recreational component to the tilefish fishery. The Tilefish Fishery Management Plan was initially developed by the

Mid-Atlantic Fishery Management Council in 2001 and has operated under an individual fishing quota (IFQ) program since the implantation of Amendment 1 in 2009. All commercial fishermen directly targeting tilefish participate in an individual fishing quota program. Fishermen who incidentally harvest tilefish while targeting other species may only harvest 500 lb. live weight at one time without an IFQ Allocation. This stock is not considered to be overfished and overfishing is not occurring (NEFSC 2014):

> The Golden Tilefish stock was not overfished and overfishing was not occurring in 2012 relative to the new biological reference points. A new model (ASAP statistical catch at age) is used in this assessment to incorporate newly available length and age data and better characterize the population dynamics of the stock. Comparison of ASAP model biological reference points to ASPIC model biological reference points was not done since the measure of fishing mortality (FMULT) and biomass (SSB) has changed with the new model.
>
> The new model indicates that the stock was at high biomass and lightly exploited during the early 1970s. As the longline fishery developed during the late 1970s, fishing mortality rates increased and stock biomass decreased to a time series low by 1999. Since the implementation of constant landings quota of 905 mt in 2002, the stock has increased by 2012 to the new biomass reference point (SSBMSY proxy).
>
> The fishing mortality rate was estimated to be 0.275 in 2012, below the new reference point FMSY proxy = F25% = 0.370 (Figure B94). There is a 90% probability that the fishing mortality rate in 2012 was between 0.198 and 0.372. SSB was estimated to be 5,229 mt in 2012, about 101% of the new reference point SSBMSY proxy = SSB25% = 5,153 mt. SSBTHRESHOLD was estimated to be 2,577 mt. There is a 90% chance that SSB in 2012 was between 3,275 and 7,244 mt. The average recruitment from 1971 to 2012 is 1.24 million fish at age-1. Recent large year classes have occurred in 1998 (2.35 million), 1999 (2.39 million) and 2005 (1.85 million).

Atlantic haddock

(*Melanogrammus aeglefinus*) is part of the family Gadidae that consists of cod, and pollock, among other species. They are considered one of the most important families of commercial fishes (Cohen et al. 1990). In the western North Atlantic, haddock occur from Cape Hatteras, North Carolina in the south to the Strait of Belle Isle, Newfoundland in the north (Bigelow and Schroeder 1953, Collette and Klein-MacPhee 2002). Haddock stocks are most abundant in the areas off Cape Cod, the Gulf of Maine and Nova Scotia. Although haddock may mature earlier than 3 years, 100 % of females are mature by age 3 in Eastern Georges Bank (5Zjm). Major spawning grounds for haddock in the Northwest Atlantic are Georges Bank, and on the Scotian Shelf, Browns Bank Emerald, Western, and Sable Island Banks. Haddock form spawning aggregations at various times of the year, although a seasonal peak of spawning occurs on Georges Bank in late-March through April (Brodziak 2005). Spawning occurs on rocks, gravel, smooth sand and mud (Klein-MacPhee 2002). Haddock have high reproductive capacity. Annual egg production for a mature female is approximately 850,000 eggs with the potential of producing up to 3 million. A female will spawn batches of eggs near the bottom over rocks, gravel, smooth sand and mud at 1 to 2 day intervals over a period of 2 to 3 weeks. The growth rate or von Bertalanffy growth coefficient (K) for haddock is 0.12–0.23. The maximum known age for haddock is 14 years (Stevens 2004), but only a small proportion of haddock survive past age 9 (Brodziak 2005).

Based on the updated assessment neither the Gulf of Maine nor the Georges Bank haddock stocks are overfished nor is overfishing occurring (NEFMC 2013):

> […] the Georges Bank haddock (*Melanogrammus aeglefinus*) stock is not overfished and overfishing is not occurring (Figures 21-22). Retrospective adjustments were made to the model results. Spawning stock biomass (SSB) in 2014 was estimated to be 150,053 (mt) which is 139% of the biomass target (SSBMSY proxy = 108,300;). The 2014 fully selected fishing mortality was estimated to be 0.241 which is 62% of the overfishing threshold proxy (FMSY proxy = 0.39;
>
> […] the Gulf of Maine haddock (*Melanogrammus aeglefinus*) stock is not overfished and overfishing is not occurring (Figures 26-27). Retrospective adjustments were not made to the model results (see Special Comments section of this report). Spawning stock biomass (SSB) in 2014 was estimated to be 10,325 (mt) which is 223% of the biomass target (SSBMSY proxy = 4,623;). The 2014 fully selected fishing mortality was estimated to be 0.257 which is 55% of the overfishing threshold proxy (FMSY proxy = F40% = 0.468;).

3.4.4 Status of Some Minor Retained Species

Atlantic Cod

Atlantic Cod (*Gadus morhua*) occurs in the North Atlantic and Arctic. In the western Atlantic cod range from Ungava Bay in Canada along the North American coast to Cape Hatteras, North Carolina. Length at maturity (Lm + 63.4 (range 31 - 74 cm), max length = 200 cm T; common length = 100.0 cm TL, max. published weight: 96.0 kg, max. reported age= 25 years. Spawning occurs in winter and beginning of spring, where big schools are formed. Spawning sites are in offshore waters, at or near the bottom, in 50-200 m depth and 0-12 °C (preferred range 0-6°C). Different spawning areas may be used in subsequent years. Fecundity ranges from 2.5 million eggs in a 5 kg female to a record of 9 million eggs in a 34 kg female. Reported number of batches spawned is 8 - 22. Sex ratio is nearly 50%, with slight predominance of females. Classified as a determinate multiple spawner, older and larger cod produce larger eggs with neutral buoyancy at lower salinities. The nursery areas are in the inner coastal zone. Recruitment to the fished stock starts below 2 years and peaks at about 3 years of age (Fish Base 2017).

Cod are managed by the NEFMC under the Northeast Multispecies FMP as two stocks, Gulf Maine (GOM) and Georges Bank (GB). The latter is a Transboundary stock and management is shared with Canada (NEFMC 2017c). Both stocks are overfished and overfishing is occurring (NEFSC 2015a,b). Despite increasingly restrictive regulations by the NEFMC and NMFS over the last several years, neither stock has shown signs of recovery. However the decline in these stocks appears to have been abated and biomass of both may be stabilized at low levels (NEFSC 2015 a,b). Management measures over the last five years have reduced the cod catch in all three UoAs by an order of magnitude. Recruitment failure at least in GOM Cod may be mitigated by climate change and unprecedented warming in the GOM over the last several years (Mills et al. 2013). Larval cod prey selectively on *Pseudocalanus* copepods, a boreal zooplankter, which has become rare concurrent with the recent warming trend in the GOM, and may be contributing to recruitment failure (Friedland et al. 2008). In addition the failure of the stock to respond to extreme cuts in catch may be due to depensation. The remaining stock may be so small that stock production may be unable to offset natural mortality.

Atlantic cod (*Gadus morhua*), was categorized as ‘main’ for the gill net UoA in the previous full assessment because it was above the 5% threshold. As explained in detail in the 4th annual surveillance

report for this fishery, as a result of management measures, Cod is now below the 5% threshold. Information from the SBRM and NEFOP database group the Georges Bank and Gulf of Maine cod stocks. Catch of Atlantic cod for both stocks from 2012-16 represented on average, 3.9 % of catch in Gillnet, 1.9 % for otter trawl, and 3.6 % for bottom longline. Atlantic cod was not considered to meet the 2% 'main' designation for less resilient species because it matures at an early age (2 yrs.), and has a very high fecundity (3-9 million eggs) (Lough 2004). These life history characteristics are more typical of highly resilient species (Musick 1999). The GB and GOM cod stocks are the southern-most metapopulations of a much larger core population in Canadian waters (Lough 2004).

Skates complex (Rajiformes)

Skates are sometimes targeted in the Gillnet fishery and trawl fishery but also may be discarded. Fishers that wish to land skates are subject to all the restrictions mandated in the Skate FMP managed by the NEFMC (NEFMC 2017a).

The seven species in the Northeast Region skate complex are: Little Skate (*Leucoraja erinacea*), Winter Skate (*L. ocellata*), Barndoor Skate (*Dipturus laevis)*, Thorny Skate (*Amblyraja radiata*), Smooth Skate (*Malacoraja senta*), Clearnose Skate (*Raja eglanteria*), and Rosette Skate (*L. garmani*). The Barndoor Skate is the most common skate in the Gulf of Maine. Georges Bank and southern New England is the center of distribution for the Little and Winter skates. The Thorny and Smooth skates typically occur in the Gulf of Maine. The Clearnose and Rosette skates have a more southern distribution, and occur primarily in southern New England and the Chesapeake Bight (Mc Eachran and Musick 1975).

Skate landings have two components, one focused on larger skates to cut wings, and the other focused on small skates for bait in other fisheries. Based upon NMFS port sampling data, over 98 percent of skate wing fishery landings are composed of Winter Skate. Similarly, approximately 90 percent of skate bait landings are composed of Little Skate, with the remainder being largely comprised of juvenile Winter Skates. While in most circumstances it is unlawful to retain, land, or possess Barndoor, Thorny, and Smooth skates, vessels and fish dealers must still report the unauthorized landing of these (NOAA 2014).

Because the analytic models that were attempted did not produce reliable results, the status of skate overfishing is determined based on a rate of change in the three year moving average of NEFSC Groundfish survey biomass. Overfishing thresholds vary by species due to normal inter-annual survey variability. Details about the overfishing reference points and how they were chosen are given in (NEFSC 2000). Based on the 2013 survey the only species in the complex that remains in an overfished condition is thorny skate, and overfishing is not occurring on any of the seven skate species (NEFMC 2017a).

Only Little and Winter Skates are considered Main species, the rest of skate species are considered minor.

White Hake

The White Hake (*Urophycis tenuis*) occurs from Iceland and along the continental slope, to Florida (Musick 1973). It is most abundant from Newfoundland to southern New England and is common on

muddy bottom throughout the Gulf of Maine. The White Hake stock is not overfished and overfishing is not occurring (NEFMC 2017c). This favorable determination of stock status is a change from the previous stock assessment in which White Hake was judged to be overfished and subject to overfishing in 2007 (NEFSC 2013b). Fishing mortality has varied over a wide range since the 1970s but presently is well below the FMSY proxy. The improving condition of the stock is indicated by the more than threefold increase in spawning stock biomass from a time series low in 1997 (NEFSC 2013b).

American Lobster

American Lobster (*Homarus Americanus*) is a bottom-dwelling crustacean widely distributed over the continental shelf of North America. In the inshore waters of the US, it is most abundant from Maine through New Jersey, with abundance declining from north to south. Offshore, it occurs from Maine through North Carolina. American Lobster is managed through the ASMFC Lobster FMP (ASMFC 2017). Two stocks have been identified based on regional differences in life history parameters. They are the Gulf of Maine/Georges Bank (GOM/GB), and Southern New England (SNE).

Lobsters reach market size in about four to nine years, depending on water temperature and other biological factors. Total U.S. landings in the fishery have steadily increased in the past 35 years. Landings in 2015 were roughly 147 million pounds. These landings are primarily comprised of catch from inshore waters (0 to 12 nautical miles).

GOM supports the largest fishery, accounting for approximately 87% of landings since 2002. GB constitutes a smaller portion of the U.S. fishery, with landings averaging 4.93 million pounds between 2008 and 2013. Before 2011, SNE was the second largest fishery, accounting for 19% of the U.S. landings between 1981 and 2007; however, a sharp decline in the population has significantly reduced catch. Landings peaked in the 1990s, reaching a high of 21.91 million pounds in 1997. Since this time, landings have precipitously dropped to a low of 3.31 million pounds in 2013.

The 2015 American Lobster Benchmark Stock Assessment and Peer Review Report indicates the American lobster resource presents a mixed picture of stock status, with record high stock abundance and recruitment in the Gulf of Maine and Georges Bank, and record low abundance and recruitment in Southern New England. The GOM/GB stock is not overfished and not experiencing overfishing. Conversely, the SNE stock is severely depleted with poor prospects of recovery, necessitating protection (ASMFC 2017c). Given the relatively small catch of Lobster in the SD Gillnet fishery it is highly unlikely that the fishery is hindering recruitment or recovery of Lobster stocks.

Butterfish

Butterfish (*Peprilus triacanthus*) are distributed from the Florida to Nova Scotia, occasionally straying as far north as the Gulf of St Lawrence. Butterfish is a fast growing species that schools by size, makes seasonal inshore and offshore movements, and seldom attains an age greater than 3 years but can occasionally live up to 6 years. Butterfish mature at age 1, spawn during the summer months (June-August), and begin schooling at about 60 mm (Collette and Klein-MacPhee 2002). They exhibit a

planktivorous diet, feeding mainly on zooplankton, ctenophores, chaetognaths, euphausiids and other organisms.

Butterfish are preyed upon by a large number of medium-sized predatory fishes such as bluefish, weakfish, and spiny dogfish, large pelagic fish including swordfish, marine mammals including pilot whales and common dolphins, seabirds such as greater shearwaters and northern gannets, and invertebrates such as squid (http://www.nefsc.noaa.gov/publications/tm/tm145/tm145.pdf). Butterfish is managed by the MAFMC in the Mackerel, Squid and Butterfish FMP (MAFMC 2017c).

The butterfish stock was most recently assessed at SARC 58 (2014, but utilizing data through 2012). The SARC independent peer review panel accepted the assessment and its reference points. For the entirety of the time series used (1989-2012), the stock has been above the biomass target (the spawning stock size that results in maximum sustainable yield) and no overfishing has occurred (https://static1.squarespace.com/static/511cdc7fe4b00307a2628ac6/t/553a4938e4b0d3a13ade86ff/1429883192763/Butterfish+APInfo-2015.pdf).

Cusk

The Cusk (*Brosme brosme*), is a deep-water species that is distributed on both sides of the Atlantic Ocean on hard bottom areas. Although the stock structure is unknown, the greatest concentrations of Cusk off the US coast occur in the central part of the Gulf of Maine and extend onto the Western Scotian Shelf (Sosebee and Cadrin 2006, NEFSC 2017b). Spawning occurs in spring and early summer; eggs rise to the surface where hatching and larval development occur. Juveniles move to the bottom at about 5 cm (2 in.) in length, where they become sedentary and rather solitary in habit. Individuals commonly attain lengths from 46-76 cm (18-30 in.) and weights from 2.3- 4.5 kg (5-10 lb).

The major prey items of cusk in the Gulf of Maine are crustaceans, primarily toad crabs and pandalid shrimps (Collette and Klein-MacPhee 2002). Although little information is available for Gulf of Maine fish, Cusk from the Scotian Shelf area are relatively slow growing and late maturing. Scotian Shelf Cusk reach a maximum age greater than 14 years and attain sexual maturity by age 5 for males and age 7 for females (Oldham 1972).

Annual landings have generally declined since 1982, and survey biomass indices have generally declined since 1985. The ratio of landings to survey indices increased during 1988-1998, implying increased exploitation. Exploitation rates have subsequently declined. The stock was at a low biomass level when last assessed in 2005.

Cusk (*Brosme brosme*) are a National Marine Fisheries Service (NMFS) "species of concern," as well as a "candidate species" under the Endangered Species Act (ESA). Work is being conducted for a status review of this species. There are Data deficiencies on the life history characteristics and no information on the stock structure. There is information on commercial landings which indicate that CPUe from 1970 to 20101 declined by >93%, while population estimates for fish greater than 50 cm (20 inches) declined during the same time frame (http://www.nmfs.noaa.gov/pr/pdfs/species/cusk_detailed.pdf)

Red Hake:

Red hake (*Urophycis chuss*) is a demersal gadoid species distributed from the Gulf of St. Lawrence to North Carolina, and is most abundant from the western Gulf of Maine through Southern New England waters (Musick 1973). Red hake are separated into northern and southern stocks for management purposes. The northern stock is defined as the Gulf of Maine to Northern Georges Bank region, while the southern stock is defined as the Southern Georges Bank to Mid-Atlantic Bight region.

In the northern stock, the age at 50% maturity is 1.4 years for males and 1.8 years for females, and the size at 50% maturity is 22 cm (8.7 in.) for males and 27 cm (10.6 in.) for females (O'Brien et al. 1993). In the southern red hake stock, the age at 50% maturity is 1.8 years for males and 1.7 years for females, and the size at 50% maturity is 24 cm (9.5 in.) for males and 25 cm (9.8 in.) for females (https://www.nefsc.noaa.gov/sos/spsyn/pg/redhake/).

Red Hake is managed by the NEFMC as part of the small mesh Multispecies Fishery FMP (NEFMC 2017d). Neither stock of Red Hake is overfished nor is overfishing occurring (http://s3.amazonaws.com/nefmc.org/2016-2017-Specifications-Supplemental-Information-Report.pdf).

Summer Flounder (Fluke):

Summer Flounder (*Paralichthys dentatus*) occur from the Canadian border to South Carolina, and spawn during the fall and winter over the continental shelf. From October to May. Juveniles use inshore estuarine nursery areas. Summer Flounder exhibit strong seasonal inshore-offshore movements, normally inhabiting shallow coastal and estuarine waters during the warmer months of the year and remaining offshore during the colder months. Most fish are sexually mature by age 2. Summer Flounder exhibit sexual dimorphism by size; most of the largest fish are females. Females can attain lengths over 90 cm (36 in) and weights up to 11.8 kg (26 lbs.; NEFSC 2011c). While female Summer Flounder grow faster (reaching a larger size at the same age), the sexes attain about the same maximum age (currently age 15 at 56 cm for males, and age 14 at 65 cm for females (MAFMC 2017b).

Summer Flounder are managed by the MAFMC under the Summer Flounder, Scup, and Seabass FMP. Regulations currently include catch and landings limits, commercial quotas, recreational harvest limits, minimum fish sizes, gear regulations, permit requirements, and other provisions as prescribed by the FMP.

In June 2016, the NEFSC completed a stock assessment update for summer flounder which indicated that the summer flounder stock was not overfished, but that overfishing was occurring in 2015. In response to excessive F the MAFMC reduced the Acceptable Biological Catch (ABC) from 26.57 mil. lbs in 2015 to 16.26 mil. lbs in 2016, with further reductions scheduled for 2017 and 2018 (MAFMC 2017). This has been a well-managed fishery and projections indicate that overfishing will no longer be occurring soon. It is highly likely that the Spiny Dogfish Fishery does not pose a risk of serious or irreversible harm to the Summer Flounder and does not hinder its recovery.

Winter (Black Back) Flounder:

The Winter Flounder (*Pseudopleurenectes americanus*) is a demersal flatfish distributed in the western North Atlantic from Labrador to Georgia. Important U.S. commercial and recreational fisheries exist from the Gulf of Maine to the Mid-Atlantic Bight. NEFMC manages and assesses winter flounder in U.S. waters as three stocks: Gulf of Maine, Georges Bank, and Southern New England/Mid-Atlantic Bight (SNE/MAB), (NEFSC 2015c).

The assessment of GOM winter flounder stock was based on an empirical swept-area model utilizing data from the 2010 NEFSC fall survey, the Massachusetts Division Marine Fisheries (MADMF) fall survey, and the Maine/New Hampshire survey. The estimated stock biomass in 2010 was 6,341 mt. However the overfished status remains unknown because a biomass reference point or proxy could not be determined. The biomass estimate for 2010 was 16% lower than that for 2009 using the same survey methods, but this difference was not statistically significant. In 2010 overfishing was not occurring for the stock. This conclusion was robust to the range of uncertainty in the biomass estimate (NEFSC 2011a).

In 2010, the GB Winter Flounder stock was not overfished and overfishing was not occurring, based on new biological reference point (BRP) estimates of: FMSY (FTHRESHOLD) = 0.42, SSBMSY (BTARGET) = 11,800 mt, and 1/2 SSBMSY (BTHRESHOLD) = 5,900 mt, MSY = 4,400 mt. The 2010 estimate of spawning stock biomass (SSB) was 9,703 mt, which was well above the BTHRESHOLD and at 82.2% of the BTARGET. The 2010 estimate of fishing mortality (average F on ages 4-6) was 0.15 and was well below the FTHRESHOLD of 0.42 . There was an 80% probability that the 2010 average F was between 0.12 and 0.21 and that the 2010 SSB estimate was between 7,304 mt and 12,578 mt (NEFMC 2015).

Based on an updated 2015 assessment, the SNE/MAB stock is overfished but overfishing is not occurring. Spawning stock biomass (SSB) in 2014 was estimated to be 6,151 (mt) which is 23% of the biomass target (26,928 mt), and 46% of the biomass threshold for an overfished stock (SSBthreshold = 13464 (mt). The 2014 fully selected fishing mortality was estimated to be 0.16 which is 49% of the overfishing threshold (FMSY = 0.325) (NEFSC 2015c).

Atlantic Herring

The Atlantic herring, *Clupea harengus,* is a schooling, coastal pelagic species that inhabits both sides of the North Atlantic Ocean. In the western North Atlantic they range from Labrador to Cape Hatteras where spring and autumn spawning populations support major commercial fisheries. Juveniles and adults undergo complex north-south and inshore-offshore migrations for feeding, spawning, and overwintering. In U.S. waters, herring from the Gulf of Maine and Georges Bank are assessed and managed as a single stock complex with two major spawning components. Males and females mature at around 3-4 years old between 25-27 cm TL. (Reid et. al. 1999).

The most recent stock assessment was conducted in 2015 (Deroba 2015). Maximum sustainable yield (MSY) reference points were based on the fit of the Beverton-Holt stock-recruitment relationship, estimated internally to the ASAP model, and inputs (e.g., weights-at-age, natural mortality) from the terminal year of the assessment (i.e., 2014). Point estimates of the MSY BRPs equaled: MSY = 77,247 mt, FMSY = 0.24, and SSBMSY = 311,145 mt. The values for these reference points during the previous benchmark assessment (NEFSC 2012) were: MSY = 53,000 mt, FMSY = 0.27, and SSBMSY = 157,000 m. The stock is not overfished and overfishing is not occurring.

Longfin Inshore Squid

Longfin Inshore Squid (*Amerigo pealeii*) are distributed primarily in continental shelf waters located between Newfoundland and the Gulf of Venezuela. In the northwest Atlantic Ocean, longfin squid are most abundant in the waters between Georges Bank and Cape Hatteras where the species is commercially exploited. The stock area extends from the Gulf of Maine to Cape Hatteras. Distribution varies seasonally. North of Cape Hatteras, squid migrate offshore during late autumn to overwinter in warmer waters along the shelf edge and slope, and then return inshore during the spring where they remain until late autumn. The species lives for about nine months, grows rapidly, and spawns year-round with peaks during late spring and autumn.

Longfin squid serves as a key prey species for a variety of marine mammals, diving birds, and finfish species (Hendrickson and Jacobson 2006). Natural mortality is very high; especially for spawners. Estimates of non-spawning mortality, 0.11 per week and spawning mortality, 0.19-0.48 per week, are very high. Minimum estimates of longfin squid consumption by finfish showed high inter-annual variability, but were 0.8 to 11 times the annual catches during 1977-2009.

The stock is managed by the Mid-Atlantic Fishery Management Council under the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan (MAFMC 2017c). Management measures for the Longfin Squid stock include annual total allowable catches (TACs) which have been partitioned into seasonal quotas since 2000 (trimesters in 2000 and quarterly thereafter), a moratorium on fishery permits, and a minimum codend mesh size of 1 7/8 inches.

The life history characteristics of short-lived squid present unique challenges to stock assessment and most of the traditional approaches that have been used for finfish species have not been successfully applied to squid stocks. Based on a new biomass reference point from the 2010 assessment (SAW SARC 51), the longfin squid stock was not overfished in 2009, but overfishing status could not be determined because no overfishing threshold was recommended. The stock exhibits very large fluctuations in abundance (from variation in reproductive success and recruitment) which is expressed as regular large inter-annual changes (2-3 fold) in survey biomass. A new threshold reference point for fishing mortality was not recommended in the 2010 assessment because there was no clear statistical relationship between Longfin catch and annual biomass estimates during 1975-2009. Furthermore, annual catches were low relative to annual estimates of minimum consumption by a subset of fish predators. The assessment and reviewers concluded that the stock appears to be relatively lightly exploited (MAFMC 2017c). Despite population modeling problems with this fast-growing, short-lived species, it is highly unlikely that the SD fishery poses a risk of serious or irreversible harm to the Longfin Squid.

3.4.5 Bycatch Species

There were approximately 30 species recorded as minor bycatch for each the gill net UoA and the bottom trawl UoA, and around 20 species for the bottom longline UoA. Volumes of minor bycatch species were very low. Most are small species with no commercial or recreational value. The primary reason reported in the Northeast Fisheries Observer Program for discard of these species is "no market".

The five top bycatch minor species for each UoA included:

- Gill net: cancer crab, black drum, sand tiger shark, and true crab.
- Trawl: species included clearnose skate, ocean pout, seastar starfish, weakfish (Squeteague Sea Trout), and smooth skate.
- Bottom longline: longhorn sculpin, porbeagle shark, torpedo ray and Jonah Crab.

Many of these minor species could be considered data deficient under the Risk Based Framework (RBF) requirements for MSC CRv2.0, however, as this fishery was scored under assessment tree v1.3, the RBF requirements for this version still apply for this assessment. According to Table AC2: Criteria for triggering the use of the RBF (v1.3), the use of Annex CC (RBF) for the PI 2.2.1 is outline triggered be the impact of the fishery in assessment on the P2 species cannot be determined quantitatively. As there is data from the observer program on the volumes of these species caught by the UoAs under assessment, the team concluded the RBF criteria is not met.

Species categorized as 'minor' automatically achieve SG80, and are only required to meet requirements at the 100 SG levels. Since there were a high number of 'minor' species, the team elected not to score minor species at SG100 as individuals, but instead used an 'all or none' approach to scoring. If any of the minor species, didn't achieve 100, then all of the minor species stay at SG80. Within each UoA there is at least one, if not more, species considered vulnerable or for which overfishing is occurring:

Porbeagle Shark is considered overfished, though overfishing is not occurring. Recovery of the northeast Atlantic stock of porbeagle, under no fishing mortality may take from 15 to 34 years (ICCAT 2015).

Sand tiger shark (*Carcharias taurus*) is included in the Endangered Species Act (ESA) Species of Concern List due to their low productivity and high levels of uncertainty in life history parameters and relative abundance trends (Carlson 2009).

Ocean Pout (*Zoarces americanus*): Based on the 2015 current assessment, the ocean pout stock is considered overfished and overfishing is not occurring: "Biomass proxy (B) in 2014 was estimated to be 0.29 (kg/tow) which is 6% of the biomass target (BMSY proxy = 4.94; […] The 2014 fully selected fishing mortality was estimated to be 0.269 which is 35% of the overfishing threshold proxy (FMSY proxy = 0.76; […]"

Bycatch Management

Discard rates in the trawl fishery are relatively high, 52% discards for the Mid-Atlantic small-mesh otter trawl fleet, 37% for the Mid-Atlantic (MA) large-mesh otter trawl fleet, 53% for the New England large-mesh otter trawl fleet and 79% for the New England (NE) small-mesh otter trawl fleet. (Skates species group comprised the majority of the discards in the MA and NE large-mesh sub fleets (> 67%) and in the MA small mesh otter trawl (41%). For these three fleets the second species was non-SBRM species group, which aggregates non-federally managed species. In NE small-mesh fleet, the main discard group are non-SBRM species group comprised the majority of discards (22%) (MAFMC 2017).

For NE longline discards represented 18% of catch, out of which 71% was Spiny Dogfish. For all gillnet fleets discards ranged from 7% to 29%. The species groups that comprises most of the discards for the different gillnet fleets were Non-SBRM species, Spiny Dogfish and Skates (MAFMC 2017). For all species groups examined, "no market" was the reason reported for the majority of discards.

The Magnuson-Stevens Act uses the term "bycatch" to refer to any fish that are harvested but not retained for commercial or personal use. The MSA National Standard 9 requires that bycatch and bycatch mortality be minimized to the extent practicable.

There are several measures and efforts intended to reduce bycatch, these include the SBRM reports, the EFH considerations and the cohesive use of FMPs for federally managed species. Among the measures implemented by councils to reduce bycatch include gear modifications, mortality caps and collaborative research initiatives with fisheries. One of these initiatives is the Bycatch Reduction Engineering Program (BREP), which supports development of technological solutions to minimize bycatch and bycatch mortality. To see funded projects click here BREP.

In 2016 NOAA published the National Bycatch Reduction Strategy, which builds on the first national strategy from 2003. The latest version has as its goals to: "guide and coordinate NOAA Fisheries' efforts to reduce bycatch and bycatch mortality in support of sustainably managing fisheries and recovering and conserving protected species". This five objectives of the strategy are:

1. **Monitor and estimate** the rates of bycatch and bycatch mortality in fisheries to understand the level of impact and the nature of the interaction.
2. **Conduct research** to improve our bycatch estimates, understand the impacts of bycatch on species and community dynamics, and develop solutions to reduce bycatch and bycatch mortality.
3. **Conserve and manage** fisheries and protected species by implementing measures to reduce bycatch and its adverse impacts.
4. **Enforce** fishery management measures, including those aimed at reducing bycatch and bycatch mortality, to ensure compliance with applicable laws.
5. **Communicate** to develop a common understanding of bycatch, to share information on our efforts to address bycatch, and to identify areas where we can improve.

These five objectives will be used to guide specific bycatch plans expected to be developed for each management region by the end of 2017.

3.4.6 Endangered, Threatened and Protected (ETP) Species

General Framework

The legislative basis for the protection of ETP species is found in the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA).

Endangered Species Act (ESA)

NOAA's Office of Protected Resources (OPR) is the program responsible for protecting marine mammals and endangered/threatened marine life. The OPR works in cooperation with NOAA regional offices and science centers. Responsibilities of the program include; listing species under the ESA and designating critical habitat, developing and implementing recovery plans for listed species; consulting on any Federal actions that may affect a listed species to minimize the effects of the action; investigating violations of the ESA and authorizing research on protected species.

The ESA, signed on 1973, provides for the conservation of species that are endangered or threatened the conservation of the ecosystems on which they depend. NOAA has jurisdiction over 159 endangered and threatened marine species and works with the U.S. Fish and Wildlife Service (USFWS) to manage ESA-listed species. Generally, NOAA manages marine species, while USFWS manages land and freshwater species. When a species is listed as endangered it is illegal to "take" (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to do these things) that species. Section 10 of the ESA allows NOAA Fisheries Service to issue permits for incidental take (Incidental Take Statements; ITS), with the requirement of a conservation plan to minimize and mitigate impacts to the affected species. Section 4(f) ESA directs NOAA's National Marine Fisheries Service (NMFS) to develop and implement recovery plans for threatened and endangered species. NMFS' Office of Law Enforcement works with the U.S. Coast Guard and other partners to enforce and prosecute ESA violations (NOAA).

Marine Mammal Protection Act (MMPA)

The Marine Mammal Protection Act (MMPA), enacted on 1972, protects all marine mammals. Similarly to the ESA, the MMPA prohibits the "take" of marine mammals, with certain exceptions, including special cases for subsistence, scientific research, and permits authorizing incidental take of marine mammals to commercial fishing operations. For a more detailed explanation of the MMPA is see the Marine Mammals Section.

There is a formal review in place to evaluate the impact of fisheries on ETP species, to measure the performance of the measures implemented and to take corrective actions as necessary. These reviews are documented in Biological Opinions (BO) given within the ESA Section 7 consultation.

Seabirds: Protected under the Migratory Bird Treaty Act

The Migratory Bird Treaty Act was enacted in 1916 to implement the convention for the protection of migratory birds between the United States and Great Britain (acting on behalf of Canada). The

statute makes it unlawful without a waiver to pursue, hunt, take, capture, kill, or sell birds listed therein as migratory birds. The statute does not discriminate between live or dead birds and also grants full protection to any bird parts including feathers, eggs, and nests. The U.S. Fish and Wildlife Service issues permits for otherwise prohibited activities under the act. These include permits for taxidermy, falconry, propagation, scientific and educational use, and depredation, an example of the latter being the killing of geese near an airport, where they pose a danger to aircraft. There is no general exemption granted to US commercial fisheries.

The migratory bird species protected by the Act are listed in 50 CFR 10.13. In accordance with the Migratory Bird Treaty Reform Act of 2004 (MBTRA) (Pub. L. No. 108-447, 118 Stat. 2809, 3071-72), all species native to the United States or its territories, which are those that occur as a result of natural biological or ecological processes are now included (See 70 FR 12710, March 15, 2005). Birds of Management Concern are a subset of Migratory Bird Treaty Act, and comprise protected species which pose special management challenges because of a variety of factors (e.g., too few, too many, conflicts with human interests, societal demands).

The US FWS have also identified 'birds of conservation concern' for species likely to become candidates for listing under the ESA and focal species for which management plans are created. FWS also spearheads broader initiatives for seabird protection including the North American Waterbird Conservation Plan. There is no established or regulatory linkage between these initiatives and NMFS fishery management operations at GARFO, NEFSC, or the Councils, but there is a staff member at GARFO with primary responsibility for liaising on seabird issues, and historical collaborations between the management agencies.

The NEFOP data provided data on a low level of incidental interactions seabirds, all of which are listed on the MBTA and some of which are listed as birds of management concern.

Information

The NMFS Office of Protected Species collects and analyses data on interactions between fisheries and ETP species using data primarily from observer programs and logbooks in commercial fisheries, scientific surveys at sea, standings on shore. These data sources are reviewed annually to revise the List of Fisheries (LOF), and based on the categorization of fisheries as described above, resources are allocated for additional at sea observer coverage for fisheries that are considered a risk to ETP species.

Fishery Impacts

The 2013 – 2015 Spiny Dogfish Specifications, Environmental Assessment, and Regulatory Impact Review identities a number of species that "[…] inhabit the environment within the Spiny Dogfish FMP management unit, and that therefore potentially occur in the operations area of the spiny dogfish." These include seventeen species classified as endangered or threatened under the ESA, three species listed as candidate species under the ESA, and six species under the MMPA. Additionally, the team reviewed the Northeast Fisheries Observer Program (NEFOP) data for the trawl, gillnet and bottom longline fleets, which also contained information on fishery interactions with ETP species.

Table 16. Summary of ETP Species as categorized elements for Evaluation. Species either identified in the Spiny Dogfish Specifications, the List of Fisheries (LOF) for the Marine Mammal Protection Act, or the Northeast Fisheries Observer Program (NEFOP) catch data and in marine mammal reports. Seabird interactions from Hatch (2017).

Common name	Scientific Name	Gill net	Trawl	Longline
Large Whales				
Northern right whale	*Eubalaena glacialis*	X		
Humpback whale	*Megaptera novaeangliae*	X		
Fin whale	*Balaenoptera physalus*	X		
Minke Whale	*Balaenoptera acutorostrata*	X	X	
Small Cetaceans				
Bottlenose dolphin WNA coastal	*Tursiops truncatus*	X	X	
Bottlenose dolphin WNA coastal	*Tursiops spp.*	X		
Common dolphin,	*Delphinus spp.*	X	X	
Risso's dolphin	*Grampus griseus*	X	X	
White-sided dolphin, WNA	*Lagenorhynchus obliquidens*	X	X	
Long-finned pilot whale, WNA	*Globicephala melas*		X	
Short-finned pilot whales (WNA stock	*Globicephala macrorhynchus*		X	
Pinnipeds (Seals and Sea Lions)				
Harbor porpoise	*Phocoena phocoena*	X	X	
Harbor seal, WNA.	*Phoca vitulina*	X	X	
Harp seal	*Pagophilus groenlandicus*	X		
Gray sea	*Halichoerus grypus*	X	X	
Hooded seal, WNA.	*Cystophora cristata*	X		
Sea Turtles				
Leatherback	*Dermochelys coriacea*			
Kemp's ridley	*Lepidochelys kempii*			
Green	*Chelonia mydas*			
Hawksbill	*Eretmochelys imbricata*			
Loggerhead	*Caretta caretta*			
Fishes				
Atlantic sturgeon	*Acipenser oxyrinchus*	X	X	
Seabirds				
Double-crested cormorant	*Phalacrocorax auritus*	X	X	
Northern fulmar	*Fulmarus glacialis*	X	X	
Northern gannet	*Morus bassanus*	X	X	
Great black-backed gull	*Larus marinus*	X	X	
Herring gull	*Larus smithsonianus*	X	X	
Common loon	*Gavia immer*		X	
Red-throated loon	*Gavia stellata*	X	X	
Thin-billed murre	*Uria aalge*		X	
Great shearwater	*Puffinus gravis*	X	X	
Sooty shearwater	*Puffinus griseus*	X	X	

Marine Mammals

Pursuant to the Marine Mammal Protection Act, NMFS publishes a List of Fisheries (LOF) annually, classifying U.S. commercial fisheries into one of three categories. The classification is based on the relative frequency and mortalities of incidental serious injuries and/or mortalities of marine mammals as a result of commercial fishing relative to the stock's Potential Biological Removal (PBR). The PBR level is defined (50 CFR 229.2) as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population. The PBR is calculated as the product of minimum population size, one-half the maximum productivity rate, and a recovery factor (Waring et al. 2014).

The classification criteria for the annually updated LOF consists of a two tiered approach: "Tier 1 considers the cumulative fishery mortality and serious injury for a particular stock, Tier 2 considers fishery-specific mortality for a particular stock" (Marine Mammal Protection Act List of Fisheries). If the estimated total annual mortality and serious injury of all fisheries that interact with a stock is less than 10% of the PBR level for it is designated as Tier 1 and all fisheries interacting with this stock would be placed in Category III. If the estimated total annual mortality and serious injury for that stock is less >10% of the PBR, each fishery is classified into one of three categories:

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

The categorization in the LOF determines whether participants in that fishery are subject to certain provisions of the MMPA such as registration, observer coverage, and take reduction plan requirements.

Marine mammal stocks may be categorized as a 'strategic stock': (a) stocks for which the level of direct human-caused mortality exceeds the PBR level; (b) which are declining and are likely to be listed in the foreseeable future as a threatened species under the Endangered Species Act (ESA); or (c) are currently listed as threatened/endangered under ESA or as depleted under the MMPA. If a strategic stock interacts with a Category I or II fishery, a multi-stakeholder "Take Reduction Team" (TRP) with industry, researchers, environmentalists, and state and federal managers is formed (16 U.S.C. 1387(f)):

> Each TRT is required to create a consensus-based suite of regulations called a Take Reduction Plan. The immediate goal of each plan is to reduce bycatch to below PBR within the first six months of implementation. The long-term goal is to reduce bycatch to levels approaching a zero mortality and serious injury rate, termed a ''zero mortality rate goal'' (ZMRG), which has been defined as 10% of PBR. If the team does not reach consensus, the Service is required to draft a plan that incorporates any consensus-based elements.

Out of the three UoAs in this assessment, two of the gillnet fisheries are classified as Category I, while all bottom trawl fisheries are Category II and bottom longline is Category III (Table 17). The evaluation of the assessment team focused the review on stocks of marine mammals that are driving the current classification for each fishery (Table 18).

Table 17. 2017 list of Fisheries by UoA with the classification under the Marine Mammal Protection Act (MMPA) based upon the level of mortality and serious injury of marine mammals that occurs incidental to each fishery. From 2017 NOAA LOF (LOF)

Gears	LOF	Potential For Interactions	Basis for Current Classification
Gillnet			
Mid-Atlantic Gillnet	Cat. I	Bottlenose dolphin (Northern Migratory coastal, Southern Migratory coastal, Northern NC estuarine system, Southern NC estuarine system)1 Bottlenose dolphin, WNA offshore. Common dolphin, WNA. Gray seal, WNA. Harbor porpoise, GME/BF. Harbor seal, WNA. Harp seal, WNA. Humpback whale, Gulf of Maine. Minke whale, Canadian east coast.	Bottlenose dolphin (WNA coastal stock) annual mortality and serious injury of that stock in this fishery was greater than 50% of the stock's PBR. NMFS cannot differentiate to which stock a killed/injured animal belongs for this reason each stock of bottlenose dolphin is considered to be driving the classification of the fishery.
Northeast Sink Gillnet	Cat. I	Bottlenose dolphin, WNA offshore. Common dolphin, WNA. Fin whale, WNA. Gray seal, WNA. Harbor porpoise, GME/BF.1 Harbor seal, WNA. Harp seal, WNA. Hooded seal, WNA. Humpback whale, Gulf of Maine. Long-finned pilot whale, WNA. Minke whale, Canadian east coast. North Atlantic right whale, WNA. Risso's dolphin, WNA. White-sided dolphin, WNA.	The annual mortality and serious injury to harbor porpoises (Gulf of Maine/Bay of Fundy [GME/BF] stock), humpback whales (Gulf of Maine stock), minke whales (Canadian East Coast stock), and North Atlantic right whales (Western North Atlantic [WNA] stock) in this fishery exceeds 50% of each stock's Potential Biological Removal (PBR) level
Northeast anchored float gillnet	Cat. II	Harbor seal, WNA. Humpback whale, Gulf of Maine. White-sided dolphin, WNA.	Based on anecdotal reports a mortality of a white-sided dolphin and an entanglement of a humpback whale.
Northeast drift gillnet	Cat. II	None documented	Based on analogy to other Northeast gillnet fisheries that use similar gear and operate in a similar manner to this fishery
Bottom Trawl			
Mid-Atlantic bottom trawl	Cat. II	Bottlenose dolphin, WNA offshore Common dolphin, WNA.1 Gray seal, WNA. Harbor seal, WNA. Risso's dolphin, WNA1	The total mortality and serious injury of common dolphins (Western North Atlantic [WNA] stock), long-finned pilot whales (WNA stock), Risso's dolphins (WNA), and short-finned pilot whales (WNA stock) in this fishery is greater than 1% and less than 50% of each of the stocks' PBR.
Northeast bottom trawl	Cat. II	Bottlenose dolphin, WNA offshore. Common dolphin, WNA. Gray seal, WNA. Harbor porpoise, GME/BF. Harbor seal, WNA. Harp seal, WNA. Long-finned pilot whale, WNA. Risso's dolphin, WNA. White-sided dolphin, WNA1.	The total annual mortality and serious injury of white-sided dolphins (Western North Atlantic [WNA] stock) in this fishery is greater than 1% and less than 50% of the stock's Potential Biological Removal (PBR) level.
Bottom Longline			
NE / Mid-Atlantic bottom longline/hook and line	Cat III	None documented.	

1 Indicates the stock or species is driving the classification of the fishery

Table 18. Summary of the stock assessment reports for stocks of marine mammals that are driving the current classification of the different fisheries reviewed in this assessment. Table modified from Hayes et al 2016.Total Annual S.I. (serious injury) and Mortality and Annual Fisheries S.I. and Mortality are mean annual figures for the period 2010-2014. Unk = unknown and undet=undetermined (PBR for species with outdated abundance estimates is considered "undetermined").” Species highlighted in grey are those for which mortality is >50%PBR.

Species	Stock Area	PBR	T. Annual S.I & Mort.	Annual Fish. S.I. and Mort. (cv	Strat. Status	Fish SI and Mort >50%PBR	Fish SI and Mort. >PBR	Take Red. Plan	UoA
Large Whales									
North Atlantic right whale	WNA*	1	5.66	4.65	Y	Y	Y	ALWTRP	Gillnet
Humpback whale	Gulf of Maine	13	9.05	7.25	N	Y	N	ALWTRP	Gillnet
Minke whale	Canadian east coast	14	8.25e	6.45	N	N	N	ALWTRP	Gillnet
Fin Whale	WNA	2.5	3.8	1.8	Y	**Y**	N	ALWTRT	Gillnet
Small Cetaceans									
Atlantic white-sided dolphin	WNA	304	74	74 (0.2)	N	N	N		Gillnet/Trawl
Common dolphin	WNA	557	409	409 (0.10)	N	Y	N		Trawl
Common bottlenose dolphin	Offshore	561	39.4	39.4 (0.29)	N	N	N		Gillnet
Common bottlenose dolphin	WNA N migratory coastal	86	1-7.5	39.4	Y	N	N	BDTRP	Gillnet
Common bottlenose dolphin	WNA S migratory coastal	63	0-12	1-7.5	Y	N	N	BDTRP	Gillnet
Common bottlenose dolphin	Northern NC Estuarine System	7.8	1.0-16.7	0-12	Y	Y (likely)	Y (likely)	BDTRP	Gillnet
Common bottlenose dolphin	Southern NC Estuarine System	Undet	0-0.4	1.0-16.7	Y	Y (likely)	Y (likely)	BDTRP	Gillnet
Risso's dolphin	WNA	126	53.6	7.9 (0.85)	N	N	N		Trawl
Pilot whale long- finned	WNA	35	38	38 (0.15)	Y	Y	Y		Trawl
Pilot whale short- finned	WNA	159	192	192 (0.17)	Y	Y	Y		Trawl
Pinnipeds (Seals and Sea Lions)									
Harbor porpoise	Gulf of Maine/Bay of Fundy	706	437	437 (0.18)	N	Y	N	HPTRP	Gillnet
Hooded seal	WNA	unk	5,199	25 (0.82)	N				Gillnet
Harp seal	WNA	unk	306,082	271 (0.19)	N				Gillnet
Harbor seal	WNA	2,006	389	377 (0.13)	N	N	N		Gillnet
Grey Seal	WNA	unk	4,937	1,162 (0.11)	N				Gillnet

Large Whales

Humpback Whale, Gulf of Maine

The Gulf of Maine is treated as a separate feeding stock from other humpback (*Megaptera novaeangliae*) stocks. However, since 2007 events involving whales that were not identified as part of another stock, were included in the Gulf of Maine count against the PBR. Fishery-Related Serious Injuries and Mortalities (Hayes et al. 2016):

> For the period 2010 through 2014, the minimum annual rate of human-caused mortality and serious injury to the Gulf of Maine humpback whale stock averaged 9.05 animals per year. This value includes incidental fishery interaction records, 7.25; and records of vessel collisions, 1.8 injuries that occurred in the southeastern and Mid-Atlantic States that could not be confirmed as involving members of the Gulf of Maine stock.

In 2016 nine of the 14 Distinct Population Segments (DPS) humpback whales were removed from the federal endangered species (ESA) list. The ESA-listed DPS not coincide with any of the MMPA designated stocks. Therefore stock delineations need to be reviewed before the ESA delisting can be considered. Under the MMPA designation the Gulf of Maine humpback whale stock indicates a positive population trend. The average annual human related mortality and serious injury to this stock does not exceed PBR, and thus it is considered a strategic stock. However, the U.S. fishery-caused mortality and serious injury is likely >10% PBR, as mortality and injured estimates are considered to be biased low. Literature and records reviewed for the stock assessment suggest that a significant number of human impacts are not recorded Hayes et al. (2016):

> For example, a study of entanglement-related scarring on the caudal peduncle of 134 individual humpback whales in the Gulf of Maine suggested that between 48% and 65% had experienced entanglements (Robbins and Mattila 2001). Decomposed and/or unexamined animals (e.g., carcasses reported but not retrieved or no necropsy performed) represent 'lost data', some of which may relate to human impacts

North Atlantic Right Whale

Status

"The western North Atlantic right whale (*Eubalaena glacialis*) population ranges primarily from calving grounds in coastal waters of the southeastern United States to feeding grounds in New England waters and the Canadian Bay of Fundy, Scotian Shelf, and Gulf of St. Lawrence" (Hayes et al. 2016).

Status of the stock of the US Atlantic right whale is considered to be extremely low relative to its Optimum Sustainable Population (OSP) and it's considered one of the most critically endangered populations of large whales in the world (Clapham et al. 1999). This is a strategic stock because the average annual human-related mortality and serious injury exceeds PBR, and also because the North Atlantic right whale is an endangered species

The North Atlantic right whale faced near extinction due to whaling. In 1992, 295 right whales were estimated alive (Knowlton et al., 1994 in Kraus et al. in Kraus et al., 2016). Growth from 1990 to 2010 averaged 2.8% per year with a minimum population count of 476 in 2011 (Waring et al. 2016) and 500 individuals in 2015 (Pettis and Hamilton, 2015). However, examinations from estimated minimum

number alive as of 2015 suggests that the abundance has declined compared to the years 1990–2012 (Hayes et al. 2016).

Since 2010 there has been a shift in the distribution of Atlantic right whales from previously prevalent northern grounds, such as the Bay of Fundy and greater Gulf of Maine (regions 3 and 4 in Figure 6), to spending more time in mid-Atlantic regions year-round (regions 7 and 8 in Figure 6) (Genevieve et al., 2017). Because abundance estimates are based on census of live animals, when there is a shift in the habitat use patterns in areas where most of the population has been observed in previous years, the likelihood of detecting individuals in the surveys declines. For this reason Hayes et al. (2016) recommend some caution in interpreting the apparent downward trend in abundance.

In order to address changes to right whale habitat use and distribution Pace et al. (2017) used an open population mark–resight/recapture (MRR) model to estimates of abundance and survival rates of North Atlantic right whales. The model indicates that after a the period of abundance increase from 270 in 1990 to 482 in 2010 , the abundance declined to 458 in 2015. Pace et al. (2017) note that the results from the model "[…] provide confidence that the observed lack of increase in North Atlantic right whales' abundance since 2011 is not due to reduced detection of whales in recent years, rather it reflects a true change in trend."

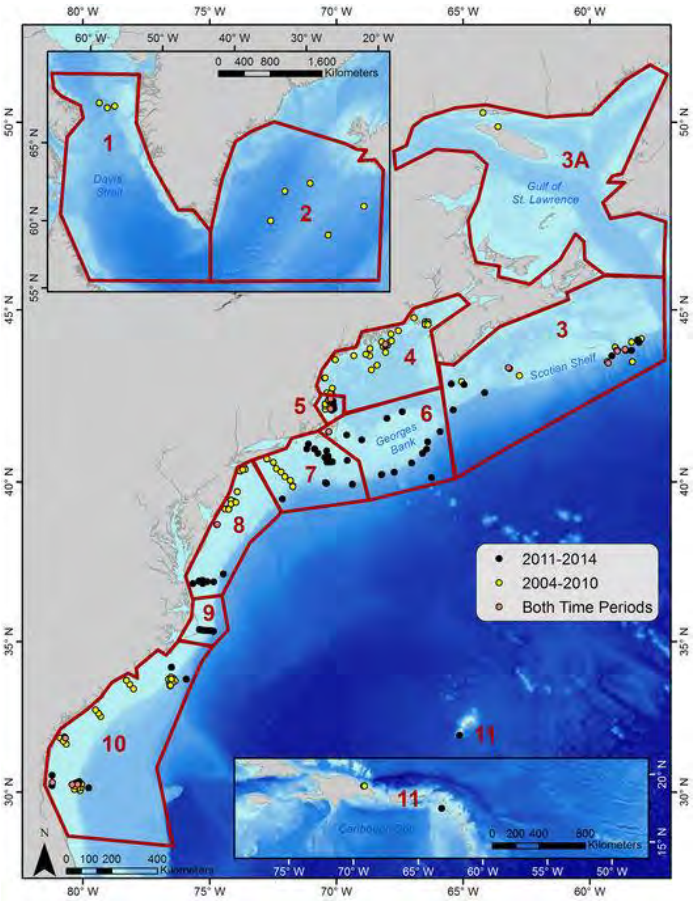

Figure 6. Long-term passive acoustic recordings track the changing distribution of North Atlantic right whales (*Eubalaena glacialis*) from 2004 to 2014 From Genevieve et al. (2017).

Quantitative UoA Impacts

The total level of human-caused mortality and serious injury is unknown. Vessel strikes and entanglements are believed to be the two leading causes of death for known mortalities of right whales. From 2010 through 2014 there was 24 records of mortality or serious injury involving entanglement or fishery interactions, the average reported mortality and serious injury to right whales due to fishery entanglement was 4.65 whales per year (United States: 0.40, Canada: 0.00, Unassigned 1st sighting in Canada: 2.5 and Unassigned first sighting in US: 1.75). For the confirmed human-caused mortality and serious injury records of North Atlantic right whales from 2010-2014 only one event was assigned to a gear type (pot/trap), the remaining incidents where either from unidentifiable gear, or when no gear was present or recovered.

According to the 2015 - 2017 preliminary entanglements in 2015 there were 4 right whales out of which 2 were believed to be non-life threatening. In 2016 preliminary entanglement reported 7 right whales (2 deceased) and as of March 28, 2017 there was one right whale that was disentangled completely. For this same period (2015-2017) for right whale the only gear recovered from US fisheries was lobster traps and snow crabs in Canada (Morin and Salvador, 2017).

Prior to 2010 there are records of right whales attributed to gillnet gear: between 1975 and 1990 there are six records of entanglements with groundfish gillnet gear in the Bay of Fundy and Gulf of Maine (Read 1994; Johnson et al. 2005 in Hayes et al. 2016). There is also a report of a calf mortality due to gillnet entanglement in the US, and "the only bycatch of a right whale observed by the Northeast Fisheries Observer Program was in the pelagic drift gillnet fishery in 1993" (Hayes et al. 2016).

Though in estimates from 2010 to 2014, only 0.4 out of the 4.65 estimated annual entanglement events could be assigned to country of origin, increased gear marking has allowed NMFS to identify gear to country of origin more frequently. According to information presented at the Atlantic Large Whale Take Reduction Team Meeting April 2017 ~25% of all large whale entanglements were attributed to U.S gear in 2015 and 40% in 2016.

Total human-caused mortality and serious injury was estimated to be a minimum of 5.65 right whales per year in this period. These minimum estimates have already exceeded the PBR, which has been calculated as 1.

A complication to accurate mortality and injury estimates is that entanglement events are unobserved, in the last couple decades no mortality or injury events have been documented by fisheries observers. Furthermore, "Information from an entanglement event often does not include the detail necessary to assign the entanglements to a particular fishery or location". Additionally whales will often free themselves of gear, and thus only scars can be used to indicate interactions with fisheries. A review of scars on right whales from 1980–2009 found that entanglement events are quite common in right whales (Hayes et al. 2016):

> Most individual whales (83%) were entangled at least once, and almost half of them (306 of 626) were entangled more than once. About a quarter of the individuals identified in each year (26%) were entangled in that year. Juveniles and calves were entangled at higher rates than were adults. Scarring rates suggest that entanglements are occurring at about an order of magnitude greater than that detected from observations of whales with gear on them. More recently, analyses of whales carrying entangling gear also suggest that entanglement wounds have become more severe since 1990, possibly due to increased use of stronger lines in fixed fishing gear (Knowlton et al. 2015).

Sub-lethal entanglement can significantly increase energetic costs, competing with the energetic requirements of reproduction to potentially increase calving intervals (van der Hoop, Corkeron, & Moore, 2017 in Meyer-Gutbrod et al. 2017).

Research conducted on scarring of Atlantic right whales from 1980–2009 and other studies on entanglement rates prior to 2009 concluded that the mitigation measures implanted up to that date were not effective in reducing whale entanglement (Hayes et al. 2016).:

> Knowlton et al. (2012) concluded from their analysis of entanglement scarring rates over time that efforts made since 1997 to reduce right whale entanglement had not worked. Working from a completely different data source (observed mortalities of eight large whale species,

> 1970–-2009), van der Hoop et al. (2012) arrived at a similar conclusion. Vessel strikes and entanglements were the two leading causes of death for known mortalities of right whales for which a cause of death could be determined. Across all 8 species of large whales, there was no detectable change in causes of anthropogenic mortality over time (van der Hoop et al. 2012). Pace et al. (2015) analyzed entanglement rates and serious injuries due to entanglement during 1999-2009 and found no support that mitigation measures that were implemented prior to 2009 were effective at reducing takes due to commercial fishing.[…]

Entanglement occurrences of large whales are rarely observed during fishing operations, and thus the observer program would not necessarily provide the required information. Entangled animals are usually not found in the same location where it was initially entangled, making it at times impossible to identify the gear type and area where the entanglement occurred. In the majority of the cases, no gear was documented or recovered, or the whale was carrying sections (line or rope) of unknown/undetermined gear type. These numbers are considered a minimum, since not all entangled whales are discovered or reported.

Of the 295 mortalities for all large whale stocks detected in 2011-2015: "12% are traced to entanglements [fisheries], 10% to vessel strike, 9% to natural causes and remaining 69% have unknown causes." (Atlantic Large Whale Take Reduction Team Meeting April 2017). In the US Atlantic coast of the 24 confirmed whale entanglement cases, recorded in 2014, seven were identified as associated with a gear type (3 cases were attributed to gill nets). (Morin et al, 2014). In 2015 there were 36 confirmed entanglements, 13 cases had identified gear type (none attributed to gill net). In 2016 there were 50 confirmed entanglements, 22 had identified gear type (five attributed to gill net) (Atlantic Large Whale Take Reduction Team Meeting April 2017).

A review of the management measures implemented to reduce take of right whales is covered in the section further down: Atlantic Large Whale Take Reduction Plan (ALWTRP) (p. 63).

Minke Whale

Minke whales (*Balaenoptera acutorostrata acutorostrata*) have a cosmopolitan distribution in temperate, tropical and high latitude waters. In the North Atlantic, there are four recognized populations—Canadian East Coast, west Greenland, central North Atlantic, and northeastern North Atlantic (Donovan 1991). The fishery interacts with the Canadian East Coast stock.

Current Population Trend (Hayes et al. 2016):

> A trend analysis has not been conducted for this stock. The statistical power to detect a trend in abundance for this stock is poor due to the relatively imprecise abundance estimates and long survey interval. For example, the power to detect a precipitous decline in abundance (i.e., 50% decrease in 15 years) with estimates of low precision (e.g., CV > 0.30) remains below 80% (alpha = 0.30) unless surveys are conducted on an annual basis (Taylor et al. 2007).

Annual Human-Caused Mortality and Serious Injury (Hayes et al. 2016):

> During 2010 to 2014, the average annual minimum detected human-caused mortality and serious injury was 8.25 minke whales per year: 0.2 minke whales per year from observed U.S. fisheries, 6.45 (1.7 U.S/2.5 Canada/2.25 unassigned but first reported in the U.S.) minke whales per year from U.S. and Canadian fisheries using strandings and entanglement data, and 1.6 (1.2 U.S./0.4 Canada) per year from vessel strikes. Data to estimate the mortality and serious injury of minke whales come from the Northeast Fisheries Science Center Observer Program, the At-Sea Monitor Program, and from records of strandings and entanglements in U.S. and

> Canadian waters. For the purposes of this report, mortalities and serious injuries from reports of strandings and entanglements considered confirmed human-caused mortalities or serious injuries are shown in Table 2 while those recorded by the Observer or At-Sea Monitor Programs are shown in Table 3. Detected interactions in the strandings and entanglement data should not be considered an unbiased representation of human-caused mortality. Detections are haphazard and not the result of a designed sampling scheme. As such they represent a minimum estimate, which is almost certainly biased low

Status of the stock (Hayes et al. 2016):

> Minke whales are not listed as threatened or endangered under the Endangered Species Act, and the Canadian East Coast stock is not considered strategic under the Marine Mammal Protection Act. The total U.S. fishery-related mortality and serious injury for this stock is not less than 10% of the calculated PBR and, therefore, cannot be considered to be insignificant and approaching zero mortality and serious injury rate. The status of minke whales relative to OSP in the U.S. Atlantic EEZ is unknown.

Fin Whale

The Western North Atlantic stock of fin whales (*Balaenoptera physalus*) constitutes those found off the eastern coast of the US, Nova Scotia, and southeastern Newfoundland (Donovan 1991); and they are particularly common in US EEZ waters from Cape Hatteras northward. Fin whales can be found in these waters in every season, and accounted for 24% of all cetacean sightings during aerial surveys conducted from Cape Hatteras to Nova Scotia in 1978-1982 (CETAP 1982). “In this region fin whales are the dominant large cetacean species during all seasons, having the largest standing stock, the largest food requirements, and therefore the largest influence on ecosystem processes of any cetacean species (Hain et al. 1992; Kenney et al. 1997)”. NOAA 2011 surveys estimate the Western North Atlantic stock is 1618 (CV=0.33), with a minimum population estimate of 1234. Fin whales are considered an endangered species under the ESA. (NOAA 2017)

From 2010-2014 the minimum annual human-caused mortality/serious injury number was 3.8 individuals per year, including 1.8 fisheries interactions and 2.0 vessel collisions (Henry et al 2016). “The total U.S. fishery-related mortality and serious injury for this stock derived from the available records is likely biased low and is not less than 10% of the calculated PBR. Therefore entanglement rates cannot be considered insignificant and approaching a zero mortality and serious injury rate” (NOAA 2017).

Atlantic Large Whale Take Reduction Plan (ALWTRP)

In 1997 NOAA Fisheries Service (NMFS) and the Atlantic Large Whale Take Reduction Team (ALWTRT) developed the Atlantic Large Whale Take Reduction Plan (ALWTRP) with the aim to “reduce the level of serious injury and mortality of three strategic stocks of large whales (North Atlantic right, humpback, and fin) in commercial gillnet and trap/pot fisheries” (NMFS, ALWTRP Home). The plan also includes minke whales.

The ALWTRP consists of a combination of regulatory and non-regulatory programs, including:

- broad-based gear modifications;
- time-area closures;

- expanded disentanglement efforts;
- extensive outreach efforts in key areas;
- research; and
- expanded right whale surveillance program to supplement the Mandatory Ship Reporting System.

After going into effect in 1997, the ALWTRP was updated in 1990 and 2000. In 2002 NMFS published three rules were published that "(1) made further modifications to commercial fishing gear, (2) established a system for temporarily restricting fishing in areas where unexpected aggregations of right whales are observed (Dynamic Area Management , DAM), and (3) established restricted areas based on the annual, predictable aggregations of right whales (Seasonal Area Management, SAM)" (NMFS, ALWTRP Home website).

In 2007 NMFS published a "final rule expanding the Southeast U.S. Restricted Area and prohibiting gillnet fishing or possession during the right whale calving season" and replaced the DAM and SAM programs by implementing broad-based gear modification strategy. This strategy included "expanded weak link and sinking groundline requirements; additional gear marking requirements; changes in boundaries; seasonal restrictions for gear modifications; expanded exempted areas; and regulatory language changes for the purposes of clarification and consistency"

In 2014 and 2015 the NMFS issued three additional amendments to the regulations implementing the Atlantic Large Whale Take Reduction Plan:

- June 27, 2014: this amendment (79 FR 36586) included gear modifications, gear setting requirements, a seasonal closure = for all trap/pot fisheries (Massachusetts Restricted Area) and gear marking for both the trap/pot and the gillnet fisheries" (NMFS 2014a)
- December 12, 2014: modified the start date of the Massachusetts Restricted Area, from January 1 to February 1, 2015; expanded the Massachusetts Restricted Area by 912 square miles and revised " the Federal lobster regulations to be consistent with the revised start date of the Massachusetts Restricted Area" (NMFS 2014a)
- May 28, 2015: includes a changes to lobster trap/pot gear and added additional gear marking requirements for trap/pot and gillnet gear marking in two important high use areas for both humpback and right whales; Jeffreys Ledge and Jordan Basin (NMFS 2015a)

Strategies such as gear marking are not expected to directly reduce entanglement ratios, but rather provide information to develop appropriate mitigation measures (Hayes et al. 2016).:

> Although gear marking will not reduce entanglements by itself, it is expected to facilitate monitoring of entanglement rates and assist in designing future entanglement reduction measures in targeted areas deemed important by the Team. We feel that the proposed gear marking combined with the current gear marking scheme is sufficient and will help us target specific areas for future management if further measures are deemed necessary.

In October 2017 NMFS completed a 5-Year review and evaluation of the north Atlantic Right whale (NMFS 2017a). The review recommended that the classification for the North Atlantic right whale remain as Endangered and concluded that "In many ways, progress toward right whale recovery has regressed." The review noted that significant progress has been made "implementing regulations to reduce lethal fisheries interactions with right whales through the Take Reduction Plan". The review

recommended that “More comprehensive evaluative research should be conducted and additional regulatory action should be undertaken” and concluded with a specific list of recommendations to NMFS, including the following.

- Dedicate additional staff personnel to focus on right whale recovery efforts.
- Consider how best to utilize recovery teams to enlist expertise in right whale research and management. The recovery team should be convened as soon as possible.
- Develop a long-term, cross-regional plan for monitoring right whale population trends and habitat use.
- Continue to prioritize and fund a combination of acoustic, aerial, and shipboard surveys for right whale surveillance.
- Conduct evaluative research to determine the effectiveness of the Atlantic Large Whale Take Reduction Plan.
- Continue to evaluate the effectiveness of the ship speed rule, including determining whether current seasonal management area geographic and temporal boundaries should be modified.
- Develop a strategy to understand the energetic stressors on right whales, including environmental variables, prey availability, and the effect of chronic, sublethal entanglement on overall and reproductive health.
- Continue to develop a partnership with the government of Canada on the reduction of human-interactions with right whales, including the implementation and assessment of ship speed regulations and cooperation on fishing gear marking and measures to reduce entanglements.
- Evaluate the current status of the species and serious injury/mortality triggers in biological opinions for commercial fisheries consultations under Section 7 of the Endangered Species Act to determine if re- initiation is warranted.
- Prioritize research on understanding the effects of climate change on right whale foraging, migration, reproduction, habitat use, and distribution.
- Prioritize the development of a population viability analysis (PVA) or other assessment to determine the North Atlantic right whale extinction risk.
- Conduct research to improve gear modifications and gear marking to inform management for the development of more finely scaled commercial fisheries regulations.
- Continue to fund the maintenance and development of a photo ID database for North Atlantic right whales. NMFS should work with curators and data contributors to identify and implement a method or allowing all qualified researchers to enter sightings data into the catalog.

In the November 30, 2017 at the Atlantic Large Whale Take Reduction Team Monitoring Webinar (NMFS 2017b), it was noted that the following recommendations from the 5-year review are already underway: “1. Convening a bilateral work group with Canada to focus on addressing science and management gaps, 2. Reinitiate our fisheries Biological Opinions under the Endangered Species Act, 3. Designating a dedicated Right Whale Recovery Coordinator in the Greater Atlantic Region, 4. Developing a new North Atlantic Right Whale Recovery Implementation Team”

At the November webinar NMFS also announced the formation of two new Team Subgroups to begin working in January 2018 focusing on specific topics: "Subgroup 1 will investigate the feasibility of using whale release rope (rope with a 1,700 lb. breaking strength) and alternative approaches to gear marking. Subgroup 2 will investigate the feasibility of ropeless fishing." (NMFS 2017b). A part of the monitoring plan the in January 2018 an expert panel will be organized to assess the effectiveness of the regulations"

In term of enforcement updates the United States Coast Guard (USCG) had "three cases involving violations of gillnet vessels in the Northeast and mid-Atlantic. These cases included failure to have an anchor, buoy lines that weren't marked, and failure to use weak links." There was an 87.4% compliance rate.

Small Cetaceans

Common Bottlenose Dolphin

Until 2011 "NMFS recognized only a single stock of coastal bottlenose dolphins [*Tursiops truncatus truncatus]* in the WNA [Western Northern Atlantic], and the entire stock was listed as depleted". The stock structure was revised to recognize multiple stocks including both resident estuarine stocks and migratory and resident coastal stocks. The common bottlenose dolphin stocks now included in the Western North Atlantic Stock include: the Northern Migratory Coastal, the Southern Migratory coastal, the Northern NC estuarine system (NNCES) and the Southern NC estuarine system (SNCES) stocks (Waring et al., 2016). These stocks retains the depleted designation from the original western North Atlantic Coastal Stock and have strategic status.

The PBR and estimates for annual human-caused mortality for these stocks for 2009-2013 are described in Table 18.

Northern Migratory Coastal Stock: Estimated mortality ranges < PBR, <50%PBR and >ZMRG
PBR is 86 "and so the zero mortality rate goal [ZMRG], 10% of PBR, is 8.6. The documented mean annual human-caused mortality for this stock for 2009–2013 ranged between a minimum of 1 and a maximum of 12.0" (Waring et al., 2016)

Southern Migratory Coastal Stock: Estimated mortality ranges < PBR, <50%PBR and >ZMRG
(PBR is 63 and so the zero mortality rate goal, 10% of PBR, is 6.3. The documented mean annual human-caused mortality for this stock for 2009 – 2013 ranged between a minimum of 0 and a maximum of 12.0.) (Waring et al., 2016)

Northern NC estuarine system (NNCES) stock: Estimated mortality ranges >PBR, >50%PBR and >ZMRG (PBR is 7.8 and so the zero mortality rate goal, 10% of PBR, is 0.8. The documented mean annual human-caused mortality for this stock for 2009 – 2013 ranged between a minimum of 1.0 and a maximum of 16.7) (Waring et al., 2016)

Southern NC estuarine system (SNCES) stock: PBR is unknown for this stock, estimated mortality maximum ranges are "Likely mall and relatively few mortalities and serious injuries would exceed PBR, NMFS considers the SNCES Stock to be a strategic stock under the MMPA. The documented

mean annual human-caused mortality for this stock for 2009–2013 ranged between 0 and 0.4." (Waring et al., 2016)

The mortality estimates for the WNA bottlenose dolphin stocks are considered to be minimum estimates of total fishery-related mortality because; due to spatial overlap among WNA stocks it's not always possible to assign a mortality to a specific stock, observer estimates for 2012-2013 for the mid-Atlantic gillnet fishery are missing, and lastly there are several fisheries operating in the regions where these stocks occur that have little to no observer coverage. Consequently, there is insufficient data to determine population trends for the WNA bottlenose dolphin stocks, and their status relative to their Optimum Sustainable Populations (OSP) is unknown (Waring et al., 2016)

The primary known source of estimated fishery mortality which has the potential to affect the WNA stocks is the mid-Atlantic coastal gillnet fishery. To reduce bycatch in gillnet gear in 2006 the Bottlenose Dolphin Take Reduction Plan (BDTRP) was implemented. The BDTRP includes regulatory management measures for small, medium, and large mesh gillnets, depending on location of fishing area. The regulatory measures of the BDTRP include gear modifications, time and area closures, and limited soak durations. The non-regulatory measures include continued research and monitoring, enforcement, outreach, and partnership efforts (NMFS, 2006).

Following the implementation of the BDTRP in May 2006, the BDTRP team members hold annual meetings to discuss the effectiveness of the BDTRP and propose recommendations. The last meeting was held on November 2015, the next meeting is planned for 2017. Since the inception of the BDTRP Plan, two additional Amendments have been passed based on recommendations of the BDTRP. In 2012 the BDTRP was amended to permanently restrict medium mesh gillnet nighttime fishing North Carolina coastal state waters from November 1 through April 30. The intent of this regulation was to reduce bottlenose dolphin serious injuries and mortalities by reducing gillnet soak times associated with medium mesh gillnets targeting spiny dogfish in North Carolina coastal state waters (NOAA 2012 50 CFR 229)[2]. In 2014, a second Amendment was passed to require year-round use of modified pound net leaders in specified waters. The intent of this measure was reduce serious injury and mortality of the WNA Northern Migratory coastal and NNCES stocks with the Virginia pound fishery and respond to the possibility that the NNCES stock likely exceeding PBR[3].

In the last meeting held November 2015, it is mentioned that to support Team discussions on possible measures to improve Plan effectiveness, NOAA intended to develop more information on "(1) strategies to improve observer coverage, (2) updated mortality estimates for North Carolina stocks; (3) updated abundance estimates for the SNCES; and (4) updated stranding/mortality analysis."(Bottlenose Dolphin Take Reduction Team Webinar November 2016 Memorandum)

[2] Final Rule https://www.federalregister.gov/documents/2012/07/31/2012-18667/taking-of-marine-mammals-incidental-to-commercial-fishing-operations-bottlenose-dolphin-take
Proposed Rule: https://www.federalregister.gov/documents/2012/04/12/2012-8770/taking-of-marine-mammals-incidental-to-commercial-fishing-operations-bottlenose-dolphin-take
[3] Proposed Rule: https://www.federalregister.gov/documents/2014/04/17/2014-08665/taking-of-marine-mammals-incidental-to-commercial-fishing-operations-bottlenose-dolphin-take

Common dolphin

(PBR = 557, all fisheries annual take 2010-2014 = 409)

The common dolphin may be one of the most widely distributed species of cetaceans, as it is found worldwide in temperate, tropical, and subtropical seas. They are widespread from Cape Hatteras northeast to Georges Bank (35° to 42° North latitude) in outer continental shelf waters from mid-January to May. Exact total numbers of common dolphins off the US or Canadian Atlantic coast are unknown, although the most recent Stock Assessment Report considers the best abundance estimate for common dolphins to be 70,184 (Coefficient of Variation (CV) =0.28). The most recent SAR notes that the population estimate is now substantially lower than the previous estimate, not due to a decline in stock abundance, but rather exclusion of data from surveys in Canadian waters.

The 2010-2014 average annual mortality attributed to the northeast bottom trawl was 52 animals (CV=0.2). The 2010-2014 average annual mortality attributed to the Mid-Atlantic bottom trawl was 243 animals (CV=0.14).

Status of the stock

> Common dolphins are not listed as threatened or endangered under the Endangered Species Act, and the Western North Atlantic stock is not considered strategic under the Marine Mammal Protection Act. The 2010–2014 average annual human-related mortality does not exceed PBR. The total U.S. fishery-related mortality and serious injury for this stock is not less than 10% of the calculated PBR and, therefore, cannot be considered to be insignificant and approaching zero mortality and serious injury rate. The status of common dolphins, relative to 117 OSP, in the U.S. Atlantic EEZ is unknown. Population trends for this species have not been investigated

Long-finned pilot whale

There are two species of pilot whales in the Western Atlantic - the Atlantic (or long-finned) pilot whale, *Globicephala melas*, and the short-finned pilot whale, *G. macrorhynchus*. These species (sp.) are difficult to identify to the species level at sea.

Under the basis for Current Classification in the NOAA fisheries website in the Mid-Atlantic bottom trawl fishery it states that short-finned mortality in this fishery is between 1% and 50% of the stocks' PBR. However, in the 2016 US Atlantic and Gulf of Mexico Marine Mammal Stock Assessments indicates that interactions with pilot whales north of 40°N latitude and in areas expected to have only long-finned pilot whales, where attributed to the long-finned pilot whale stock. The fisheries listed that could potentially interact with short-finned pilot whale--Mexico large pelagics longline and Atlantic Highly Migratory Species, Atlantic tuna purse seine and commercial passenger fishing vessel (hook and line) fisheries-- do not include Mid-Atlantic bottom trawl. Short-finned pilot whale was not included as an ETP species affected by the bottom-trawl UoA.

The best estimate population size for long-finned pilot whales to be 5,636 (C.V. = 0.35).

According to the 2017 stock assessment summary, the long-finned pilot whale is not listed as threatened or endangered under the Endangered Species Act, but the western North Atlantic stock is considered strategic under the MMPA because the mean annual human-caused mortality and serious

injury exceeds PBR. The status of this stock relative to an optimum sustainable population level in the U.S. Atlantic EEZ is unknown and there are insufficient data to determine the population trends for this stock.

The 2010-2014 average annual mortality of long-finned pilot whales attributed to the northeast bottom trawl was 33.2 animals (CV=0.15). There were zero mortalities of short-finned pilot whales attributed to the northeast fleet and no estimated mortalities for the Mid-Atlantic bottom trawl fleet over this period for either species.

Based on the most recent impact estimation and PBR, northeast bottom trawl merits classification as a Category 1 fishery. There is significant uncertainty in the stock assessment, where methodologies to separate the long-finned and short-finned pilot whale stocks is under development, and the 2017 stock assessment report states that the 2011 surveys that support the population estimate likely underestimate overall abundance because they did not survey the Scotian Shelf where high densities of pilot whales have been observed. However, the published stock assessment is expected to represent the best available information.

In April 2003, a settlement agreement was signed between the Center for Biological Diversity (CBD) and NMFS to convene a take reduction team (TRT) to address the incidental mortality and serious injury of long-finned pilot whales (*Globicephala melas*), short-finned pilot whales (*Globicephala macrorhynchus*), common dolphins (*Delphinus delphis*), and white sided dolphins (*Lagenorhynchus acutus*) incidental to the Mid-Atlantic mid-water trawl fishery, as well as other trawl fisheries The intended plan was for the Atlantic Trawl Gear Take Reduction Team to be convened in 2006[4]. In 2008 NMFS prepared the Atlantic Trawl Gear Take Reduction Strategy. There is no evidence that the strategy was finalized and the take reduction team implemented.

[4] https://www.greateratlantic.fisheries.noaa.gov/prot_res/atgtrp/ATGTRT.factsheet.pdf

Harbor Porpoise

From Hayes et al (2016):

> Harbor porpoise in the Gulf of Maine/Bay of Fundy are not listed as threatened or endangered under the Endangered Species Act, and this stock is not considered strategic under the MMPA. The total U.S. fishery-related mortality and serious injury for this stock is not less than 10% of the calculated PBR and, therefore, cannot be considered to be insignificant and approaching zero mortality and serious injury rate. The status of harbor porpoises, relative to OSP, in the U.S. Atlantic EEZ is unknown. Population trends for this species have not been investigated.

The PBR for Harbor Porpoise is 706, the 50% of PBR is 353, the zero mortality rate goal, 10% of PBR, is 70.6. For the 2010-2014 period the estimated total mean annual serious injury and mortality is of 437 (Northeast Sink Gillnet= 293, Mid-Atlantic Gillnet=97, North Atlantic Bottom Trawl= 4) (Hayes et al 2016):

Northeast Sink Gillnet: Estimated mean annual mortality >50% PBR and >ZMRG

Mid-Atlantic Gillnet: Estimated mortality ranges <PBR and >ZMRG

North Atlantic Bottom Trawl: Estimated mortality ranges <PBR and <ZMRG

In 1996 and 1997 two Take Reduction Teams--one for Gulf of Maine and Southern New England gillnet fisheries, and another for the Mid-Atlantic gillnet—were convened to develop a plan to reduce harbor porpoise bycatch. The Harbor Porpoise Take Reduction Plan (HPTRP) was implemented in late 1998. Management measures under the HPTRP included seasonal closure areas and requirements to attach pinger (acoustic alarms) to deter porpoises, and outreach and education on the use of pingers (van Beest et al., 2017; Orphanides and Palka, 2013).

The first year of implementation of the HPTRP, in 1999, effectively reduced bycatch. However, after the first year's bycatch of harbor porpoise increased steadily, by 2005 annual bycatch estimate were slightly above the PBR. The increase in bycatch "appears to have been driven by several factors, including a fishing effort shift into areas not managed under the HPTRP, increased effort targeting monkfish, inter-annual variability in environmental factors, and poor compliance with regulatory mandates" (Orphanides and Palka, 2013). After a dip the bycatch estimates increased to even higher levels in 2008 and 2009.

In 2007 analysis revealed poor compliance in area closures, particularly for the Mid-Atlantic, and that only between 50 and 80% of observed hauls had 90% of the required pingers. "This is particularly important because in areas where pingers were required, gillnet strings with fewer pingers than required were found to have bycatch rates 2 to 3 times higher than those with the full complement of pingers (Palka et al. 2008)." (Orphanides and Palka, 2013).

Orphanides and Palka (2013) note that low levels of enforcement were probably due to a number of factors, including the difficulties of observing gear modifications and testing pinger functionality. Another challenge identified by Bisak and Das (2015) is the absence of a systematic way to monitor compliance of pinger regulations.

In December 2007 the HPTRT convened to address the recent increases in bycatch. The HTRP modifications were agreed on 2008, the proposed rule was published in 2009 and the final rule was published in 2010 (75 FR 7383, February 19, 2010). The 2010 amendment included the expansion of season and temporal requirements, and closure of areas when harbor porpoise bycatch was exceeded, as a measure to incentivize use of pingers. Subsequently NOAA emphasized increase in compliance, which is conducted principally by the Coast Guard, and use of pinger technology (NMFS 2011)

In 2013 a rule was passed which eliminated the consequence closure strategy enacted in 2010. This action was seen as necessary to prevent improper triggering of closure areas (Federal Register 61821 Vol. 78, No. 193)[5]. In the 2013 amendment to the HTRP, the emphasis was placed on continuing the work of NMFS and the Take Reduction team to consider additional measures via the "Monitoring and Enforcement Workgroups".

Estimated bycatch for harbor porpoise has decreased since 2010 and has remained below PBR since 2011 to the latest estimates in 2014. In November 2016 the last Tale Reduction team meeting was held via webinar. Draft estimates on compliance level presented at the meeting indicated that for New England there was low bycatch, and that pinger compliance (referring to presence, not functionality was 86%. In the Mid-Atlantic total compliance was 76%; 55% for large mesh and 88% for the small mesh. Presentations also indicated that efforts to improve purchases of pingers from manufactures with lower failure rate. Representatives from the Office of Law Enforcement (OLE) noted that some of the challenges of enforcement are the multiple fishing permits, which difficult targeting particular fleets/vessels and challenges in using in-water pinger testers to check for pinger functionality, preferring instead to board and visually inspect the gear for compliance (HTPR Webinar, 2016).

In early 2017 published an enforcement update describing the recent distribution of pinger detector units to three state enforcement partners ((Maine, Massachusetts, and Rhode Island) to assist in enforcing the regulations implementing the Harbor Porpoise Take Reduction Plan (HPTRP) (NMFS n.d.)

Sea Turtles

"Interactions between turtles and commercial fishing gear are considered a threat to the recovery of several species of turtles, including loggerheads (*Caretta caretta*), greens (Chelonia mydas), Kemp's ridleys (*Lepidochelys kempii*), and leatherbacks (*Dermochelys coriacea*)" (Murray 2013)

[5] The consequence closure target bycatch rates were based on the number of observed harbor porpoises caught per metric tons of fish landed between 1999 and 2007 within the areas subject to a closure. Since the advent of sectors, the overall fishing effort generally remained the same and the number of harbor porpoise caught actually decreased and is below the stock's potential biological removal (PBR) level (Table 1). However, because fish landings also decreased, the observed bycatch rates increased above the closure area target bycatch rates resulting in the triggering of the closures. As stated previously, the bycatch rate trigger was intended to function such that the triggering of it meant that the overall bycatch of harbor porpoise was above PBR. Given the overall reductions in fish landings, however, this calculation no longer holds true. Preliminary data indicate that the annual 2010–2012 harbor porpoise bycatch estimates are below PBR, and that the 5-year average incorporating the most recent data from 2011–2012 is also below PBR

Information on interactions of the three UoA with sea turtles was obtained from the Northeast Fisheries Observer Program (NEFOP). Estimated interactions of commercial bottom trawl are higher for loggerheads, and areas of high interactions occur mostly in the in U.S. Mid-Atlantic bottom trawl fisheries occur south of 37◦N in warm in shallow waters. The bottom trawl fisheries with higher interactions are those targeting Atlantic croaker (*Micropogonias undulatus*) in the southern Mid-Atlantic followed by the Summer flounder fishery. Interactions of bottom trawl with Kemp's ridley (*Lepidochelys kempi*) and leatherback (*Dermochelys coriacea*) occurs in low numbers (Murray KT. 2008.)

Similarly, for gillnet fisheries higher interaction rates a in the southern Mid-Atlantic, in warm surface temperature water, and in large mesh nets (SOURCE). For gillnets interactions are estimated as "hard-shelled" turtles, which includes loggerheads plus other unidentified hard-shelled species.

Table 19. The most recent average annual estimates of sea turtle interactions and their associated coefficient of variation (CV) in U.S. Mid-Atlantic commercial fisheries. Modified form the 2017 Standardized Bycatch Reporting Methodology Annual Discard Report with Observer Sea Day Allocation (NEFSC 2017e).

Fishery	Estimate	CV	Years Included	Species	Reference
Bottom trawl, for fish and scallops	231	0.13	01 Jan 2009-2013	Loggerhead	Murray 2015a
Sea Scallop Dredge	22	0.73	01 Jan 2009 - 2014	Loggerhead	Murray
Sink Gillnet	89	0.26	01 Jan 2007-2001	Loggerhead	Murray
Sink Gillnet	95	0.21	01 Jan 2007-2011	Hard-shelled	Murray

Loggerheards

There is place a "Recovery Plan for the Northwest Atlantic Population of the Loggerhead Sea Turtle (*Caretta caretta*)" (NMFS 2008) which was revised in 2008. The recovery plans which lists as one of its objectives to "Minimize bycatch in domestic and international commercial and artisanal fisheries."

In 2009, NOAA Fisheries and USFWS published an updated status review for the loggerhead Northwest Atlantic Ocean (NWA) Distinct Population (DPS). The assessment concluded that the loggerhead NWA DPS is currently at risk of extinction (Conant et al., 2009):

> […] the Northwest Atlantic Ocean DPS is likely to decline in the foreseeable future, even under the scenario of the lowest anthropogenic mortality rates. These results are largely driven by mortality of juvenile and adult loggerheads from fishery bycatch that occurs throughout the North Atlantic Ocean. Although national and international governmental and non-governmental entities on both sides of the North Atlantic are currently working toward reducing loggerhead bycatch, and some positive actions have been implemented, it is unlikely that this source of mortality can be sufficiently reduced across the range of the DPS in the near future because of the diversity and magnitude of the fisheries operating in the North Atlantic, the lack of comprehensive information on fishing distribution and effort, limitations on implementing demonstrated effective conservation measures, geopolitical complexities, limitations on enforcement capacity, and availability of comprehensive bycatch reduction technologies. Therefore, the BRT concluded that the Northwest Atlantic Ocean DPS is currently at risk of extinction.

The assessment of Loggerhead Sea turtles in the Western North Atlantic Ocean conducted by the Turtle Expert Working Group

Kemp's ridley

The Bi-National Recovery Plan for Kemp's ridleys (NMFS et al. 2011) contained a model that predicted the population to grow 19% per year from 2010-2020. However, the increase in nesting numbers stopped after 2009, and an updated model found a population decline of over 40% per year (Heppell unpublished data in NMFS and USFWS 2015). These results indicate the population is not recovering. Potentially related to the 2010 oil spill in the Gulf of Mexico

Green

Nesting in the North Atlantic Distinct Population Segment is considered to be increasing (Seminoff et al. 2015). In particular, Statewide Florida surveys have shown an increasing trend of green sea turtle nesting since 1989 (FFWCC 2017 unpub. data).

Leatherbacks

In the Atlantic, an increasing or stable population trend is seen in all regions except the Western Caribbean and West Africa (TEWG 2007). The largest population in the Atlantic, French Guinea and Suriname, is found to have a stable population (based on nest numbers 1977 to 2005; Fossette et al. 2008). Stewart et al. (2011) evaluated nest counts from 68 Florida beaches over 30 years (1979-2008) and found that nesting increased at all beaches with trends ranging from 3.1%-16.3% per year, with an overall increase of 10.2% per year. Florida nest counts since 2008 have been increasing (FFWCC 2017 unpub. data).

Management measures

Several conservation measures have been implemented in the southern Mid-Atlantic to reduce the likelihood of commercial interactions with sea turtles, including the following mesh size regulations for gillnets in areas of seasonal occurrence of loggerheads and use of TEDs for bottom trawls fishing for summer flounder in specific times and areas off Virginia and North Carolina.

From the assessment of loggerhead sea turtles in the Western North Atlantic Ocean conducted by the Turtle Expert Working Group (Conant et al. 2009):

> […]Considerable effort has been expended since the 1980s to document and address fishery bycatch, especially in the United States and Mexico. Observer programs have been implemented in some fisheries to collect turtle bycatch data, and efforts to reduce bycatch and mortality of loggerheads in certain fishing operations have been undertaken and implemented or partially implemented. These efforts include developing gear solutions to prevent or reduce captures or to allow turtles to escape without harm (e.g., TEDs, circle hooks and bait combinations), implementing time and area closures to prevent interactions from occurring (e.g., prohibitions on gillnet fishing along the mid-Atlantic coast during the critical time of northward migration of loggerheads, implementation of careful release protocols (e.g., requirements for careful release of turtles captured in longline fisheries), prohibitions of gillnetting in some U.S. state waters), and/or modifying gear (e.g., requirements to reduce mesh size in the leaders of pound nets in certain U.S. coastal waters to prevent entanglement)
>
> The primary bycatch reduction focus in the Northwest Atlantic, since the 1978 ESA listing of the loggerhead, has been on bycatch reduction in shrimp trawls. The development of turtle excluder devices (TEDs) in the 1970s and the refinement of these devices over the past three

> decades has been a primary focus of loggerhead bycatch reduction efforts. The U.S. has required the use of TEDs throughout the year since the mid-1990s, with modifications required and implemented as necessary (NMFS 1987, 52 FR 24244; NMFS 1992, 57 FR 57348). Most notably, in 2003, NMFS implemented new requirements for TEDs in the shrimp trawl fishery to ensure that large loggerheads could escape through TED openings (NMFS 2003, 68 FR 8456). Significant effort has been expended to transfer this technology to other shrimping fleets in the Northwest Atlantic; 135 however, not all nations where loggerheads occur require the device be used. Enforcement of TED regulations is difficult and compliance is not believed to be complete. Because TEDs are not 100% effective, a significant number of loggerheads are estimated to still be killed annually in shrimp trawls throughout the Northwest Atlantic.

Use of TEDS is not currently required in all of the trawls fisheries that are part of the dogfish trawl UoA. This is an area of ongoing research. In 2010 a large flounder grid TED design was tested in Southern New England. Initially, there was a loss of ~55% but after making modifications the loss decreased to 10%, which was not significant (DeAlteris 2010). However, this 10% figure was based on only 16 paired tows on a single vessel. Currently, there are field tests ongoing for a cable TED design. A cable TED as it may be more operationally feasible with net reels and vessel configurations used in this area.

In 2014 the NMFS and USFWS convened a critical habitat review team (CHRT) to assess and evaluate of critical habitat areas for the Northwest Atlantic Ocean and North Pacific Ocean DPSs. Critical habitat is defined as" the specific areas within the geographical area occupied by the species at the time it was listed and contain physical or biological features (1) which are essential to the conservation of the species and (2) which may require special management considerations or protection." (SOURCE 78 FR 39855, August 11, 2014) Based on this report 38 specific marine areas within the Northwest Atlantic Ocean DPS were designated as critical habitat. These areas are classified as: Nearshore reproductive habitat, winter area, breeding areas, constricted migratory corridors, and/or Sargassum habitat (NMFS 2014c).

Biological Opinion

The Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.) requires that consultations are carried out in relation to commercial fisheries to ensure that the authorized activities are not jeopardize the continued existence of any endangered or threatened species. Traditionally these consultations (Biological Opinions) for section 7 ESA evaluated the impacts on ESA-listed species for each Fisheries Management Plan individually. Due to the challenges of attributing Atlantic sturgeon takes to any particular FMP, NMFS elected to combine seven FMPS in the latest 2013 Biological Opinion on ESA-listed species. The seven FMPs included are: (1) Northeast multispecies (multispecies), (2) monkfish, (3) spiny dogfish, (4) Atlantic bluefish (bluefish), (5) Northeast skate complex (skate), (6) Atlantic mackerel/squid/butterfish (MSB), and (7) summer flounder/scup/black sea bass (FSB) fisheries (NMFS 2013).

After the review of observer records from 2008 to 2012, the Northeast sea turtle injury workgroup calculates the sea turtle interactions expected to occur annually in the evaluated gear types and the anticipated mortality (See Table 20). For loggerheads based on the 2008 population viability analysis (PVA) NMFS concluded that the anticipated lethal removal is not likely to result in any appreciable decline to the Loggerhead NWA DPS.

Table 20. Sea Turtle interactions expected to occur annually in the trawl and gillnet component of the seven FMP's evaluated in the 2013 Biological Opinion. IT= Interaction L=Lethal

Gear Type	Loggerhead		Leatherback		Kemp's ridley		Olive Ridley	
	IT	L	IT	L	IT	L	IT	L
Gillnet	269	167	4	3	4	3	4	3
Trawl	204*	67*	4	2	3	2	3	2

*Trawl annual interaction lowered from 213 to 204

The assessment team has noted that the 2017 estimated SBRM estimated interactions (Table 19) for trawl exceed the ITS. NMFS uses 5-year estimates to evaluate annual interactions relative to the Incidental Take Statements (ITS), due to the small number of observed interactions that make annually produced estimates less reliable than estimates using multiple years of data. NMFS states that in addition to its 5-year reviews it considers on an annual basis observed takes of loggerhead turtles to consider trends in takes and look for patterns and changes in take levels. For sea turtle species other than loggerheads, NMFS will use all available information (e.g., observed takes, changes in fishing effort, etc.) to assess if the annual incidental take level in the Opinion has been exceeded.

Observer Coverage

Annually the National Marine Fisheries Service (NMFS) reviews information on sea turtle-fishery interactions, sea turtle distribution and spatial overlap with fisheries operations, sea turtle standings and temporal overlap with fisheries operations, and fishing techniques and gears used that are known or likely to result in incidental take of sea turtles. This information is used to determine which commercial and recreational fisheries should be considered for inclusion on the Annual Determination (AD). The MMPA List of Fisheries (LOF) is used as the comprehensive list of commercial fisheries for consideration. The fisheries identified through the Annual Determination process will be required to carry sea turtle observers upon request for a 5-year period in order to: learn more about sea turtle interactions in that fishery, evaluate existing measures to reduce or prevent prohibited sea turtle "takes", determine whether additional measures may be necessary to prevent sea turtle takes.

The Proposed 2018 Annual Determination proposed to include 2 new fisheries, one of them is part of the UoA of this fishery; the Mid-Atlantic Gillnet Fishery. The reason for including this fishery is due to "known interactions between sea turtles and this gear type and the need to collect more sea turtle bycatch data in state inshore gillnet fisheries". The current AD in place already includes the Chesapeake Bay Inshore Gillnet Fishery and Long Island Inshore Gillnet fishery. By including the Mid-Atlantic gillnet fishery in the 2018 AD NMFS will be able to authorize more observer coverage to cover the mid-Atlantic region (82 FR 48674).

Oceana has challenged the adequacy of NMFS' 2013 Biological Opinion on these 7 FMPs regarding the likelihood that continued operation of these fisheries will be likely to jeopardize the continued existence of the NWA DPS of loggerhead sea turtles (Oceana, Inc., v. Pritzker, et al., No. 1:12-cv-00041-PLF (D.D.C.)). The Plaintiff, Oceana, Inc., alleged that NMFS's no-jeopardy determination was arbitrary and capricious, and asked the Court to vacate the 2013 BiOp. On August 31, 2015, Judge Friedman

ruled in NMFS's favor in regards to the 2013 BiOp's no jeopardy finding and incidental take limits set for loggerheads (DNs 51 & 52, attached here). However, he remanded NMFS to provide (1) further explanation of the agency's conclusions that the short-term effects of climate change are not significant; and (2) further explanation of how the agency will monitor trawl and gillnet takes effectively when new take estimates are only produced every five years (and why the agency is not simply sending out more observers). He also directed the agency to complete a new BiOp, at the very latest, by the end of this BiOp's ten-year term (in 2023). As of the publication of this report, submission of the remand response and several additional response by both parties had been submitted, and both parties are awaiting final ruling from the judge.

Fishes

Atlantic sturgeon Status

The Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) are long-lived, late maturing, estuarine dependent, anadromous fish. NMFS has divided U.S. populations of Atlantic sturgeon into five population segments (DPS). These are: the Gulf of Maine (GOM), New York Bight (NYB), Chesapeake Bay (CB), Carolina, and South Atlantic DPSs

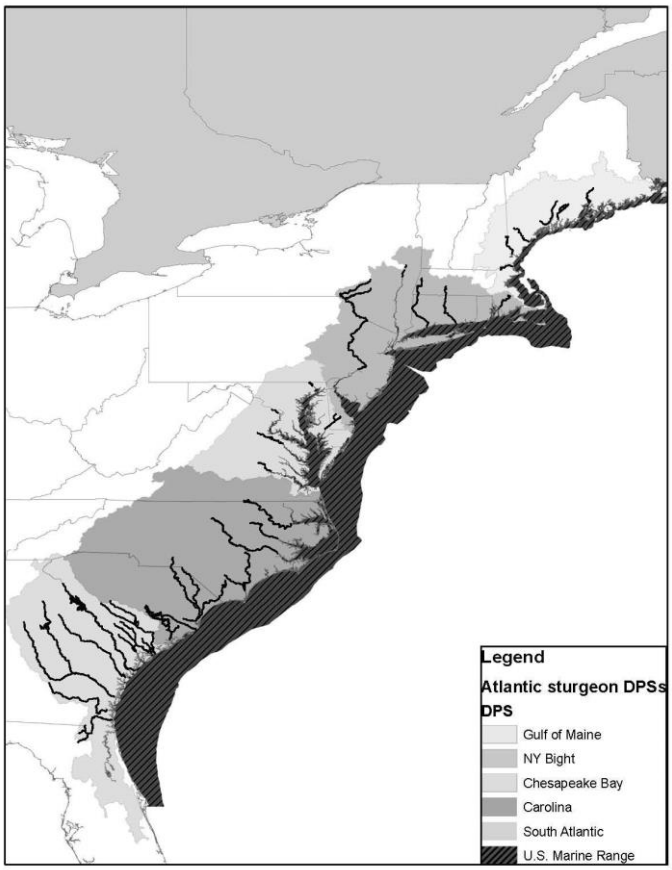

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Figure 7. Geographic Locations for the Five ESA-listed DPSs of Atlantic Sturgeon. From NMFS 2013.

). The range of all five DPSs overlaps and extends from Canada through Cape Canaveral, FL (NMFS 2013).

Given their life history characteristics Atlantic sturgeon are susceptible to over-exploitation. Atlantic sturgeon experienced significant declines throughout its range from historical abundance levels due to overfishing in the mid to late 19th century and impacts to its habitat. In 2012 NOAA's Fisheries Service announced a final decision to list the five DPS of Atlantic sturgeon under the Endangered Species Act; he CB, NYB, Carolina, and South Atlantic DPSs of Atlantic sturgeon were listed as endangered, while the GOM DPS was listed as threatened. Atlantic sturgeon from any of the five DPSs could occur in areas where Spiny Dogfish fisheries operate, and the species has been captured in gillnet and bottom trawl gear (NMFS 2013).

Since the ESA listing of Atlantic sturgeon, new stock assessment efforts have been completed (Kocik et al. 2013). Localized abundance estimates are produced from fishery-independent surveys. As these are not directed for Atlantic sturgeons they don't sample all the location and times where Atlantic sturgeon are present. The Northeast Area Monitoring and Assessment (NEAMAP) survey, was used to calculate swept area estimates for 2009-2012 of 67,776 fish, which is considerably higher than the estimates that were available at the time of listing (NMFS 2013). These are considered minimum estimates because the calculation makes the unlikely assumption that the gear will capture 100% of the sturgeon in the water column along the tow path

Assuming a 50% efficiency of the NEAMAP survey, since they survey does not sample all the locations and times where Atlantic sturgeon are present, the abundance estimate of 67,776 fish was partitioned by DPS using on genetic frequencies of occurrence (NMFS 2013).

Table 21. Summary of calculated population estimates based upon the NEAMAP Survey swept area assuming 50% efficiency. From NMFS 2013.

DPS	Estimated Ocean Population Abundance	Estimated Ocean Population of Adults	Estimated Ocean Population of Subadults (of size vulnerable to capture in fisheries)
GOM (11%)	7,455	1,864	5,591
NYB (51%)	34,566	8,642	25,925
CB (13%)	8,811	2,203	6,608
Carolina (2%)	1,356	339	1,017
SA (22%)	14,911	3,728	11,183
Canada (1%)	678	170	509

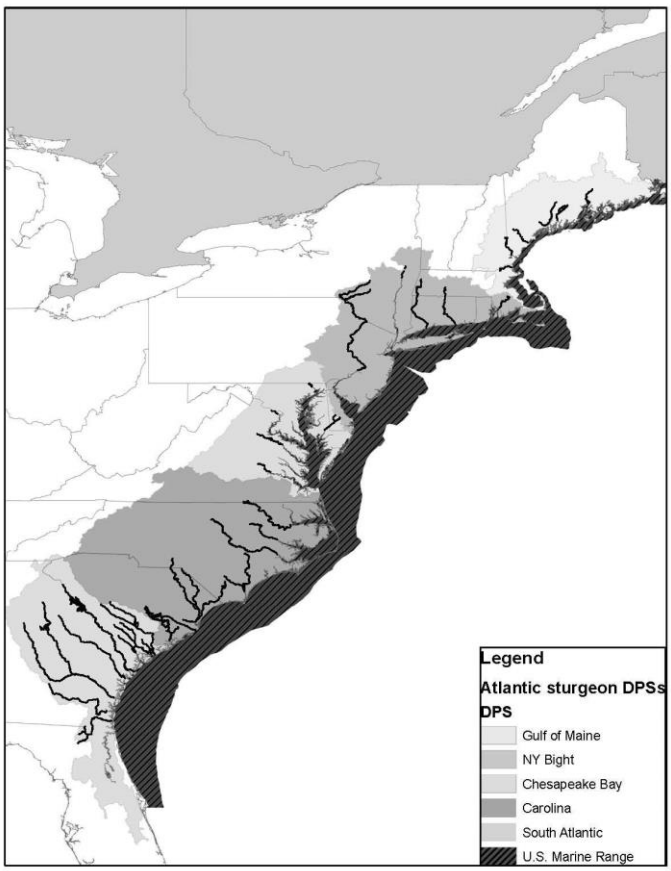


Figure 7. Geographic Locations for the Five ESA-listed DPSs of Atlantic Sturgeon. From NMFS 2013.

In 2017 the stock assessment subcommittee (SAS) conducted trend analysis to evaluate the status of Atlantic sturgeon along the U.S. Atlantic coast "relative to relative abundance and total mortality on both a coastwide and DPS basis". "Approaches included a Mann-Kendall test, Autoregressive Integrated Moving Average (ARIMA) model, and power, cluster, dynamic factor, and population viability analyses." ASMFC, 2017)

The results of the 2017 assessment indicate "a slight positive trend coastwide for Atlantic sturgeon since the1998 moratorium with variable signs of recovery by DPS." "The coastwide estimate of total mortality was below the Z50%EPR threshold, suggesting current levels of mortality for the entire meta-population are sustainable." Mortality levels at the DPS-level, are above the Z Threshold for the Chesapeake Bay DPS, Carolina DPS, South Atlantic DPS and Gulf of Maine DPS (Table 22). Though these are indications that anthropogenic effects may be higher than the acceptable threshold at the DPS level; these estimates

are considered highly uncertain. Because affected animals are rarely genotyped, it is not possible assign to individual DPSs. For this reason on their Benchmark Stock Assessment the SAS focused on assessing trends and Z at a coastwide level rather than for individual DPSs (ASMFC, 2017).

Table 22. Stock status determination for the coastwide Atlantic sturgeon stock and DPSs based on morality estimates and biomass/abundance status relative to historic levels and the terminal year of indices relative to the start of the moratorium as determined by the ARIMA analysis. Reproduced From (ASMFC, 2017)

	Mortality Status	Biomass/Abundance Status	
Population	**P(Z)>Z50%E PR 80%**	**Relative to Historical Levels**	**Average probability of terminal year of indices > median 1998 value**
Coastwide	6.5%	Depleted	0.95
Gulf of Maine	**73.5%**	Depleted	0.51
New York Bight	31.2%	Depleted	0.75
Chesapeake Bay	30.0%	Depleted	0.36
Carolina	**75.4%**	Depleted	0.67
South Atlantic	40.2%	Depleted	Unknown (no suitable

Quantitative UoA Impacts

"Atlantic sturgeon are particularly sensitive to bycatch mortality because they are a long-lived species, have an older age at maturity, have lower maximum fecundity values, and a large percentage of egg production occurs later in life […]" (MAFMC 2013). According to ASMFC (2017) "Bycatch is most likely the primary source of fishing mortality currently and is a primary threat to the recovery of this species" Fisheries known to incidentally catch Atlantic sturgeon include sink gillnet, drift gillnet, and otter trawl gear. Sink gillnet gear poses the greatest known risk of mortality for bycaught sturgeon (MAFMC 2013).

Allocating of takes of Atlantic sturgeon to individual Fishery Management Plans (FMPs) is difficult, thus the NEFSC allocates takes to otter vs. sink gillnet (NEFMC 2012). NMFS (2013) estimates the number of Atlantic sturgeon captured and killed in federally managed fisheries from 2006 through 2010 is of 1,548 and 1,569 encounters per year in observed gillnet and trawl fisheries, respectively. Miller & Shepherd (2011) estimates that between 2006 and 2010, a total of 15,587 lbs of Atlantic sturgeon were captured and discarded in bottom otter trawl (7,740 lbs) and sink gillnet (7,848 lbs) gear.

Based on observer data, discard mortality in gillnets is estimated to be 20%, for gillnets where the primary target species is monkfish the mortality rate increases to 27%. In otter trawls discard mortality is estimated to be only 5% (NEFMC 2012).

Bycatch mortality is likely underestimated for Atlantic sturgeon (ASMFC, 2017a). Data is limited by observer coverage to waters outside the coastal boundary 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 observer program; limited data collected in the At-Sea Monitoring Program were not included, although preliminary views suggest the incidence of sturgeon encounters was low.

Management Measures

The Atlantic Sturgeon Fishery Management Plan (FMP) was approved by the Atlantic Sturgeon Management Board in 1990 and implemented by the Atlantic States Marine Fisheries Commission (ASMFC). In 1998, the ASFMC approved Amendment 1 to the FMP, which instituted a coast-wide moratorium on the harvest of Atlantic sturgeon, which continues to remain in effect. NMFS followed the ASMFC moratorium with a similar moratorium for Federal waters. One of the key management objectives of Amendment 1 to the Atlantic Sturgeon FMP is to "reduce or eliminate bycatch mortality," Amendment 1 to ASMFC's Atlantic sturgeon Fishery Management Plan also includes measures for preservation of existing habitat, habitat restoration and improvement, monitoring of bycatch and stock recovery, and breeding/stocking protocols.

The 2013 – 2015 Spiny Dogfish Specifications, Environmental Assessment, and Regulatory Impact Review April 15 concludes that given the low level of interactions of the spiny dogfish fishery, it is not likely to have a significant adverse impact on the overall Atlantic sturgeon population, or any of the other distinct populations (MAFMC 2013):

> Given the comparatively low contribution of the spiny dogfish fishery to Atlantic sturgeon mortality, the magnitude of interactions during the 2013 - 2015 fishing years are not likely to result in jeopardy to the species based on current assessments of each DPS (Kocik et al. 2013). These data support the conclusion from the earlier bycatch estimates that the spiny dogfish fishery may interact with Atlantic sturgeon. However, the more recent, larger population estimate derived from NEAMAP data (Kocik et al. 2013) suggests that the level of interactions with the spiny dogfish fishery is not likely to have a significant adverse impact on the overall Atlantic sturgeon population, or any of the DPS's. […]
>
> Since the Atlantic sturgeon DPSs have been listed as endangered and threatened under the ESA, the ESA Section 7 consultation for the spiny dogfish fishery has been reinitiated, and additional evaluation will be included in the resulting Biological Opinion to describe any impacts of the fisheries on Atlantic sturgeon and define any measures needed to mitigate those impacts, if necessary. The Biological Opinion is expected to be completed during the 2013 spiny dogfish fishing year.
>
> The anticipated bycatch of Atlantic sturgeon are based on the 2006-2010 average bycatch estimates and they are 1,239 individuals for gillnets and 1,342 individuals for otter trawls. Based on the anticipated mortalities estimates for the different distinct populations of Atlantic sturgeon NMFS concludes these are not likely to appreciably reduce the survival and recovery of this species.

Due to the likely inaccuracies of attributing Atlantic sturgeon takes to any particular FMP, NMFS in the 2013 (amended 3/10/2016) Biological Opinion consultation on ESA-listed species collectively examined the Atlantic sturgeon interaction with seven FMPs[6] by gear types as a batch, including the spiny dogfish FMP (NMFS 2013).

[6] monkfish (*Lophius americanus*), skate (*Leucoraja ocellata*), spiny dogfish (*Squalus acanthias*), bluefish (*Pomatomus saltatrix*), squid (*Doryteuthis (Amerigo) pealeii*), mackerel (*Scomber scombrus*), butterfish (*Peprilus triacanthus*), summer flounder (*Paralichthys denatus*), scup or porgy (*Stenotomus chrysops*), and black sea bass (*Centropristis striata*).

The 2013 Biological Opinion concluded that the projected incidental capture may adversely affect, but are not likely to reduce the likelihood that the status of the five DPSs of Atlantic sturgeon can improve to the point where it is recovered and could be delisted any of the ESA. The Biological Opinion included reasonable and prudent measures, as well as terms and conditions which will further reduce impacts to Atlantic sturgeon. The Incidental Take Statements (ITS), according to the 2013 BiOp, includes incidental take of ~100 Atlantic Sturgeon, with varying amounts allocated across all 5 DPSs.

Since Atlantic sturgeon were listed under the ESA, several measures have been implemented aimed at recovery of Atlantic sturgeon. NMFS (2013) has determined that the following has determined that the following Reasonable and Prudent Measures (RPM) are necessary/appropriate to minimize impacts of the incidental take of the five DPSs of Atlantic sturgeon in the seven federally managed fisheries assessed in the 2013 ESA Biological Opinion

> 1. NMFS must work to ensure that any sea turtles, Atlantic sturgeon, and Atlantic salmon incidentally taken in gears used in these fisheries (e.g., gillnet, bottom trawl, trap/pot, and hook and line gear) are handled in a way as to minimize stress to the animal and increase its survival rate.
>
> 2. NMFS must continue to investigate and implement, within a reasonable time frame following the completion of ongoing and future research, modifications to gears used in these fisheries to reduce incidental takes of sea turtles, Atlantic sturgeon, and Atlantic salmon and the severity of the interactions that occur.
>
> 3. NMFS must continue to review available data to determine whether there are areas or conditions within the action area where sea turtle, Atlantic sturgeon, and Atlantic salmon interactions with fishing gears used in these fisheries are more likely to occur.
>
> 4. NMFS must ensure that monitoring and reporting of any sea turtles, Atlantic sturgeon, and Atlantic salmon encountered in fishing gear utilized in the seven fisheries: (1) detects any adverse effects such as serious injury or mortality; (2) detects whether the anticipated level of take has occurred or been exceeded; and (3) collects necessary data from individual encounters (e.g., photos, species identification, date and geographic location).

The following examples are considered evidence that NMFS is complying with the RPMs:

- Guidance for commercial fishermen on sturgeon resuscitation available (NOAA Sturgeon Resucitation Card)
- Studies conducted to evaluate the effectiveness of a modified gillnet for the southern flounder fishery in North Carolina aimed at reducing Atlantic sturgeon interactions (Levesque et al., 2016).
- Satellite driven distribution models of endangered Atlantic sturgeon occurrence in the mid-Atlantic Bight to help reduce harmful interactions (Breece et al 2017)
- States' application for Incidental Take Permit (ITP)
- State of New York supported NOAA's Northeast Fisheries Observer Program (NEFOP) to increase coverage to help to develop better estimates of Atlantic sturgeon bycatch for its Section 10 ITP permit application (ASMFC 2017b).

Seabirds

UoA Impacts

Information on seabird–fishery interactions for the U.S. Northeast and mid-Atlantic is limited. A 2017 study by Hatch provides a summary of all observed interactions with seabirds in the northeast from 1996-2014. Information for this study was collected from the Northeast Fishery Observer Program (NEFOP) and the At-Sea Monitoring Program (ASM). Vessels targeting spiny dogfish had the highest interaction with loons and with gannets. Two species of loons (Common loon and red-throated loon) are considered to be of the highest conservation priorities in the mid-Atlantic and New England Region according to the North American Waterbird Conservation Plan (NAWCP). Table 23 provides a summary of data on seabird interactions from observer records for the bottom trawl and gillnet fleet from 2012 to 2016.

Table 23. Observed seabird bycatch from 1996 to 2014 for the US Northeast and mid-Atlantic by gear type along with conservation priority status from the Birds of Conservation Concern (BCC) 2008 list and the North American Waterbird Conservation Plan (NAWCP). Table adapted from Hatch 2017.

Species	Bottom Otter Trawl	Gillnet	BBC[a]	NAWCP[b]
Double-crested cormorant	2	158	No	Low
Northern fulmar	1	73	No	Low
Northern gannet	61	103	No	Moderate
Great black-backed gull	19	32	No	Low
Herring gull	33	24	No	High
Common loon	0	211	No	Highest
Red-throated loon	1	229	Yes	Highest
Thin-billed murre	0	84	No	Moderate
Great shearwater	72	2736	Yes	Highest
Sooty shearwater	3	174	No	Moderate

[a]Priority species for conservation action in the Northeast region from Table 44 of the BCC 2008 list.
[b]Regional waterbird population conservation priorities in the mid-Atlantic/New England/Maritimes region of North America from Table 10 of the NAWCP.

A summary of the status of the seabird species with greater number of interactions and those determined to be of high conservation priority status are included below. Adapted from: USFWS 2011, audobon.org and IUCN Red List.

Northern Gannet

The Northern Gannet (*Morus bassanus)* is one of the largest seabirds of the North Atlantic. They breed only in eastern Newfoundland and the Gulf of St. Lawrence. From there, they travel south to the Gulf of Mexico and the Carribbean from December to February. In the fall they migrate south across the Gulf of Maine and Georges Bank, and travel as far south as the Mid-Atlantic Bight. In April, the spring migration reaches its peak on the Georges Bank and the majority of birds present are adults. According to the Audubon.org profile, populations declined drastically during 19th century owing to taking of eggs and slaughter of adults over much of range, but especially off eastern Canada. With

protection, populations began to recover early in 20th century, with increase apparently continuing to present day.

Common loon

Common Loon (*Gavia immer*) is a migratory species with inland breeding populations, with breeding in the Atlantic in Canada and Newfoundland. This species has an extremely large range, and hence does not approach the thresholds for Vulnerable under the range size criterion for the IUCN Red List. In the United States this species is protected under the Federal Migratory Bird Treaty Act. The threats to these species include mortality from entanglement and drowning in fishing gear. Other threats include acidification of breeding lakes, heavy metal pollution, poisoning from ingestion of lead fishing weights and oil spills. The overall population trend for this species is thought to be stable, in North America the population of this species experienced a small increase over the last 40 years.

Red-Throated Loons

Red-throated Loons (*Gavia stellata*) breed in the arctic and subarctic tundra and winter in temperate coastal and marine waters throughout the northern hemisphere. The species occurs off the U.S. Atlantic coast during winter, primarily in nearshore waters and inlets from Florida to Maine. Despite worldwide population estimates of over 500,000 individuals, the Red-throated Loon is considered a Species of Conservation Concern by the USFWS, due to substantial declines (up to 52%) in many parts of their North American range. While a comprehensive census of Red-throated Loons has not been conducted in eastern U.S., the current population is thought to be 50,000 to 100,000, based on migration counts. Potential population declines have led Red-throated Loon to be included in several state bird conservation plans in the eastern U.S. and considered “in urgent need of conservation action” by the Mid-Atlantic/New England/Maritimes Waterbird Conservation Plan.

The cause of Red-throated Loon population declines in North America is unclear. However, the species faces a number of cumulative threats from anthropogenic sources including oil spills, offshore energy development, degradation of nesting habitat, introduced predators, contaminants, and particularly commercial fishing operations.

Greater Shearwater

Greater Shearwaters (*Puffinus gravis*) are among the world’s longest distance migrants, breeding on remote islands in the southern Atlantic Ocean, and migrating to the northwest Atlantic for the austral winter. The total population of Greater Shearwaters is thought to exceed 5 million breeding pairs. However, as the species nests in cliff burrows on extremely remote islands, populations are nearly impossible to accurately census and monitor, thus a decline may not be readily apparent. Despite the large population estimate, Greater Shearwaters are considered a Species of Conservation Concern by the U.S. Fish and Wildlife Service (USFWS) and are on National Audubon Society and American Bird Conservancy watch lists. As with many marine birds, Greater Shearwaters are long-lived with a low productivity. Thus, the cumulative impact of human threats could cause rapid declines in Greater Shearwater numbers that would be difficult or impossible to recover.

Management Measures

The Spiny Dogfish Management Plan offers broad protection to listed seabird species; however, there is not a clear and established system to provide for and monitor incidental takes by commercial fishing operations. The North American Waterbird Conservation Plan identifies fisheries bycatch as a serious threat to at least 17 species of marine birds in the Mid-Atlantic/New England/Maritimes, and Southeastern regions, an area including all U.S. Atlantic waters. Several of these birds are also considered Species of Conservation Concern by the USFWS and are on National Audubon Society and American Bird Conservancy watch lists. However, there is no systematic or regulatory linkage that combines monitoring with impact evaluation and consideration of necessary management measures as seen in the MMPA via the LOF.

There have been several interagency and national and international collaborations to mitigate seabird impacts, particularly on longline fisheries in the Pacific, but overall there is a paucity of information for seabird–fishery interactions occurring in the US Northeast and mid-Atlantic regions, including gear types that are often overlooked (e.g. gillnets and trawls) and that may pose serious threats to seabird populations (Hatch 2017). The primary source for seabird interactions is the NEFOP data but there are concerns that low observer coverage provides for inadequate estimations of total interactions and impacts.

3.4.7 Habitat Impacts

Outcome

Bottom Trawl

Towed bottom fishing gears have the potential to cause significant and long-lasting impacts to benthic habitats and communities (Jennings & Kaiser 1998). Repeated disturbance by fishing gear can remove high biomass of seabed organisms that contribute to seabed complexity and provide shelter for fish and other species (Kaiser et al. 2002). The overall impact of towed gears and the recovery time of the ecosystem vary depending on intensity of the interaction (the total area impacted and the frequency of tows), the composition of the seabed habitat, and the level of natural perturbation (DeAlteris, 2005). Habitats and communities that are subject to high levels of natural perturbation are more likely to recover quickly from towed gears (Hiddink et al. 2006). “Recovery times are typically faster in more dynamic (shallow, high energy) environments with less bottom structure (e.g., flat, featureless sand). Hard bottom habitats (gravel, rocky) that support more prolific growth of attached epifauna are generally more vulnerable to trawling” (MAFMC 2014).

The most recent Spiny Dogfish FMP amendment to include a review of Fishing Effects on Essential Fish Habitat was Amendment (MAFMC, 2014.) The following general Impacts of Fishing on Habitat are identified based on a report of habitat effects of trawling and dredging prepared by the Committee on Ecosystem Effects of Fishing for the National Research Council’s Ocean Studies Board

- Trawling and dredging reduce habitat complexity
- Repeated trawling and dredging result in discernable changes in benthic communities

- Bottom trawling reduces the productivity of benthic habitats
- Fauna that live in low natural disturbance regimes are generally more vulnerable to fishing gear disturbance

Between fall 2007 and spring 2010 the NEFMC Habitat Plan Development Team (PDT) developed the Swept Area Seabed Impact (SASI) to support the development of the Omnibus EFH Amendment 2. The SASI approach is used to estimate the magnitude, location, and duration of adverse effects across gears types and FMPs in order to evaluate the cumulative impacts of alternatives to minimize adverse effects. The SASI approach consists of five components: (1) Vulnerability Assessment, (2) SASI Model, (3) Local Indicators of Spatial Association (LISA) Analysis, (4) Cost-efficiency Analysis, and (5) Area Closure Analysis.

The vulnerability[7] assessment reviewed relevant habitat impacts literature to Northeast U.S. to organize seabed features (e.g. sponges, biogenic burrows, bed forms, etc.) according to susceptibility[8] (initial effect by single pass of fishing gear) and recovery[9] values. A value of 10 years is selected as the potential recovery times for the features incorporated in the SASI model, which may be an underestimate of the recovery for some features. To examine distribution of vulnerable seafloor habitats, seabed features were inferred to occur in particular combinations of seafloor substrate (mud, sand, granule-pebble, cobble or boulder) and seafloor energy (high or low). The susceptibility and recovery of each 'seabed feature-gear-substrate-energy' combination was scored on a 0-3 scale (Table 24). To read more about the methodology of the SASI model See Omnibus Habitat Amendment 2.

Table 24. Susceptibility and Recovery values. Reproduced from NEFMC 2011

Table 28 – Susceptibility and recovery values

Code	*Quantitative definition of susceptibility*	*Quantitative definition of recovery*
0	0 – 10%	< 1 year
1	>10%-25%	1 – 2 years
2	25 - 50%	2 – 5 years
3	> 50%	> 5 years

> The vulnerability assessment identified low-energy granule-pebble, cobble- and boulder-dominated habitats as being the most vulnerable to fishing impacts (Appendix D, Grabowski et al 2014). This vulnerability is driven primarily by the estimated recovery times, i.e., the amount of time it takes for structural habitat features to return to their prior state (NEFMC 2011)

According to the 2011 SASI report (NEFMC 2011), these vulnerable habitats represent ~20% of the distribution of areas assumed to be fishable by generic trawl gear.

[7] Vulnerability "represents the extent to which the effects of fishing gear on a feature are adverse. 'Vulnerability' is defined as the combination of how susceptible the feature is to a gear effect and how quickly it can recover following the fishing impact (NEFMC 2011)

[8] Susceptibility : "the percentage of total habitat features encountered by fishing gear during a hypothetical single pass fishing event that have their functional value reduced (NEFMC 2011)

[9] Recovery: "the time in years that would be required for the functional value of that unit of habitat to be restored" Recovery does not necessarily mean a restoration of the exact same features, but that after recovery the habitat would have the same functional value. (NEFMC 2011)

Table 25. Distribution of dominant substrates, by energy environment, within the areas assumed to be fishable by particular gears, according to maximum depth thresholds. Reproduced from NEFMC 2011

		Trawl	Longline	Gillnet
Distribution of substrates in low energy	Mud	37.5%	35.7%	33.9%
	Sand	42.9%	43.8%	44.8%
	Granule- pebble	15.1%	15.7%	15.9%
	Cobble	3.2%	3.4%	3.8%
	Boulder	1.4%	1.5%	1.6%
	Total area, low energy (km^2)	105,111	93,029	80,835
		Trawl	**Longline**	**Gillnet**
Distribution of substrates in high energy	Mud	15.0%	14.9%	14.9%
	Sand	52.9%	52.9%	52.9%
	Granule- pebble	22.9%	23.0%	23.0%
	Cobble	7.2%	7.2%	7.2%
	Boulder	2.1%	2.1%	2.1%
	Total area, high energy (km^2)	125,324	125,261	125,204

The SASI model estimates on the realized (based on fishery dependent data) adverse effects from otter trawl found that areas with high potential vulnerability scores included "the area between Cape Cod and the deeper waters of the Great South Channel, a small area in central Georges Bank, the northeastern flank of Georges Bank, areas along the coast in the Gulf of Maine, and various offshore banks and ledges in the Gulf of Maine, including Jeffreys Bank, Stellwagen Bank, Platts Bank, Jeffreys Bank, Fippennies Ledge, and Cashes Ledge." (NEFMC 2016).

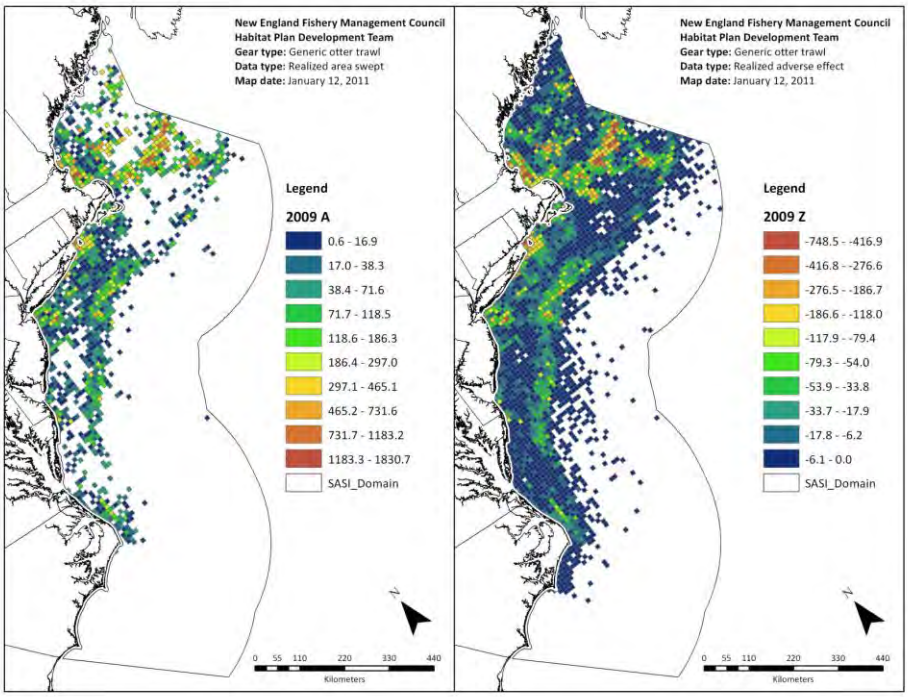


Figure 8. Generic otter trawl realized area swept and adverse effect for calendar year 2009. (A) Estimates of contact-adjusted area swept based on VTR data (Z) The magnitude of the resulting adverse effect.

The results of the SASI model on the realized adverse effects of generic otter trawl for three selected years (2000, 2005, and 2009) shows that the magnitude of impacts has decreased over time (Figure

9). These declines are considered to be consistent with effort decline since the mid-1990s. However, there are areas where concentrated adverse effects have remained stable over time. These "[…] including the southwestern Gulf of Maine, the northeast flank of Georges Bank from Cape Cod to the EEZ boundary, and the Southeast Part of Georges Bank. Effects are also concentrated along the coast in Southern New England, and along the shelf break in Southern New England." Some of the areas of concentrated adverse effects, such as the northeast flank of Georges Bank, overlap with those identified as having high potential vulnerability scores (NEFMC 2016).

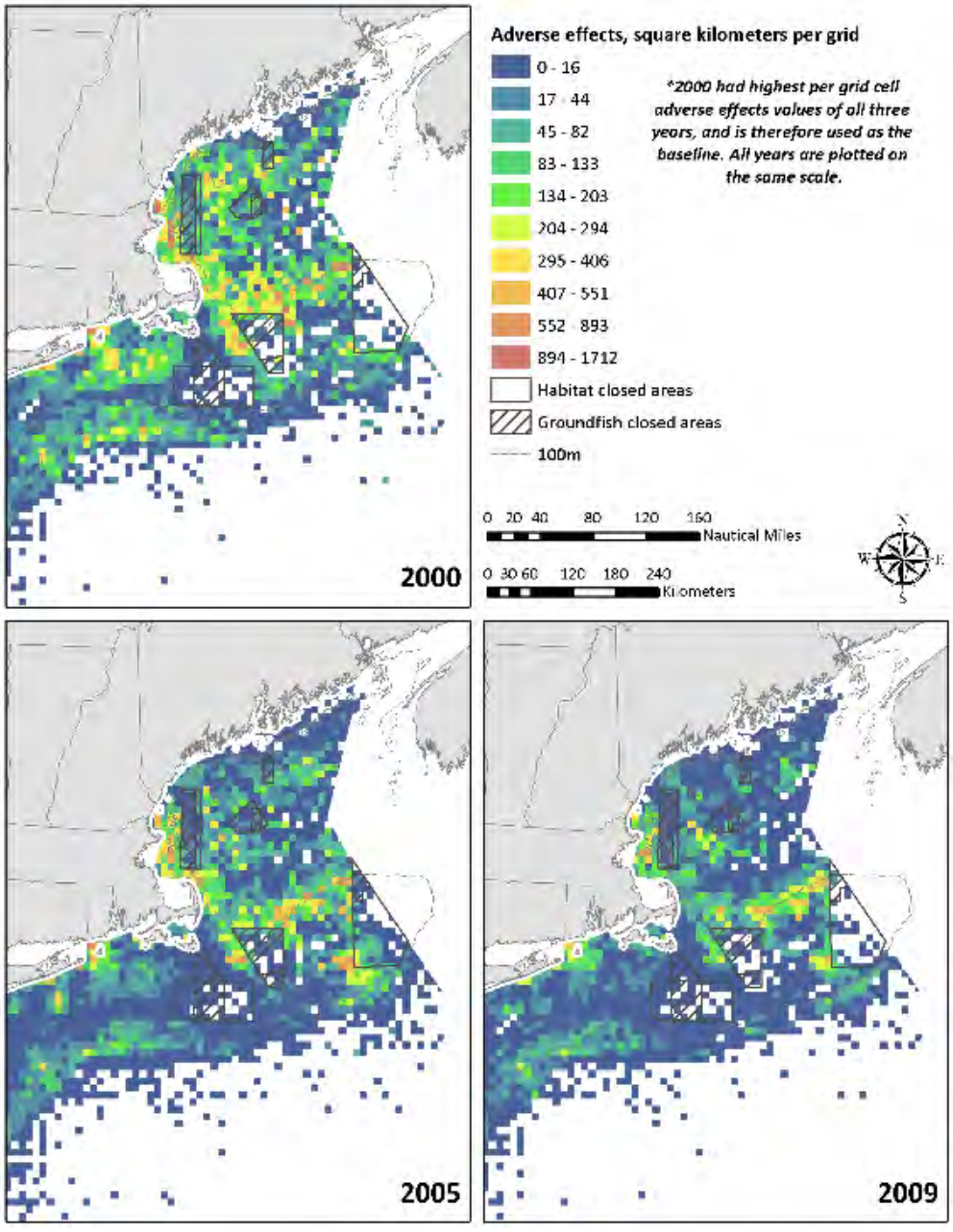
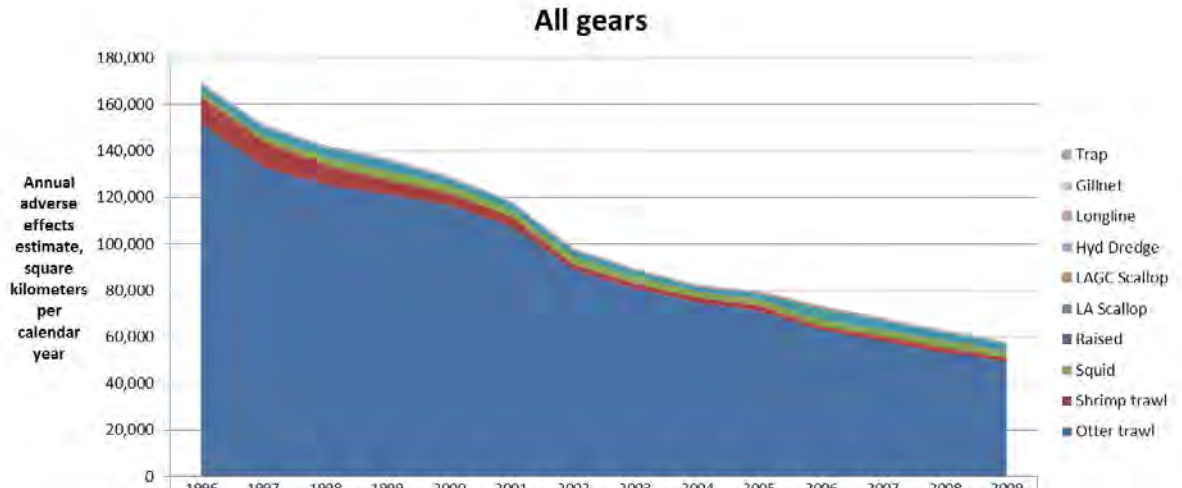


Figure 9. Reproduced from NEFMC (2016) "Map 43 – Spatial distribution of realized adverse effects from generic otter trawl gear type at three time steps: 2000, 2005, and 2009. All panels use the same color scale. The maps given an annual snapshot of adverse effects, summing impacts from previous years fishing where the habitat has not yet fully recovered combined with new impacts."



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Trap	627	613	605	606	466	417	382	384	400	428	411	372	347	340
Gillnet	43	38	38	30	28	40	24	24	22	22	18	15	16	15
Longline	125	140	130	224	103	112	332	111	50	39	28	15	12	14
Hyd Dredge	185	186	187	187	187	195	209	197	218	247	238	239	213	227
LAGC Scallop	186	211	202	152	119	258	329	297	312	450	498	427	307	241
LA Scallop	3,510	3,938	4,138	4,163	3,264	2,773	2,743	2,558	2,023	2,588	4,934	4,258	3,445	3,059
Raised	0	0	0	0	0	0	0	93	119	81	99	134	140	191
Squid	2,043	2,118	3,291	4,133	3,295	2,929	3,179	2,798	2,358	2,410	2,688	2,644	3,032	2,678
Shrimp trawl	11,633	11,238	8,682	6,290	5,253	4,475	2,562	2,515	2,405	2,474	1,884	2,184	2,437	1,745
Otter trawl	151,483	133,063	125,271	121,239	116,637	107,463	88,799	80,576	74,709	71,099	62,816	58,040	52,944	49,426

Figure 10. Reproduced from NEFMC (2016) "Figure 8 – Comparison of estimated realized adverse effects from the SASI model by gear type and calendar year. All values in km2."

A 2017 study (Hiddink et al) compared otter trawls (OTs), beam trawls (BTs), towed (scallop) dredges (TDs), and hydraulic dredges (HDs) to estimate depletion and recovery rates of biota after trawling. The study found that otter trawls caused the least depletion, where depletion of biota and trawl penetration are highly correlated. Median recovery times for all gear types ranged from 1.9-6.4 years. Study sites were focused in the northwest and northeast Atlantic. The analyses did not identify any variables other than trawling frequency that affected community biomass. The findings suggest that differences in time to recovery and expected biomass (B/K) will be driven primarily by gear type (and hence, d) and trawling frequency (F). The study finding that community recovery rates increase with trawling frequency due to a shift to communities with faster life histories, but notes that this increased resilience does not indicate faster recovery to a pre-trawled state.

Bottom Longline & Gillnet

The impact of both gillnets and bottom longlines on EFH habitat has generally been considered low relative to the impact of bottom trawl (MAFMC 2014). The SASI vulnerability estimates identify the areas of Georges Bank and the Gulf of Maine as vulnerable to as vulnerable to the demersal longline gear and sink gillnet gear. The estimate of the realized adverse effects for bottom longline is concentrated inshore, and in muddy areas off the shelf in Southern New England, particularly in southwestern Gulf of Maine, and between Cape Cod and the Great South Channel (Figure 11). As with otter trawl gear type, the overall magnitude of adverse effects from bottom longline have declined over time. Adverse effects of sink gillnet are similar to those of bottom longline, with greater adverse effects offshore in the Gulf of Maine and near the coast in Southern New England (Figure 12).

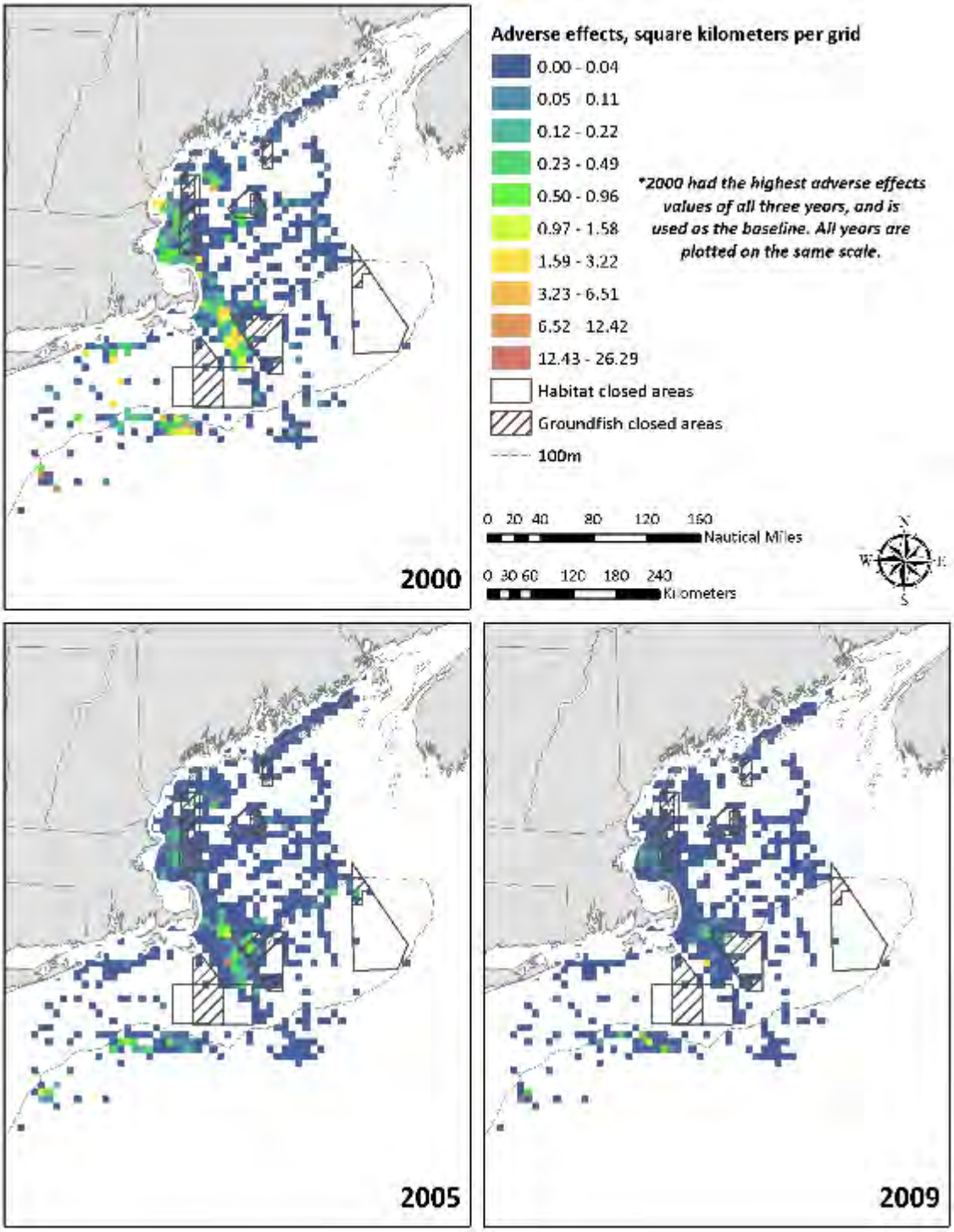


Figure 11. Reproduced from NEFMC (2016) "Figure 50. Spatial distribution of realized adverse effects from demersal longline gear type at three time steps: 2000, 2005, and 2009. All panels use the same color scale. The maps given an annual snapshot of adverse effects, summing impacts from previous years fishing where the habitat has not yet fully recovered combined with new impacts."

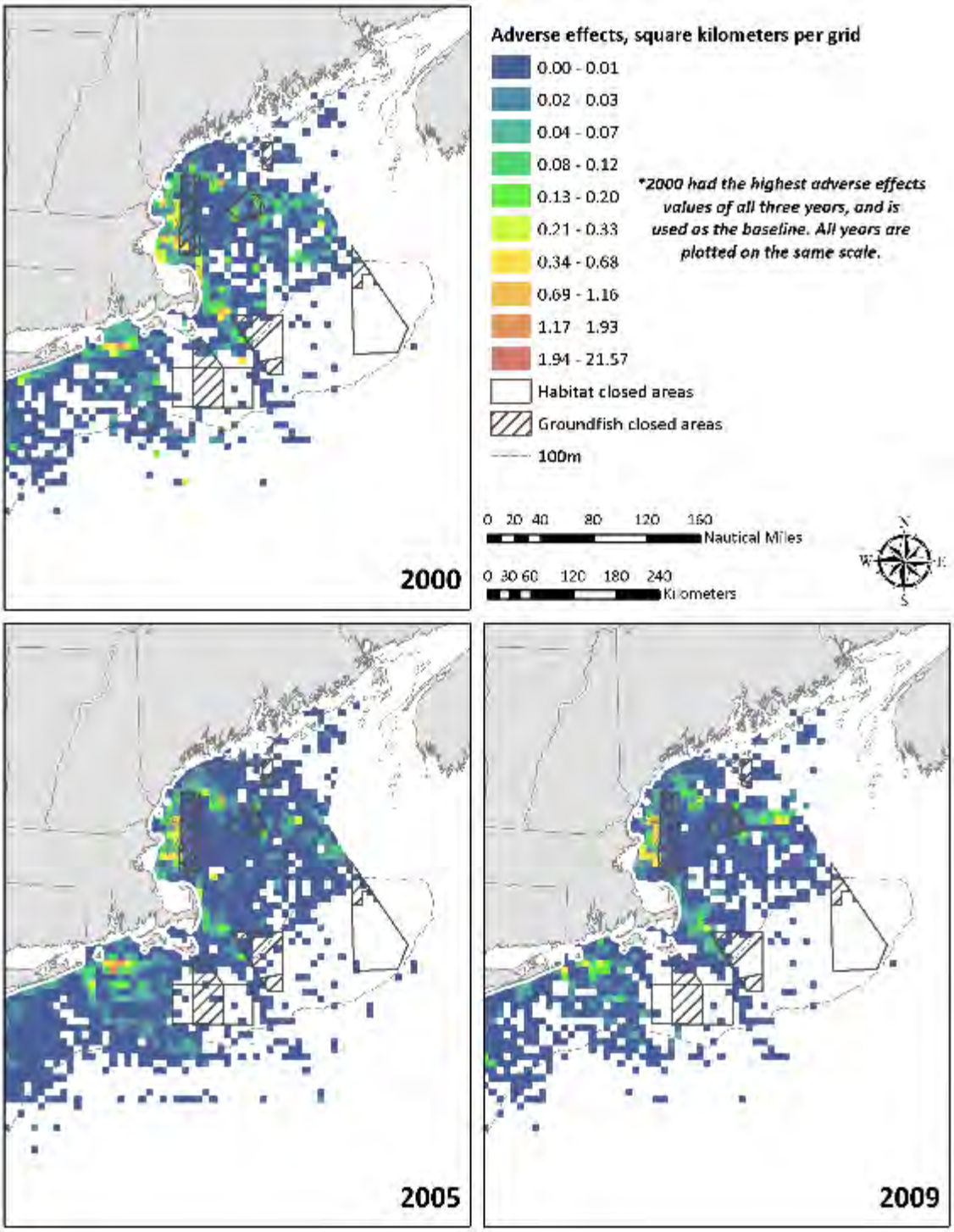


Figure 12. Reproduced from NEFMC (2016): "Map 51 – Spatial distribution of realized adverse effects from sink gillnet gear type at three time steps: 2000, 2005, and 2009. All panels use the same color scale. The maps given an annual snapshot of adverse effects, summing impacts from previous years fishing where the habitat has not yet fully recovered combined with new impacts."

Management

Under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) there is a formal framework in place for federally managed fisheries to evaluate and manage the impact of fisheries on habitat. Habitat conservation in the Greater Atlantic is driven by the requirements to identify and conserve Essential Fish Habitat (EFH) for all federally managed species. Additionally, Marine Protected Areas (MPAs) are also used as a tool to conserve important biodiversity hotspots and provide protection to spawning aggregations of important species for fisheries.

The MSFCMA defines EFH as the waters and substrate necessary for fish for spawning, breeding, feeding or growth to maturity. The waters are defined as the associated physical, chemical, and biological properties. Substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities. Adverse effect refers to "direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH." (50 CFR 600.810(a)). EFH that merit special attention because of the importance of their ecological function, sensitivity to degradation, the level of stress that they are subject or the rarity of the habitat type are categorized as Habitat areas of particular concern (HAPCs).

The EFH mandate has provisions in place which require each Fisheries Management Plans (FMPs) to describe and identify Essential Fish Habitat (EFH) and the adverse effects on EFH. Based on these management councils can set Habitat protections (such as gear restrictions, area closures and effort reductions) on individual FMPs or across all FMPs. The NEFMC has used year-round area closures as a tool to minimize adverse effects from fishing on habitat. Current regulations in place to minimize the adverse effect of bottom trawls and dredges on EFH include (NEFMC 2011):

- gear restrictions, including the inshore Gulf of Maine roller gear restriction;
- establishment of habitat closed areas in the multispecies and scallop FMPs;
- establishment of groundfish mortality closed areas (with associated gear restrictions), which are assumed to provide incidental benefits to EFH; and
- reductions in area swept over time (via reductions in effort and/or increased use of rotational management that provides for the same or greater harvest with less area swept).

In 2016 the New England Fishery Management Council (NEFMC) published the Draft of the Omnibus Essential Fish Habitat Amendment 2 (OHA2). Prior to this amendment efforts to minimize adverse effects of NEFMC fisheries had been developed and implemented mostly for each FMPs individually. The amendment was developed to fulfill the essential fish habitat requirements of the MSA and integrate habitat management measures across all NEFMC-managed fisheries. The principal objectives of the EFH Amendment are to review and revision of the EFH designations (Purpose A), identify habitats where adverse impacts should be minimized (Purpose B) and "identify other actions to encourage conservation and enhancement of such habitat" (Purpose C). The amendment also includes two purposes specific to groundfish management: "to improve protection for juvenile groundfish and their habitats" (Purpose D) and "to identify seasonal closed areas in the Northeast Multispecies FMP that would reduce impacts on spawning groundfish and on the spawning activity of key groundfish species" (Purpose E) (NEFMC 2016).

Recognizing that “both temporary and year-round fishing area closures result in effort displacement if they are not accompanied by commensurate catch or effort controls (Rijnsdorp et al. 2001, Dinmore et al. 2003)” (NEFMC 2011). The SASI approach proposes “a method for assessing the trade-off between recovery in areas closed to fishing and additional adverse effects resulting from fishing in the open areas” and “the potential change in aggregate adverse effects from opening currently closed areas” (NEFMC 2011). Their findings are summarized below:

> We find that for nearly all area and gear type combinations, opening existing closed areas to fishing is predicted to decrease aggregate adverse effects. For mobile bottom tending gears, which comprise nearly 99% of all adverse effects in our region, allowing fishing in almost any portion of the area closures on Georges Bank is estimated to substantially decrease total adverse effects from fishing. Closures in the Gulf of Maine appear to also decrease aggregate adverse effects, but the magnitude of these reductions is substantially smaller

Information

There are a number of sources available used to assess fishery impacts on EFH. The SASI model utilized substrate data are assembled from two primary sources the usSEABED dataset from the U.S. Geological Survey, and the University of Massachusetts Dartmouth School for Marine Science and Technology (SMAST) video survey. Information on effort and fishing effects is obtained from Vessel Trip Report (VTR) data and observer data.

The NEFMC PDT conducted a literature review looking at 97 studies on the impacts of fishing gear on habitats relevant to Northwest Atlantic fishing gears and substrate features. The PDT notes in the SASI report that only about half of the studies provided experimental before/after impact studies that could be used to assign susceptibility and recovery scores. The majority (>70) of the studies focused on generic trawls. However, one of the limitations of the available information is the lack of details on specific gear types. The NEFMC PDT noted that “Efforts to assess the vulnerability of fish habitats to impacts from fishing remain challenged by (1) a limited amount of information regarding the locations and types of bottom substrates and (2) a lack of clear understanding of specifically how fishing activities affect these substrates” (NEFMC 2011).

3.4.8 Ecosystem Impacts

Overview

The UoAs reside within what NOAA identifies as the Northeast U.S. Continental Shelf Large Marine Ecosystem (NES LME), which spans the area from Cape Hatteras to the Gulf of Maine. LMEs are defined by four ecological criteria: bathymetry, hydrography, productivity, and tropically linked populations. It is by these characteristics that the ~260,000km2 area known as the NES LME is defined and distinguished from adjacent ecosystems. The NES LME is further characterized into subunits by NEFSC, including: Georges Bank, Gulf of Maine, Scotian Shelf, and Mid-Atlantic Bight.

The Northeast U.S. Continental Shelf Large Marine Ecosystem is a dynamic, highly productive, and intensively studied system providing a broad spectrum of ecosystem goods and services. This region supports some of the highest revenue fisheries in the U.S. The system historically underwent profound changes due to very heavy exploitation by distant-water and domestic fishing fleets. Further, the region is experiencing changes in climate and physical forcing that have contributed to large-scale alteration in ecosystem structure and function. Projections indicate continued future climate change related to both short and medium terms cyclic trends as well as noncyclic climate change. (MAFMC 2014)

The assessment team has considered that the ecological criteria used to define the UoA as an LME is an appropriate parallel for identifying key ecosystem elements, where SA 3.16.3 defines key ecosystem elements as:

> […] the features of an ecosystem considered as being most crucial to giving the ecosystem its characteristic nature and dynamics, and are considered relative to the scale and intensity of the UoA. They are features most crucial to maintaining the integrity of its structure and functions and the key determinants of the ecosystem resilience and productivity.

Fisheries do not impact all of these criteria: bathymetry and hydrography are examples of key ecosystem characteristics that are not subject to material fishery impact. Productivity at the base of the foodweb is certainly related to fisheries, though whether dynamics are bottom-up or top down can vary by system. For instance, Mcowen et al (2014) found that bottom-up and top-down effects vary consistently with past fishing pressure and oceanographic conditions; where bottom-up control predominates within productive, overfished regions and top-down in relatively unproductive and under-exploited areas. Trophically linked populations is the criteria most vulnerable to fishing impacts, and the assessment team considers this key ecosystem element to encompass a consideration of impacts of ecological community structure.

This assessment has focused on these two biological LME defining criteria as the key ecosystem elements vulnerable to fishery impacts in assessing ecosystem status relative to UoA impacts. Management and information evaluations will consider the extent to which management systems monitor and manage to also account for the broader range of ecosystem characteristics and dynamics that affect the ecosystem structure and function in fisheries management.

Status and Information

NOAA's Integrated Ecosystem Assessment (IEA) program evaluates ecosystems in 5 regions where it is currently being implemented, including the Northeast. Information available is synthesized in the NEFSC Ecosystem Status Reports (ESR). The following text primarily draws from the most recent version of the NES LME Ecosystem Status Report available online at the time of the assessment.

Below are some of the summarize points provided in the report that discuss changes in overall ecosystem:

Primary and Secondary Productivity:

There is no long term trend in the abundance of phytoplankton, while there is evidence of a shift of the composition of the zooplankton community: "small copepods increased in abundance in the 1990s, but shifted to larger bodied copepod species around 2000 (Figure 4.3). There is evidence of a more recent shift, with smaller zooplankton becoming more abundant again over the last several years."

Fish Communities:

The evaluation of fish communities has found dramatic increases over time in the small elasmobranch and pelagic fish components. In contrast, an initial decline and subsequent recovery is evident for the groundfish category, while other fish have remained stable or increased. These trends in groundfish are understood to be related to historic overfishing practices and the successful implementation of management measures to rebuild some groundfish species (Figure 13). A review of the ratio of pelagic to demersal species shows a relative decrease in demersal species in all regions except the Mid-Atlantic Bight in the 1970s and 80s, with trends leveling in the 1990s.

Biodiversity trends are evaluated using Hurlbert's expected number of species which standardizes the sample size between tows. For the NES LME, trends in the expended number of species follow one of two patterns; expected numbers either increased during the middle of the time series with recent slight declines or vice versa Figure 14).

In terms of fish size, Georges Bank has remained relatively stable with some evidence of a slight recent, the Gulf of Maine has had seen relatively continuous decline, and the Mid-Atlantic region showed initial declines followed by a stabilization at low mean size, with a recent increase in this area. Link et al (2012) found declines in several diversity indices in the groundfish community of the NES LME continental shelf. Studies have found varying results on compensatory dynamics within feeding guilds, but overall In the NES LME, despite declines in species diversity it appears that functional diversity has been mostly preserved and that the compensatory process has functioned to replace commercial species that have declined to maintain the basic ecosystem functions of the NES LME food web (Link et al 2012). Mean trophic levels have been stable across most areas, with the exception of the Mid-Atlantic Bight which underwent a decline in the early 90s, followed by a rebound and another recent decline.

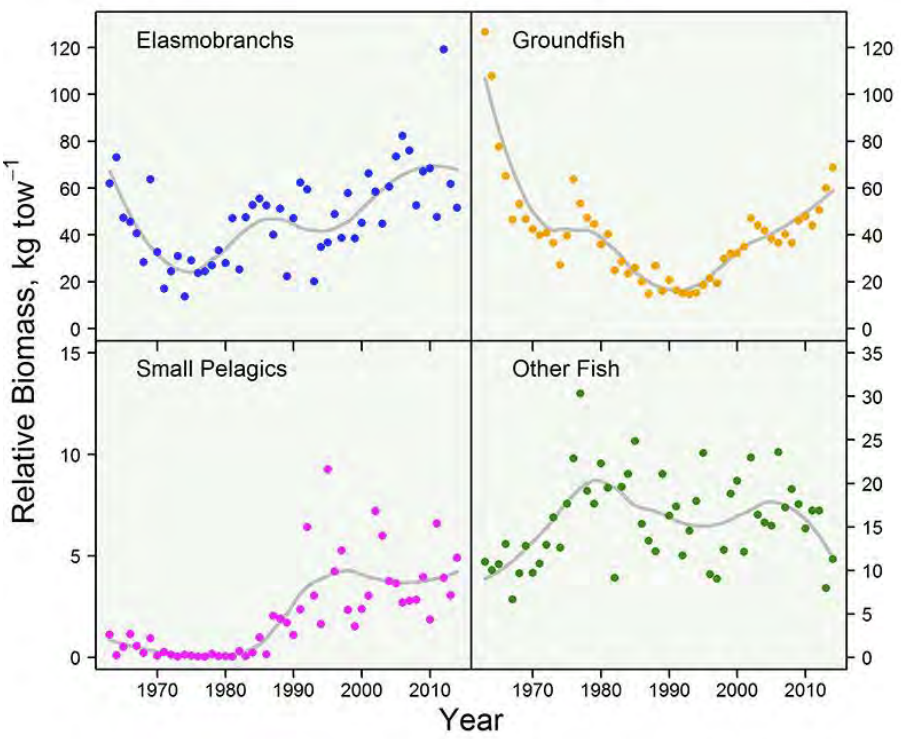


Figure 13. Survey indices (mean catch per tow) of aggregate species groups caught during NEFSC autumn bottom trawl surveys. From: https://www.nefsc.noaa.gov/ecosys/ecosystem-status-report/fish-communities.html

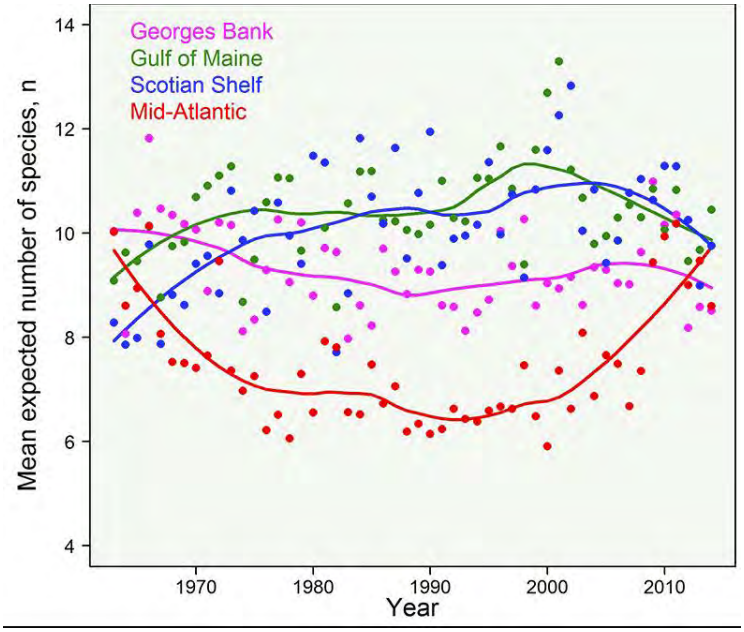


Figure 14. The mean expected number of species from the NEFSC autumn bottom trawl survey by ecological production units. Tows were standardized using 100 individuals. From: https://www.nefsc.noaa.gov/ecosys/ecosystem-status-report/fish-communities.html

While historical trend data provides evidence that fisheries can have a significant effect on the ecological community, this evidence also indicates that management has had success in rebuilding some stocks, suggesting that such overfishing impacts can be considered 'reversible'. The ecosystem is also undergoing significant changes due to the changing ocean climate. There have been shifts in distribution and regional productivity largely attributed to climate change, including a southwestern movement in the Gulf of Maine and northeasterly movement across the coast as a whole. In addition

this this movement, there has been notable shifts in depth distribution with species moving to deeper water due to warming waters.

The Ecosystem Status Report features a synthesis section that integrates climate, physical and ecological indicators that evaluates drivers and pressures related to these factors as well as management interventions and other factors, by 7 major species groups (Figure 15). There is a general overall positive trend, with a period pattern shows in the second composite score in red. The report notes that there are key fisheries management actions or changes that correspond with these periodic shifts. The report notes that data also indicates decadal ecosystem changes in the LME, that together with management interventions strongly affect fishery performance.

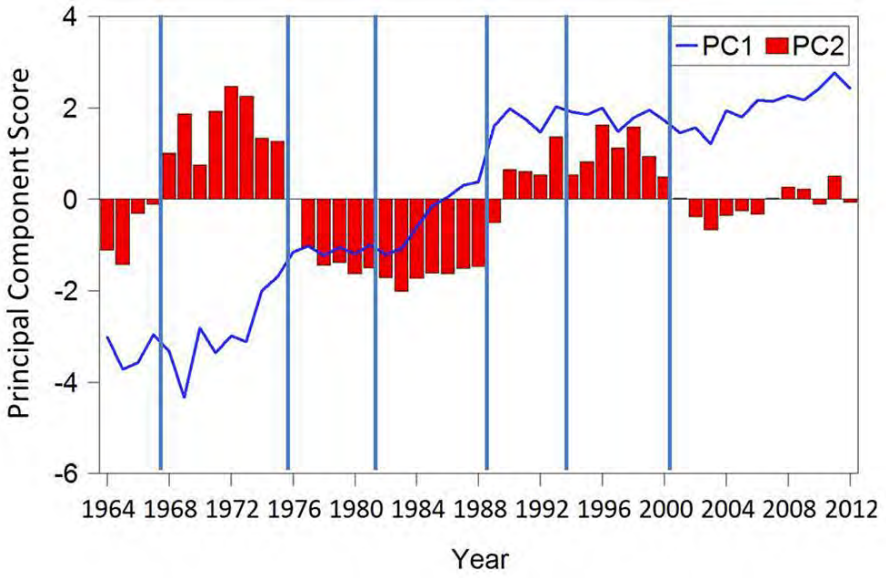


Figure 15. Composite fishery index values for the Northeast U.S. Continental Shelf Large Marine Ecosystem. The first composite index is shown in the blue line. The second composite index is shown in the red bars. The composite indices are based on landings data for species groups. Source: https://www.nefsc.noaa.gov/ecosys/ecosystem-status-report/synthesis.html.

Trophic Interactions

The role of SD within their ecosystem is summarized in the 3rd Amendment to the Spiny Dogfish FMP:

> Spiny dogfish are voracious feeders. Fishes accounted for 54% of their diet (by weight) in the western Atlantic and mollusks for 27% with a high degree of variability in species composition across seasons, areas and years (Bowman et al. (2000).7 Schooling pelagic fishes such as herring, sand lance, mackerel, and menhaden are heavily consumed, but benthic species are also eaten as are squid, jellyfish and ctenophores (Burgess 2002). Spiny dogfish migrate vertically in the water column, feeding on forage fish that move toward the surface at night and on prey organisms near or on the bottom during the day. Juveniles (80 cm) animals are primarily piscivorous. Their diet appears broadly related to abundance trends in some of their major prey items (e.g., herrings, Atlantic mackerel, codfishes, hakes, and squid). Benthic substrates suitable for epifaunal and infaunal prey must be soft rather than hard (Compagno 1984).

The 2013 Specifications for the Dogfish Fishery conclude that the fishery does not have indirect impacts on the prey of protected species, mainly marine mammals and sea turtles:

> Although marine turtles and large whales could be potentially affected through interactions with fishing gear, NMFS has determined that the continued authorization of the multispecies fishery, and therefore the FY 2011 sectors, would not have any adverse effects on the availability of prey for these species. Sea turtles feed on a variety of plants and animals, depending on the species. However, none of the turtle species are known to feed upon spiny dogfish. Right whales and sei whales feed on copepods (Horwood 2002, Kenney 2002). The multispecies fishery will not affect the availability of copepods for foraging right and sei whales because copepods are very small organisms that will pass through multispecies fishing gear rather than being captured in it. Humpback whales and fin whales also feed on krill as well as small schooling fish such as sand lance, herring and mackerel (Aguilar 2002, Clapham 2002). Multispecies fishing gear operates on or very near the bottom. Fish species caught in multispecies gear are species that live in benthic habitat (on or very near the bottom) such as flounders. As a result, this gear does not typically catch schooling fish such as herring and mackerel that occur within the water column. Therefore, the continued authorization of the spiny dogfish fishery or the approval of the FY 2012 Spiny Dogfish FMP specifications will not affect the availability of prey for foraging humpback or fin whale

Management

According to the NEFSC Ecosystem Dynamics and Assessment Branch website, the importance of implementing marine Ecosystem-based Management in the United States has recently been highlighted with the adoption of a new National Ocean Policy, established under presidential order on July 19, 2010. This policy identifies nine objectives, the first of which establishes Ecosystem-based Management (EBM) as its guiding principle. The second priority highlights the importance of Coastal and Marine Spatial Planning as a tool for EBM.

The Mid-Atlantic Fishery Management Council articulated objectives for the living marine resources under its management authority in its Strategic Plan in 2011 (Gaichas et al 2016). Foremost among these objectives is the need to advance ecosystem approaches to fisheries management in the Mid-Atlantic. In June 2015, the Council convened a workshop with scientists and managers to discuss potential strategies to more fully consider species interactions and climate drivers in the stock assessment and management process (including determination of catch limits), and to build capacity within the region to conduct comprehensive management strategy evaluations (MSEs) as part of the Mid-Atlantic Council's Ecosystem Approach to Fisheries Management (EAFM). The workshop reviewed existing single species approaches as well as information and analytical tools available to address key interactions between species and their environment, between species within the food web, and between the ecosystem and fisheries, and between fleets due to technical or management issues. A white paper has been produced as a step towards creating a plan to operationalize a decision-making process and framework for incorporating species, fleet, habitat, and climate interactions into fishery management. In addition to this document, the EAFM section of the Council website features a white paper on managing forage fishes, which would include managed and unmanaged species (Houde et al 2014).

In 2016, the Council approved a Guidance Document for an Ecosystem Approach to Fisheries Management. This document does not in and of itself operationalize any changes in management, but is rather considered a "how-to" guide, though it could be converted into a regulatory document in the future (MAFMC 2016a).

as a “new approach that involves all species and fisheries in a specific area, recognizes the energetic limits of the system, takes into account the trophic relationships among species, allows for greater adaptability to variability and change, and addresses multifaceted goals and objectives.” The NEFMC has taken as a first goal of EBFM the development of the Fishery Ecosystem Plan for Georges Bank, which will serve as an example for development of future plans and management measures. More information on the progress of these initiatives may be found in the NEFMC Ecosystem-Based Fishery Management Committee webpage.

3.5 Principle Three: Management System Background

3.5.1 Area of Operation and Relevant Jurisdictions

The Unit of Assessment includes one species of spiny dogfish (*Squalus acanthias*) off the coast of the United States from Cape Hatteras to the U.S.-Canada offshore boundary. The stock is considered a single stock throughout its range in U.S. waters (MAFMC 1999). The spiny dogfish fishery in the U.S. Exclusive Economic Zone falls under a single, U.S. federal jurisdiction and is managed jointly by the Mid-Atlantic Fishery Management Council (MAFMC) and the New England Fishery Management Council (NEFMC) in cooperation with the National Marine Fisheries Service. Legislative authority and requirements are provided by Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), the National Environmental Policy Act (NEPA), the Administrative Procedures Act (APA), and various U.S. Executive Orders. Individual states manage the spiny dogfish fishery within 3 miles of shore under an Interstate Fishery Management Plan adopted by the Atlantic States Marine Fisheries Commission (ASMFC 2002). The ASMFC FMP is designed to complement the federal spiny dogfish FMP.

The first spiny dogfish FMP was developed by the MAFMC and the NEFMC in 1999 and approved, implemented, and enforced by the National Marine Fisheries Service, an agency of the U.S. Department of Commerce. The FMP established the management unit as all spiny dogfish in the U.S. Atlantic EEZ. The FMP has been modified 6 times through 4 amendments and 2 framework actions, which are intended to expedite needed changes to the FMP.

National Level Management

Federal fisheries in the United States are managed under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), which includes 10 national standards. These can be considered as explicit and clear long term objectives that guide decision-making and are consistent with the MSC Principles and Criteria and the precautionary approach. The 10 national standards under MSFCMA are as follows:

Conservation and management measures shall:

1. Prevent overfishing while achieving optimum yield.
2. Be based upon the best scientific information available.
3. Manage individual stocks as a unit throughout their range, to the extent practicable; interrelated stocks shall be managed as a unit or in close coordination.
4. Not discriminate between residents of different states; any allocation of privileges must be fair and equitable.
5. Where practicable, promote efficiency, except that no such measure shall have economic allocation as its sole purpose.
6. Take into account and allow for variations among and contingencies in fisheries, fishery resources, and catches.
7. Minimize costs and avoid duplications, where practicable.
8. Take into account the importance of fishery resources to fishing communities to provide for the sustained participation of, and minimize adverse impacts to, such communities (consistent with conservation requirements).
9. Minimize bycatch or mortality from bycatch.

10. Promote safety of human life at sea.

The MSFCMA also created eight regional fishery management councils (councils) responsible for the fisheries that require conservation and management in their region. The councils are composed of both voting and non-voting members representing the commercial fishing, recreational fishing, environmental, academic, and government interests. Under the MSFCMA, councils are required to:

- Develop and amend Fishery Management Plans
- Convene committees and advisory panels and conduct public meetings
- Develop research priorities in conjunction with a Scientific and Statistical Committee
- Select fishery management options
- Set annual catch limits based on best available science
- Develop and implement rebuilding plans

Other Laws

US fishery regulations must comply with many laws apart from the MSA (MAFMC 2008). These include NEPA, the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA), the Coastal Zone Management Act (CZMA), the Administrative Procedures Act, the Paperwork Reduction Act, the Regulatory Flexibility, the Interjurisdictional Fisheries Act, ACFCMA and the National Marine Sanctuaries Act. International agreements and organizations, such as the International Convention for the Conservation of Atlantic Tunas, Inter-American Tropical Tuna Commission, and the United Nation's Code of Conduct for Responsible Fisheries, also play roles in shaping management of US fisheries.

Marine Mammal Protection Act

The MMPA (1972) as subsequently reauthorized protects all marine mammals, prohibiting, with certain exceptions, the "take" of marine mammals in US waters and by US citizens on the high seas. One of the underlying goals of the MMPA is to reduce the incidental serious injury and mortality of marine mammals in commercial fishing operations to insignificant levels approaching a zero mortality and serious injury rate. The 1994 Amendment, calls for "take reduction plans" to assist in the recovery or prevent the depletion of strategic stocks that interact with a Category I or II fishery. A strategic stock is a stock: (i) for which the level of direct human-caused mortality exceeds the potential biological removal (PBR) level; (ii) which is declining and is likely to be listed under the ESA in the foreseeable future; or (iii) which is listed as a threatened or endangered species under the ESA or as a depleted species under the MMPA. Category I and II fisheries are those that have frequent or occasional incidental mortality and serious injury of marine mammals, respectively, whereas Category III fisheries have a remote likelihood of incidental mortality and serious injury of marine mammals. All fishermen, regardless of the category of fishery they participate in, must report all incidental injuries and mortalities caused by commercial fishing operations. The MMPA requires the authorization of the incidental taking of individuals from marine mammal stocks listed as threatened or endangered under the ESA in the course of commercial fishing operations where (i) incidental mortality and serious injury will have a negligible impact on the affected species or stock; (ii) a recovery plan has been developed or is being developed for such species or stock under the ESA; and (iii) a monitoring program has been established, vessels engaged in such fisheries are registered, and a take reduction plan has been developed or is being developed for such species or stock.

The Endangered Species Act

The ESA (1973) provides for the conservation of species that are endangered or threatened throughout all or a significant portion of their range, and the conservation of the ecosystems on which they depend. The taking of endangered sea turtles and marine mammals is prohibited. In addition, NMFS may issue protective regulations necessary and advisable to provide for the conservation of threatened species. There are several mechanisms established in the ESA to avoid the takings prohibition: (i) a regulation may include less stringent requirements intended to reduce incidental take and thus allow for the exemption from the taking prohibition; (ii) the NMFS may permit, under prescribed terms and conditions, any taking otherwise prohibited, if the taking is incidental to, and not the purpose of, carrying out an otherwise lawful activity; and (iii) NMFS must consult with other federal agencies to ensure that any action that is authorized, funded, or carried out by these agencies is not likely to jeopardize the continued existence of any listed species. Section 7(b) authorizes incidental take of listed species after full consultation and identification of reasonable and prudent alternatives or measure to monitor and minimize such take.

3.5.2 Interstate Fishery Management

The Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA) (1993) provides for the coordinated management of coastal migratory fisheries along the US Atlantic coast. It requires the development, implementation and enforcement of coastal FMPs to promote interstate conservation and management of Atlantic coastal fishery resources. This involves the ASMFC, NMFS and the US Fish and Wildlife Service (USFWS). The ACFCMA provides a mechanism to ensure Atlantic coastal state compliance with mandated conservation measures in Commission-approved FMPs. With the act, all Atlantic coast States included in a Commission FMP must comply with certain conservation provisions of the plan. If the ASMFC reports a State to be out of compliance with the mandatory provisions of an ASMFC FMP, the Department of Commerce may implement moratoria on fishing in state waters. A moratorium will be imposed if it is determined that a state has failed to implement measures necessary for the conservation of any species covered under an ASMFC FMP.

The standards contained in Section 805 of the ACFCMA serve as the guiding principles for the conservation and management programs contained in the ASMFC FMPs (ASMFC 2009).

- Conservation programs and management measures shall be designed to prevent overfishing and maintain over time, abundant, self-sustaining stocks of coastal fishery resources. In cases where stocks have become depleted as a result of overfishing and/or other causes, such programs shall be designed to rebuild, restore, and subsequently maintain such stocks so as to assure their sustained availability in fishable abundance on a long-term basis.
- Conservation programs and management measures shall be based on the best scientific information available.
- Conservation programs and management measures shall be designed to achieve equivalent management results throughout the range of a stock or subgroups of that stock.
- Management measures shall be designed to minimize waste of fishery resources.

- Conservation programs and management measures shall be designed to protect fish habitats.
- Development and implementation of FMPs shall provide for public participation and comment, including public hearings.
- Fairness & equity (i) An FMP should allow internal flexibility within States to achieve its objectives while implemented and administered by the States; and (ii) Fishery resources shall be fairly and equitably allocated or assigned among the States.

3.5.3 Consultation, Roles and Responsibilities, Decision Making Processes

Consultation Under Federal Fishery Management

The spiny dogfish fishery is managed primarily through the Spiny Dogfish Fishery Management Plan (FMP) developed by the MAFMC and the NEFMC under the MSFCMA. Complementary management in state waters is achieved through the ASMFC Interstate FMP for Spiny Dogfish. Both the federal and interstate fishery management programs require extensive consultation with clearly defined roles and responsibilities and a well-established decision-making process.

Under the MSFCMA, fisheries management plans contain legal requirements that are codified in the Code of Federal Regulations (USOFR 2016). The process followed by the regional fishery management councils is codified in law and in council policy. Fishery management councils respond to issues raised by the public or by the National Marine Fisheries Service. Councils establish priorities and assign committees to develop fishery management plans, amendments to FMPs, or framework actions, which were intended to allow the councils to change previously analyzed management measures through an abbreviated process, thus allowing more timely response to critical issues.

The MAFMC Council meets six times a year and each meeting takes three days. All Council meetings, committee, or advisory meetings are open to the public, except for sessions in which the Council deals with personnel and litigation issues. Transcripts are available on the MAMFC web site. Briefing material prepared for each meeting is available to the public on CD. Public comments and reports must be provided two weeks prior to the start of the Council meeting. Public comment during the meetings is allowed. Stakeholders may also testify at meetings and write; they may also arrange personal meetings with MAFMC staff and members.

Public scoping is done to satisfy requirements under the NEPA. As part of scoping, the Council solicits public comment prior to the development or revision (through amendment or framework adjustment) of FMPs. Comments are solicited on all EISs per NEPA requirements, usually with a 45 day comment period. Public hearings are held to review draft FMPs/amendments/frameworks and solicit public comments prior to final implementation.

Council committees composed of a subset of council members do the preliminary work on issues assigned to them by the council. Council committees are assisted by plan development teams (PDTs) and formally advised by members of the public who are appointed to advisory panels specific to each fishery or other area of council interest. All council meetings, committee meetings and advisory panel meetings are open to the public both in person and through telephone and Internet access. Councils

hold public hearings on changes to FMPs. All council deliberations and actions are guided by the Administrative Procedures Act.

NMFS has legal responsibility for implementing FMPs developed under the MSFCMA, and can be subject to lawsuits, during which the public “administrative record” (the basis for decision making—including everything in the public record on all fisheries related issues) is used to demonstrate how NMFS made its decisions. NMFS also has legal responsibility for reviewing and approving (or not) FMPs, implementing and enforcing regulations, and administering supporting programs. This legal framework requires decision-makers to consider a range of alternatives and their impacts as well as their compliance with the ten National Standards. As part of the process, NMFS publishes a "Notice of Proposed Rule-making" that invites comments from the public. When a final rule is published, NMFS routinely includes all comments received on proposed rules and the NMFS response to those comments.

The Council process is fully public and there are regular opportunities for public involvement. The roles and responsibilities of the respective Councils, their committees and staff, and the regional NMFS science centers are clear and understood by all relevant parties. Key roles and functions for spiny dogfish are as follows:

National Marine Fisheries Service ("NMFS") (NOAA) – final approving authority for the Spiny Dogfish Fishery Management Plan ("FMP") and amendments thereto; final approving authority for annual quotas; authority for issuance of administrative rules implementing management decisions.

Northeast Fisheries Science Center (NEFSC/Woods Hole) – responsible for at sea surveys, estimating volume of biomass, age/length relationships, recruitment, etc.; responsible for periodic formal (peer reviewed) stock assessments, evaluating all characteristics of the biomass, based on the at sea surveys, and providing projections of future volume of biomass under varying hypothetical harvest scenarios, all for the use of regulators in setting quotas.

Mid-Atlantic Fishery Management Council (MAFMC) – entity with joint jurisdiction under the Magnuson Act for the development of management measures for the spiny dogfish fishery in federal waters through the initiation, development, and approval of all amendments to the FMP, as well as the setting of annual quotas (see website www.mafmc.org).

New England Fishery Management Council (NEFMC) -- entity with joint jurisdiction under the Magnuson Act for the development of management measures for the spiny dogfish fishery in federal waters through the initiation, development, and approval of all amendments to the FMP, as well as the setting of annual quotas (see website www.nefmc.org).

Scientific and Statistical Committee ("SSC") of the MAFMC – a group of approximately 15 scientists and academics required by the Magnuson Act to review annual reports from the MAFMC staff and NEFSC regarding the status of the stocks, and then to set the ABC ("Acceptable Biological Catch") for each species. The ABC is the maximum level at which the MAFMC may set the harvest quota each year. The SSC additionally recommends

improvements for the assessments and notes parameters – such as biological reference points – that they believe need further study.

Spiny Dogfish Committee of the MAFMC – committee comprised of MAFMC members charged with initial responsibility for interacting with industry, and for recommending to the full Council proposed changes in FMP/management regulations and proposed annual quotas. In the case of dogfish, whereas the fishery is jointly managed by the MAFMC and the NEFMC, with the MAFMC in the lead, members of the NEFMC sit on the MAFMC Spiny Dogfish Committee.

Spiny Dogfish Advisory Panel – comprised of representatives of the fishing industry and the public who use their knowledge and experience in the fishery to advise the Spiny Dogfish Committee and the MAFMC concerning the performance of the fishery and any proposed changes in the management system. In the case of dogfish, whereas the fishery is jointly managed by the MAFMC and the NEFMC, with the MAFMC in the lead, members of the public from New England sit on the MAFMC Spiny Dogfish Advisory Panel.

Decisions about management of the spiny dogfish fishery are driven by two main processes:

1. Annual decision-making processes that may result in measures to meet the short-term fishery objectives are driven by the control rules contained in the FMP;

2. Longer-term decision-making processes, such as amendments or framework actions that result in new measures and/or strategies to achieve the long-term fishery objectives (i.e. changes to the management system).

Consultation Under Interstate Fishery Management

The Atlantic States Marine Fisheries Commission was formed by the 15 Atlantic coastal states in 1942 for the purpose of coordinating management of fisheries that occur in multiple states along the Atlantic coast of the USA. Member States are ME, NH, MA, RI, CT, NY, NJ, PA, DE, MD, VA, NC, SC, GA, and FLA. The following excerpts from the ASMFC.org web site (http://www.asmfc.org/fisheries-management/program-overview) explain how the interstate fishery management system operates.

Each State is represented by three Commissioners: the director for the state's marine fisheries management agency, a state legislator, and an individual appointed by the governor. Commissioners participate in the deliberations in the Commission's five main policy arenas: Interstate fisheries management, research and statistics, fisheries science, habitat conservation, and law enforcement.

The bulk of the Commission's fisheries decision-making occurs through the Interstate Fisheries Management Program (ISFMP), where species management boards determine management strategies that the states implement through fishing regulations. The ISFMP Policy Board is responsible for the overall administration and management of the Commission's fishery management programs and provides direct oversight to the individual species management boards. The Program promotes the conservation of Atlantic coastal fishery resources, is based on the use of sound science, and provides adequate opportunity for public participation.

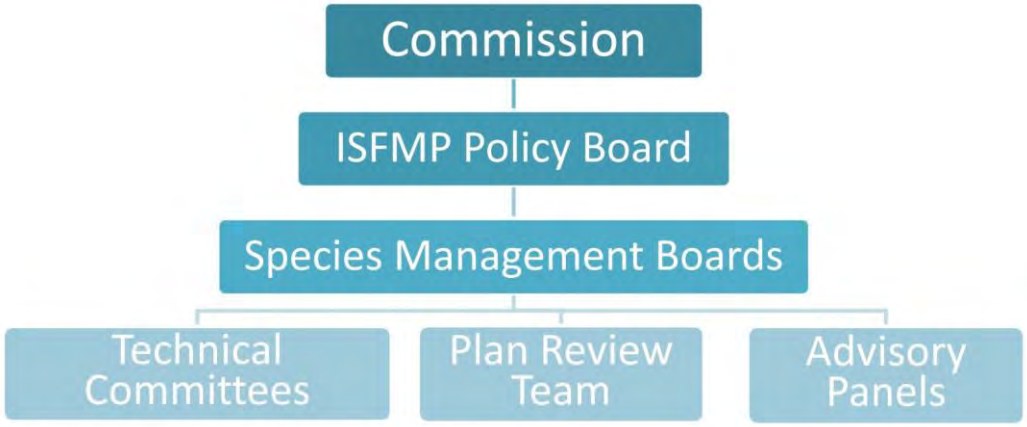


Figure 16. Organization chart for the Atlantic States Marine Fisheries Commission

ISFMP Policy Board: The ISFMP Policy Board is comprised of the Commissioners from the fifteen member states and representatives of the District of Columbia (DC), the Potomac River Fisheries Commission (PRFC), NOAA Fisheries and the U.S. Fish and Wildlife Service. It meets at least bi-annually to establish and monitor the program.

Species Management Boards: These species-specific management boards are composed of Commissioners from the states that have declared an interest in the species' management program. The management boards consider and approve the development and implementation of fishery management plans (FMPs), including the integration of scientific information, proposed management measures, and considerations for habitat conservation and the management of protected species/fishery interactions. All Commission boards/sections and committee meetings are held in accordance with Robert's Rules of Order. The species management boards establish and oversee the activities of their respective Plan Review Teams, Plan Development Teams, Technical Committees and Advisory Panels.

Technical Committees: Species technical committees are comprised of representatives from each state, jurisdiction, and federal agency with a declared interest in the fishery. Technical committees are responsible for providing the species management boards the best scientific information available for guidance in the management process.

Advisory Panels: Advisory panel members are citizens who represent a cross-section of commercial and recreational fishing interests and other stakeholders who are concerned about fisheries conservation and management. The Advisory Panel provides the Management Board with advice concerning species' management activities.

Plan Development and Review Teams: Species Plan Development Team is responsible for preparing all documentation necessary in the development of a FMP, Amendment, or Addendum. Once a management program is adopted by a Species Management Board, the Plan Review Team is responsible for providing annual advice concerning implementation of the management program.

ASMFC Guiding Documents

- ASMFC Compact, Rules and Regulations (revised February 2016)
- ISFMP Charter (revised February 2016)

- ASMFC Appeals Process
- Conservation Equivalency: Policy and Technical Guidance Document (October 2016)
- Technical Support Group Guidance and Benchmark Stock Assessment Process (February 2016)
- Advisory Panel Primer
- Advisory Panel Nomination Form
- Atlantic Coastal Fisheries Cooperative Management Act (1993)
- Status of the Stocks Overview

The ASMFC Spiny Dogfish Coastal Shark Management Board (SDCSMB) is generally responsible for carrying out all activities under the FMP (ASMFC 2000). It establishes and oversees the activities of the PDT and PRT, the Technical Committee and the Stock Assessment Subcommittee, and requests the establishment of ASMFC's SD Advisory Panel. Among other things, the Board makes changes to the management program under adaptive management and approves State programs. The Board reviews the status of state compliance with the FMP or amendment at least annually, and if it determines that a state is out of compliance, reports that determination to the ISFMP. All supporting documents and meeting minutes are available on the ASMFC web site.

PDTs prepare all documentation necessary for the development of an FMP, amendment, or addendum using the best scientific information available and the most current stock assessment information.

PRTs are responsible for providing advice concerning the implementation, review, monitoring, and enforcement of FMPs that have been adopted by the Commission, and as needed be charged by the management board/sections. Each PRT meets at least annually or as provided in a given FMP, to conduct a review of the stock status and Commission member states' compliance for which implementation requirements are defined in the FMP. The PRT develops an annual plan review in order to evaluate the adequacy of the FMP. This report addresses, at a minimum: adequacy and achievement of the FMP goals and objectives (including targets and schedules), status of the stocks, status of the fisheries, status of state implementation and enforcement, status of the habitat, research activities, and other information relevant to the FMP.

The Assessment Science Committee provides guidance to species stock assessment subcommittees, technical committees, and management boards on broad technical issues (e.g., stock assessment methods, biological reference points, sampling targets, and other assessment issues common to multiple Commission-managed species).

The species stock assessment subcommittee is responsible for stock assessments for use by the PDT in formulation of an FMP, amendment, or addendum; and conducting periodic stock assessments.

Technical Committees address specific technical or scientific needs requested periodically by the respective management board/section, PDT, PRT, or the Management and Science Committee. Among its duties, a technical committee provides a range of management options, risk assessments, justifications, and probable outcomes of various management options.

Other Technical Support Subcommittees (e.g., tagging, stocking – with the exception of ISFMP socioeconomic subcommittees) address specific scientific issues important to the assessment and management of the species.

Advisory Panels assist in carrying out the board's/section's responsibilities. Advisory panels also work with PDTs and PRTs.

The Habitat Committee reviews, researches and develops appropriate response to concerns of inadequate, damaged or insufficient habitat for Atlantic coastal species of concern to the Commission.

The Law Enforcement Committee provides information on law enforcement issues, brings resolutions addressing enforcement concerns before the Commission, coordinates enforcement efforts among states, exchanges data, identifies potential enforcement problems, and monitors enforcement of measures incorporated into the various interstate fishery management plans. The program's primary objective is to ensure that the law enforcement provisions of the Commission's fishery management plans are adequate. The program is coordinated through the activities of the Commission's Law Enforcement Committee, which includes law enforcement representatives from the 15 Atlantic coastal States, the District of Columbia, the NMFS, the US Fish and Wildlife Service, and the US Coast Guard.

The Management and Science Committee provides advice concerning fisheries management and the science of coastal marine fisheries.

The Committee on Economics and Social Sciences develops and implements mechanisms to make economic and social science analysis a functioning part of the Commission's decision making process.

ASMFC 2009 describes public participation and the need for stakeholders to review and comment upon problems and alternative solutions. A draft FMP, an amendment and its approval, and an emergency action require a minimum of four public hearings, including at least one in each state that specifically requests a hearing. The hearing document is made available to the public for review and comment at least 30 days prior to the date of the first public hearing. Written comments are accepted for 14 days following the date of the last public hearing. Records of the public hearings and summaries of the written comments are made available to anyone requesting them as are summaries of verbal and written comments. Agendas for meetings of the management board/section, the ISFMP Policy Board, or the Commission, as appropriate, are available for public comment prior to the board, section, or Commission taking action on a fishery management issue. Public comments are evaluated and considered prior to deciding what modifications will be made to the draft FMP or amendment, or draft final FMP or amendment, and prior to approval of the FMP or amendment.

Documents are placed on the Council web site1 for one month requesting public comment and to support public hearings. Public hearings held to comment on Addendum 3 to the SD FMP were hosted by RI Division of Fish and Wildlife, NY Dept. of Environmental Conservation, NJ Division of Fish and Wildlife, DE Dept. of Natural Resources and Environment Control, MD Dept. of Natural Resources, VA Marine Resources Commission and NC Division of Marine Fisheries.

3.5.4 Fishery-Specific Management

Objectives for the Fishery

MAFMC & NEFMC 1999

The overall goal of the spiny dogfish FMP is to conserve spiny dogfish in order to achieve optimum yield from the resource.

To meet the overall goal, the following objectives were adopted in the initial spiny dogfish FMP, adopted in 1999:

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

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

ASMFC Spiny Dogfish FMP

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. In support of this goal, the following objectives were adopted for the Spiny Dogfish Fishery Management Plan:

- Reduce fishing mortality and rebuild the spawning stock biomass to prevent recruitment failure and support a more sustainable fishery.
- Coordinate management activities between state, federal and Canadian waters to ensure complementary regulations throughout the species range.
- Minimize the regulatory discards and bycatch of spiny dogfish within state waters.
- Allocate the available resource in biologically sustainable manner that is equitable to all the fishers.
- 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.

History of the Fishery Management Plan

The Federal FMP

NMFS designated SD as overfished in April, 1998. Under the provisions of the MSFCMA this action mandated the development of a fisheries management plan (FMP) with the introduction of measures to end overfishing and to rebuild the stock. A joint FMP for Federal waters was developed by MAFMC and NEFMC and implemented in 2000.

The objective of the FMP was to halt large scale depletion of reproductively mature female SD and allow the stock to recover to a sustainable level. The recovery plan was designed to constrain fishing mortality (F) on mature females at a rate (FREBUILD) that would grow the stock to 90 % of the nominal biomass target in five years (90 % of the 200,000 mt nominal target = 180,000 mt). This led to the demise of the directed fishery as an incidental catch quota (4 million lbs.) and low trip limits (initially 600 lbs /300 lbs. in the divided fishery year) were put in place. Subsequently, the biomass target was not approved by NMFS and the Councils were required to use the nominal target i.e. 200,000 mt.

The U.S. Sustainable Fisheries Act (SFA) requires that each federal FMP must specify objective and measurable status determination criteria for identifying when stocks or stock complexes covered by the FMP are overfished. To fulfill the requirements of the SFA, status determination criteria for spiny dogfish were comprised of two components: 1) a maximum fishing mortality threshold and 2) a minimum stock size threshold. The maximum F threshold should be specified as Fmsv (or a suitable proxy) and the minimum biomass threshold should be specified as % Bmsv (or a suitable proxy).

For spiny dogfish, at the time the initial FMP was developed, MSY could not be reliably estimated from a surplus production model. The Councils adopted Frep' with a pup per-recruit ratio of 1 .0 or the fishing mortality rate which allows for the production of 1 .0 female pup per female recruit to adult stock (i.e., the adult female portion of the stock is replacing itself), as a proxy for Fmsv. This fishing mortality rate is currently estimated to be F=0.11.

The SFA also requires that a risk averse fishing mortality target be specified, as well as a biomass target. For spiny dogfish, the Councils adopted a fishing mortality rate of Frep with a pup-per-recruit ratio of 1. 5, or the fishing mortality rate which allows for the production of 1 .5 female pups per female recruit (estimated to be F = 0.08 for current size at first entry to the fishery). The Councils have chosen a target stock biomass which is 90% of Bmsy (as represented by the proxy SSBmax).

An additional requirement of the SFA is that stocks which are identified as overfished must be rebuilt to the level that will produce maximum sustainable yield (Bmsv). The SFA guidelines advise that, in most cases, the stock rebuilding period may not exceed 1 0 years. The most recent stock assessment data presented by NEFSC (1998) and the Dogfish Technical Committee indicated that total adult female spiny dogfish stock biomass was about 280 million lbs. (127,000 mt) at the time the FMP was developed, well below the stock biomass target of 397 million lbs. (180,000 mt) based on a three year moving average of the most recent NEFSC survey data. As a result, the Councils proposed to rebuild the adult female spiny dogfish stock to 180,000 mt (90% of SSBmax) over a five year rebuilding period through the implementation of the FMP.

The preferred alternative was expected to eliminate overfishing and rebuild the spiny dogfish stock through a two-step reduction in fishing mortality rate. The first step allowed for a one year exit fishery of 22 million lbs (10,006 mt) to allow a phase out of the directed fishery. This approach was chosen to minimize the impact of the rebuilding program on both the harvest and processing sectors of the industry. For the first year of the rebuilding plan, F was planned to be reduced to 0.2 and then to be reduced further to F = 0.03 in the remaining four years of the rebuilding plan. This schedule allowed for stock rebuilding to the level at or near 90% of the SSBmax level in the year 2003.

Framework Adjustment 1 to the Spiny Dogfish FMP (MAFMC & NEFMC 2006) allowed, but did not obligate the Councils to specify commercial quotas and other management measures for up to five years. Under this framework adjustment, all of the environmental and regulatory review procedures currently required under MSFCMA, and other applicable law, including NEPA would continue to be conducted and documented during the year in which specifications are set. This modification to the FMP was intended to relieve administrative demands on Council and NOAA Fisheries imposed by the annual specification process. Additionally, longer term specifications were expected to provide greater regulatory consistency and predictability to fishery participants.

Amendment 1 to the Spiny Dogfish FMP (MAFMC & NEFMC 2007) incorporated the omnibus amendment to address the standardized by-catch reporting methodology (SBRM) requirements of the MSFCMA. The purpose of the amendment was to explain the methods and processes by which bycatch is currently monitored and assessed for Northeast Region fisheries; determine whether these methods and processes need to be modified and/or supplemented; establish standards of precision for bycatch estimation for all Northeast Region fisheries; and, thereby, document the SBRM established for all fisheries managed through the FMPs of the Northeast Region. An objective of the SBRM is to establish, maintain, and utilize biological sampling programs designed to minimize bias to the extent practicable, thus promoting accuracy while maintaining sufficiently high levels of precision. The scope of the amendment is limited to those fisheries that are prosecuted in the Federal waters of the Northeast Region and managed through an FMP developed by either the Mid-Atlantic or New England Council.

Framework Adjustment 2 to the Spiny Dogfish FMP (MAFMC 2008) was intended to improve the timeliness and efficiency of incorporating the best available scientific information available, consistent with National Standards 1 and 2, into the annual management processes outlined in the code of federal regulations (CFR) paragraph 648.230 for the spiny dogfish stock.

Framework 2 broadened the descriptions of stock status determination criteria contained within the Spiny Dogfish FMP to allow for greater flexibility in those definitions, while maintaining objective and measurable status determination criteria for identifying when the stock is overfished. The framework also identified acceptable categories of peer-review for stock status determination criteria. When these specific peer-review metrics are met and provide new or updated information, the new or revised stock status determination criteria may be incorporated by the Council directly into the annual management measures for each species.

Amendment 2 to the Spiny Dogfish FMP was the spiny dogfish-specific portion of the omnibus amendment designed to bring FMPs into compliance with new requirements in the MSFCMA for acceptable biological catch (ABC), annual catch limits (ACLs), and accountability measures (AMs). For the MAFMC those FMPs included Atlantic mackerel, butterfish, Atlantic bluefish, spiny dogfish, summer flounder, scup, black sea bass, Atlantic surfclam, ocean quahog, and tilefish.

Amendment 2 also addressed the requirements of the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA). When preparing an FMP or FMP amendment, the Council also must comply with the applicable requirements of the Regulatory Flexibility Act (RFA), the Administrative Procedure Act (APA), the Paperwork Reduction Act (PRA), the Coastal Zone Management Act (CZMA), the Information Quality Act (IQA), Regulatory Impact Review (RIR), and Executive Orders. These other

applicable laws and executive orders help ensure that in developing an amendment, the Council considers the full range of alternatives and their expected impacts on the marine environment, living marine resources, and the affected human communities. This integrated document will contain all required elements of the FMP amendment as required by NEPA and information to ensure consistency with other applicable laws and executive orders.

Amendment 2 also formalized the process of addressing scientific and management uncertainty when setting catch limits for upcoming fishing year(s) and established a comprehensive system of accountability for catch (including both landings and discards) relative to those limits, for each of the managed resources subject to this requirement. Specifically, the Amendment: (1) Established ABC control rules, (2) Established a Council risk policy, which is one variable needed for the ABC control rules, (3) Established a requirement for ACL(s), (4) Established a system of comprehensive accountability, which addresses all components of the catch, (5) Described the process by which the performance of the annual catch limit and comprehensive accountability system will be reviewed, (6) Described the process to modify the measures above in 1-5 in the future.

Amendment 3 to the Spiny Dogfish FMP (MAFMC 2014) was prepared by the Mid-Atlantic Fishery Management Council under consultation with the National Marine Fisheries Service (NMFS). The Amendment was needed to maintain consistency with the MSFCMA regarding essential fish habitat (EFH). The amendment called for updating EFH definitions for spiny dogfish as needed. Amendment 3 also addressed other issues that relate to more efficiently achieving the established management goals of the FMP.

Amendment 3 included the spiny dogfish fishery in the Research Set-Aside (RSA) program that had been incorporated into all of the MAFMC's other FMPs while the spiny dogfish FMP was under development. Amendment 3 allowed up to 3% of the commercial quota for spiny dogfish to be set aside for use in the RSA program.

Amendment 3 also provided for the previous year's commercial quota to be maintained until the effective date for the commercial quota for the new fishing year.

Amendment 3 eliminated the allocation of commercial quota by seasons for the purpose of reducing confusion caused by the seasonal allocation of quota contained in the federal FMP and the geographical allocation of quota contained in the ASMFC Interstate FMP.

Amendment 4 to the Spiny Dogfish FMP was adopted in March 2015 for the purpose of incorporating the Standardized Bycatch Reporting Methodology (SBRM) into the FMP. This omnibus amendment was developed to address the requirements of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) to include the SBRM in all FMPs.

ASMFC Spiny Dogfish FMP

On May 20, 1999, the Atlantic States Marine Fisheries Commission approved the development of an interstate fishery management plan for spiny dogfish. The Secretary of Commerce established a quota of four million pounds, a possession limit of 600 pounds from May 1 to October 30, and a possession

limit of 300 pounds from November 1 to April 30. In August 2000 the Spiny Dogfish and Coastal Shark Management Board (SDCSMB) of the ASMFC took emergency action to close state waters to the commercial harvest, landing and possession of SD when federal waters were closed due to the fishery landing its quota. Subsequently an interstate FMP was approved in 2002 that broadly followed the lead of the Federal FMP and was intended to complement federal management in state waters. (http://www.asmfc.org/species/spiny-dogfish)

The goal of the FMP is "to promote stock rebuilding and management of the spiny dogfish fishery in a manner that is biologically, economically, socially, and ecologically sound." In support of this goal, the FMP established the objectives quoted above.

Both the Commission and federal plans use a fishing mortality rate to set annual quotas and trip limits. The Commission's FMP has an additional five addenda (Addendum I - V).

Addendum I (2005) provides the Board the flexibility to establish spiny dogfish specifications for up to five years.

Addendum II (2008) established regional quotas.

Addendum III (2011) set state-specific shares for New York through North Carolina and granted those states flexibility in implementing possession limits and transferring quota.

Addendum IV (2012) addressed the differences in the overfishing definitions between the NEFMC, MAFMC and ASMFC. The Board adopted the fishing mortality (F) threshold to be consistent with the Federal plan.

Addendum V (2014) ensures consistency in spiny dogfish management with the Shark Conservation Act of 2010 by prohibiting processing at-sea, including the removal of fins. Prior to approval, states could process spiny dogfish at-sea, so long as the ratio of fins aboard the vessel did not exceed 5% of the ratio of carcasses aboard the vessel.

Fisheries Regulations to Meet Objectives

Federal Management

This summary of the federal spiny dogfish regulations is taken from https://www.greateratlantic.fisheries.noaa.gov/regs/infodocs/spinydogfactsheet.pdf *and provides a broad overview of restrictions and requirements of NOAA's National Marine Fisheries Service (NMFS). Citations to the relevant sections of Title 50 part 648 of the Code of Federal Regulations are provided throughout this summary.*

A commercial quota is established annually based upon the estimated size of the dogfish population and sustainable harvest rates. In Federal waters, the quota is allocated coastwide for the fishing year May 1-April 30. All spiny dogfish landings, whether from Federal or state waters, are counted toward that quota and monitored by NMFS. When the annual quota is fully harvested, the dogfish fishery will be closed for the remainder of the fishing year. Commercial landings are not permitted following a

closure announcement. Weekly landings reports are available at http://www.greateratlantic.fisheries.noaa.gov/aps/ monitoring/spinydogfish.html. The Atlantic States Marine Fisheries Commission manages dogfish in a slightly different way by setting its own quota and allocating that quota by state or region.

The dogfish possession limit is 6,000 lb in Federal waters; however, individual states may set more restrictive possession limits. There is no minimum fish size for spiny dogfish.

There are four regulated mesh areas (RMAs) that serve to determine which gear can be used in each of the following areas: Gulf of Maine (GOM); Georges Bank (GB); Southern New England (SNE); and Mid-Atlantic (MA). Coordinates defining these RMAs can be found at 50 CFR 648.80 or at http://www. greateratlantic.fisheries.noaa.gov/nero/ fishermen/charts/mul3.html. Within these RMAs, fishing with gillnet or trawl gear must abide by the minimum mesh sizes required by the NE multispecies regulations as shown in **Table 26**.

Table 26. Regulated Mesh Area Requirements (Spiny Dogfish Information Sheet)

Regulated Mesh Area	Gill Net mesh size requirements	Trawl codend mesh size requirements
Gulf of Maine (GOM)	6.5 inches throughout the entire net	6.5-inch square or diamond
Georges Bank (GB)		
Southern New England (SNE)		
Mid-Atlantic (MA)	6.5-inch square or diamond	

Vessels with a limited access NE multispecies permit, and not fishing on a NE multispecies sector trip, must also comply with the NE multispecies Restricted Gear Areas (RGAs). The coordinates of the RGAs can be found in the Closed Area Information Sheet at http://www.greateratlantic.fisheries.noaa. gov/regs/infodocs/multsclosedareas.pdf. There are additional gear requirements for some of the exempted fishing areas which can be found in NOAA's spiny dogfish fact sheet.

In addition to the gear requirements above, protected species requirements may also apply, depending on the season and area being fished. These additional requirements are to reduce incidental interactions between fishing gear and protected species, such as marine mammals and sea turtles. All vessels fishing with gillnets in Federal waters must comply with the applicable provisions of the:

1. Atlantic Large Whale Take Reduction Plan found in 50 CFR 229.32 and on the internet at http://www.greateratlantic. fisheries.noaa.gov/Protected/whaletrp/. Requirements include time-area closures (with limited exceptions) and gear modifications (e.g., weak links, anchoring requirements, sinking groundline, gear marking) from Maine through the east coast of Florida.

2. Harbor Porpoise Take Reduction Plan found in 50 CFR 229.33 (Gulf of Maine) and 229.34 (Mid-Atlantic) and on the internet at http://www. greateratlantic.fisheries.noaa.gov/protected/porptrp/.

Requirements include time-area closures and seasonal gear modifications (e.g., pingers in the Gulf of Maine and gear requirements in the Mid-Atlantic) from Maine through North Carolina.

3. Bottlenose Dolphin Take Reduction Plan found in 50 CFR 229.35 and on the internet at http://www.nmfs.noaa.gov/pr/ interactions/trt/bdtrp.htm. Requirements include time-area closures and gear restrictions (e.g., prohibited night sets, net tending, gear length requirements, etc.) from New Jersey through the east coast of Florida.

4. Gear Restrictions in the NC/VA Large Mesh Gillnet Fishery for the Protection of Sea Turtles found in 50 CFR 223.206 and on the internet at http:// www.greateratlantic.fisheries.noaa.gov/ Protected/seaturtles/. Requirements include seasonal time-area closures to large-mesh gillnet fishing (≥ 7 inches).

Reporting Requirements

The owner or operator of any vessel issued a Federal dogfish permit must maintain on board the vessel and submit an accurate Federal fishing vessel trip report (VTR) for all fishing trips (regardless of species retained). For vessels not issued a limited access NE multispecies permit, VTRs must be received by NMFS or postmarked within 15 days after the end of the reporting month. For NE multispecies limited access permit holders, VTRs must be submitted weekly and received by NMFS or postmarked by midnight of the Tuesday following the reporting week. Copies of VTRs must be retained on board the vessel for 1 year after the date of the last entry on the log.

Any change in the permit information such as vessel name, vessel owner, address, etc., must be submitted in writing to NMFS within 15 days of the change, or the permit is void. A vessel operating a Vessel Monitoring System (VMS), must make an “out of fishery” declaration through VMS before starting a trip when fishing for dogfish in an exemption area. A vessel fishing on a NE multispecies sector trip, does not need to declare “out of fishery” to retain dogfish.

All federally permitted seafood dealers are required to report the purchase of dogfish via computer, using one of the approved electronic means, unless otherwise directed by the Regional Administrator.

Exempted Fishing Areas

Within the GOM and GB RMAs there are six exempted fishing areas that are summarized in **Table 27**. More specific details for each area can be found at https://www.greateratlantic.fisheries.noaa.gov/regs/infodocs/spinydogfactsheet.pdf. A Letter of Authorization (LOA) is required to participate in some of these exempted fishing areas. LOAs can be obtained from the GARFO Permits Office.

Table 27. Exemption Areas (EA) in the Gulf of Maine and Georges Bank. Source: GARFO 2016, Spiny Dogfish Information Sheet.

Area Name	Gear Allowed	LOA Required
Nantucket Shoals Dogfish Fishery EA	Trawl, Gillnet	Yes
Cultivator Shoals Whiting Fishery EA	Trawl	Yes
Small Mesh Areas 1 & 2	Trawl	No
Raised Footrope Trawl Whiting Fishery Areas	Trawl	Yes
GOM/GB Dogfish Gillnet EA	Gillnet	No
Cape Cod Spiny Dogfish EAs	Gillnet, Longline, Handgear	No

Table 28. Exemption Areas (EA) in Southern New England and Mid-Atlantic. Source: GARFO 2016, Spiny Dogfish Information Sheet.

Area Name	Gear Allowed	LOA Required
SNE EA (includes part of GB RMA)	Trawl	No
SNE Dogfish Gillnet EA	Gillnet	No
Mid-Atlantic EA (includes part of SNE RMA)	Trawl, Gillnet	No

There are two exempted fishing areas in the SNE RMA and one exempted fishing area in the MA RMA that are summarized in Table 28. More specific details for each area can be found at https://www.greateratlantic.fisheries.noaa.gov/regs/infodocs/spinydogfactsheet.pdf. Vessels fishing for spiny dogfish in Federal waters, must also comply with closed areas for other fisheries, including NE multispecies. The NE multispecies Closed Area regulations can be found at http://www. greateratlantic.fisheries.noaa.gov/regs/ infodocs/multsclosedareas.pdf. These include seasonal and year-round closures, Essential Fish Habitat (EFH) closures, and transiting/gear stowage requirements.

ASMFC Management Measures

The spiny dogfish fishing season is from May 1 through April 30. The Board approved a 2017 fishing season commercial quota of 39.1 million pounds. The quota is allocated by state shares; Maine through Connecticut receive 58% and are limited by a maximum possession limit of 6,000 pounds per day. Possession limits for states of New York – North Carolina vary by state. The southern state shares are allocated as follows New York (2.7%); New Jersey (7.6%); Delaware (0.9%); Maryland (5.9%); Virginia (10.8%); and North Carolina (14.0%). Any overages from the previous fishing seasons are paid back by the region or state in the following season. Finning is prohibited.

The following lists the specific compliance criteria that a state or jurisdiction must implement in order to be in compliance with the Interstate FMP for Spiny Dogfish (Section 5.1):

1. States are required to close state waters to the commercial landing, harvest and possession of spiny dogfish for the duration of the seasonal period when the commercial quota is projected to be harvested in their state or region.

2. States are required to report landings weekly to NOAA Fisheries

3. Dealer permits issued pursuant to state regulations must submit weekly reports showing at least the quantity of spiny dogfish purchased (in pounds), the name, and permit number of the individuals from whom the spiny dogfish were purchased.

4. States in the northern region are required to implement possession limits as determined through the annual specification process.

5. States may issue exempted fishing permits for the purpose of biomedical supply not to exceed 1,000 spiny dogfish per year.

6. State regulations must prohibit “finning” as described in Addendum V.

Additionally, each state must submit a compliance report detailing its spiny dogfish fisheries and management program for the previous fishing year. Compliance reports are due annually on July 1st and must include at a minimum:

1. the previous fishing year’s fishery and management program including activity and results of monitoring, regulations that were in effect and harvest, including estimates of nonharvest losses;

2. the planned management program for the current fishing year summarizing regulations that will be in effect and monitoring programs that will be performed, highlighting any changes from the previous year; and

3. the number of spiny dogfish exempted fishing permits issued in the previous fishing year, the actual amount (in numbers of fish and pounds) collected under each exempted fishing permit, as well as any other pertinent information (i.e. sex, when and how the spiny dogfish were collected). The report should also indicate the number of exempted fishing permits issued for the current fishing year.

Under the Spiny Dogfish FMP, a state may request *de minimis* status if its commercial landings of spiny dogfish are less than 1% of the coastwide commercial total. If granted, the state is exempt from the monitoring requirements of the commercial spiny dogfish fishery for the following fishing year. However, all states, including those granted *de minimis* status, must continue to report any spiny dogfish commercial or recreational landings within their jurisdiction via annual state compliance reports. Maine, Connecticut, New York, and Delaware qualify for *de minimis* status, however only Delaware is requesting *de minimis* status for the 2016/2017 fishing season.

In order to monitor the fishery and for the states to forecast when a closure will be needed, dealers with permits issued pursuant to state regulations must submit weekly reports showing, at least, the quantity of spiny dogfish purchased (in pounds), the name and permit number of the individuals from whom the spiny dogfish was purchased. Dealers with state permits must report to the state or NMFS all spiny dogfish purchased. States are required to report state landings weekly to NMFS.

The ACCSP is developing a standard permitting and registration system in conjunction with the Gulf of Mexico Fisheries Information Network (FIN). This system will be adopted by ACCSP upon completion and will include a minimum set of standard data elements.

Access Rights

An open access commercial dogfish permit is required to possess, land, or sell dogfish. However, in order to possess dogfish in Federal waters, you must have a Federal dogfish permit, and you must also be fishing under one of the following conditions:

- A NE multispecies trip (including day-at-sea (DAS), B DAS, non-DAS sector, Handgear A and B);
- A scallop DAS;
- A monkfish-only DAS (if fishing in a monkfish exemption area as defined in the large mesh information sheet found at http://www.greateratlantic.fisheries.noaa.gov/regs/infodocs/large_mesh_exemption.pdf); or
- An exempted fishery, which is defined in the GARFO spiny dogfish information sheet available at https://www.greateratlantic.fisheries.noaa.gov/regs/infodocs/spinydogfactsheet.pdf .

Any catch of allocated groundfish stocks by a NE multispecies sector vessel while targeting spiny dogfish will count against its sector's annual catch entitlement, unless the vessel is fishing in an exempted fishery or with exempted gear outside of the DAS program.

(https://www.greateratlantic.fisheries.noaa.gov/regs/infodocs/spinydogfactsheet.pdf)

Research Plan

The Magnuson Stevens Reauthorization Act of 2006 requires that each Council develop a five-year research priority plan (MSFCMA 1996). The Mid-Atlantic Fishery Management Council (Council), in consultation with its Scientific and Statistical Committee, first developed a research plan to meet this requirement in 2008 through examination of research needs identified in numerous stock assessments, Council FMP/Amendment documents and through the Council's Research Set Aside Program.

Since then, the Council embarked on a Visioning Project to map out the future course of marine fisheries management in the Mid-Atlantic region. The Visioning Project resulted in the development of the Council's Strategic Plan which outlines the Councils strategies for implementing the Council's vision for improved federal fisheries management in the Mid-Atlantic. A central theme that emerged from this exercise was the lack of public confidence in the data and science that drive fishery management decisions. As a result, one of the major goals of the Council's Strategic Plan is to ensure

that Council management decisions are based on timely and accurate scientific data that are analyzed and modeled in a manner that improves management performance and build stakeholder confidence. To this end, the Council's intent is to expand cooperative research and rebuild stakeholder confidence in the data and analyses which support its management programs. This updated research plan is responsive to and organized around key themes/elements articulated in the Strategic Plan relative to improving the timeliness and accuracy of information used in the management of marine resources under the purview of the Council. (http://www.mafmc.org/research-priorities/)

The Council's current Comprehensive Five Year Research Plan covers the period 2016-2020. The Plan identifies the following areas of research (MAFMC 2016a):

Stock assessment improvement

Improvement of the data and analyses supporting the stock assessment process in the Northeastern US is the Council's top priority. Scientific uncertainty is generally a function of the quality of the information input into stock assessments and directly impacts the specification of catch limits and hence the amount of fish that can be harvested. Stock assessment improvement was also identified by the NEFSC as a top priority in its Draft Strategic Plan (NEFSC, Draft Strategic Plan 2016-2021).

The development of multi-species models which incorporate environmental covariates is a high priority.

Research to support measures which reduce/eliminate discards

The Council's Visioning Project highlighted the universal view shared by stakeholders about the need to greatly reduce or eliminate discards in Mid-Atlantic fisheries, especially those which occur as a result of fishery regulations.

The gear selectivity component of the discard problem should be addressed through collaborative research with fishermen from both the commercial and recreational sectors. On the commercial side, cooperative studies with industry which evaluate the selectivity of commercial gear types in various fisheries are warranted (see Table 1). These studies should evaluate the efficacy of current mesh and gear configuration regulations in trawl and gill net fisheries and test gear innovations which improve selectivity (i.e., achieve desired size/age at retention with greater precision) through cooperative gear research.

In addition to research on gear selectivity, the Council seeks innovative management solutions which could also reduce discards. These include management approaches which achieve the primary management objectives of preventing overfishing while maximizing yield, but in a manner that minimizes discards and/or mortality of the discarded component of the catch. Research which identifies management measures such as closed areas and/or seasonal gear or other fishery restrictions which minimize or eliminate discards in known time/areas of high discards is a high priority.

In the commercial fisheries, a system of cooperative communication among fishery participants to identify and avoid bycatch in known hot spots in or near real time should be investigated.

Collect and incorporate social and economic data into fishery management decision process and stabilize yields (develop management strategy evaluations)

The lack of adequate policy analysis of the social and economic consequences of management actions taken by the Council prior to decision making was identified as a major problem by stakeholders during the Visioning Project. The 2006 Magnuson Act reauthorization placed major emphasis on the biological imperative to end overfishing and rebuild overfished stocks under specified time constraints. While the Council has been successful in meeting the biological mandates of the MSA, the resulting social and economic consequences have been viewed as unnecessarily severe by both commercial and recreational stakeholders. The collection and analysis of improved social and economic data in support of management decisions (prior to actual decision making) is a high priority.

Another area of research given high priority by the Council is the development of management strategy evaluations for its managed species. Management strategy evaluation (MSE), the evaluation of management strategies using simulation, is widely considered to be the most appropriate way to evaluate the trade-offs achieved by alternative management strategies and to assess the consequences of uncertainty for achieving management goals.

Improving timeliness and accuracy of fishery data collection through electronic reporting

Council FMPs currently contain numerous reporting requirements (including vessel trip reports or paper logbooks), many of which could be made more cost and time efficient through the use of modern electronic reporting methods. Stakeholders identified the need for the implementation of electronic reporting methods to improve the timeliness and accuracy of reports of fishing effort and catch in the commercial fisheries. Electronic reporting has the potential to greatly streamline catch reporting and reduce the cost and burden of reporting catch by stakeholders. Collaborative research projects with both commercial, party/charter (for– hire) and recreational (volunteer angler) fishermen should be conducted to test the efficacy of electronic reporting and to beta-test these applications for eventual integration into the current data reporting system.

Evaluation of Existing Allocations to Fishery Sectors

The Mid-Atlantic Council has utilized output controls to manage the fisheries under its jurisdiction throughout its history. During the initial development of these quota-based management systems, the Council chose to allocate quotas by fishery sector (commercial and recreational) and, in some cases, regionally by state for some species. The initial allocation of quota was generally based on the

historical catch by sector or state for the preceding ten year period. Thus, the historical performance of each fishery defined the percentage share of annual quotas by sector and/or area in perpetuity. Stakeholders have noted the general inflexibility of the fixed quota allocation system currently in place and recommended that the Council consider alternative methods to allocate annual quotas. Major issues of fairness and equity have arisen with respect to access to the fish allocated to sectors and states due to the dynamic nature of fish abundance and distribution since the initial allocations were made. For example, recent research indicates that the geographical distribution of species of major importance to both sectors (i.e., summer flounder, scup and black sea bass) have shifted northward over time such that there is a major disconnect between the quota allocations based on prior states of nature and current conditions. The Council seeks research which evaluates alternative methods of allocating quotas which are capable of accommodating distributional shifts which are likely to continue to occur. In addition, the Council seeks research into methods and analyses which allow for optimal allocation of quota share among fishery sectors based on biological, social and economic considerations.

For Spiny Dogfish specifically, the Council has established the following research agenda:

SURVEYS

Fishery-Independent

- Determine the efficiency of the NEFSC survey gear.
- Investigate catchability as it relates to distribution of spiny dogfish beyond the depth range of current NEFSC trawl surveys (including inter annual differences), possibly by using experimental research or supplemental surveys.

MODELING/QUANTITATIVE

- Investigate alternative stock assessment modeling frameworks.
- Revise the assessment model to investigate the effects of stock structure or distribution, sex ratio, and size of pups on birth rate and first year survival of pups.

BIOLOGY/LIFE HISTORY/HABITAT

- Continue aging studies for spiny dogfish age structures (e.g., fins, spines) obtained from all sampling programs (include additional age validation and age structure exchanges), and conduct an aging workshop for spiny dogfish, encouraging participation by NEFSC, Canada DFO, other interested state agencies, academia, and other international investigators with an interest in dogfish aging (US and Canada Pacific Coast, ICES).
- Continue large scale (international) tagging programs, including conventional external tags, data storage tags, and satellite pop-up tags, to help clarify movement patterns and migration rates.
- Evaluate ecosystem effects on spiny dogfish acting through changes in dogfish vital rates.

Review and Audit of the Management Plan

Internal review of the spiny dogfish management plans are conducted on an annual basis in both the federal management system and in ASMFC. Stock assessments are subject to internal and external reviews.

The management system is regularly reviewed and amended if necessary through the MAFMC council process. The following entities have relevant roles:

- Mid-Atlantic Fishery Management Council ("MAFMC") – entity with jurisdiction under the Magnuson Act for management of the spiny dogfish fishery, including review/approval of all amendments to the FMP, as well as the setting of annual quotas for both species (see website www.mafmc.org).
- Scientific and Statistical Committee ("SSC") of the MAFMC – a group of up to 20 scientists and academics required by the Magnuson Act to review annual reports from the MAFMC staff and NEFSC regarding the status of the stocks, and then to set the ABC ("Acceptable Biological Catch") for each species. The ABC is the maximum level at which the MAFMC may set the harvest quota each year. The SSC additionally recommends improvements for the assessments and notes parameters – such as biological reference points – that they believe need further study.
- Spiny Dogfish Committee of the MAFMC – committee comprised of MAFMC members charged with initial responsibility for interacting with industry, and for recommending to the full Council proposed changes in FMP/management regs and proposed annual quotas.
- Spiny Dogfish Advisory Panel – representatives of the industry who meet at least annually to review the performance of the fishery and makes recommendations to the MAFMC regarding management actions that may be needed.

Some parts of the management system, such as the stock assessments used to set annual TACs and quotas, are subject to external review as part of the rigorous stock assessment workshop administered by the NEFSC. The management system as a whole is part of the federal regional fisheries management system that was established under the MSFCMA. As such, MAFMC council staff and officers participate in periodic meetings of the Council Coordination Committee (CCC). The CCC consists of the chairs, vice chairs, and executive directors from each regional fishery management council (council), or other staff, as appropriate. This committee meets twice each year to discuss issues relevant to all councils, including issues related to the implementation of the MSFCMAA. NOAA Fisheries is committed to the timely implementation of all provisions of the MSFCMA. Regular face-to-face meetings or conferences between NOAA Fisheries and the leadership of the eight councils are critical to ensure administrative and MSFCMA priorities are met. (MRAG 2014)

The ASMFC Spiny Dogfish FMP requires states to submit compliance reports no later than July 1st of each year. The content of the report must cover:

- the previous fishing year's fishery and management program including activity and results of monitoring, regulations that were in effect and harvest, including estimates of non-harvest losses;

- the planned management program for the current fishing year summarizing regulations that will be in effect and monitoring programs that will be performed, highlighting any changes from the previous year; and
- the number of spiny dogfish exempted fishing permits issued in the previous fishing year, the actual amount (in numbers of fish and pounds) collected under each exempted fishing permit, as well as any other pertinent information (i.e. sex, when and how the spiny dogfish were collected). The report should also indicate the number of exempted fishing permits issued for the current fishing year.

The ASMFC Spiny Dogfish FMP incorporates procedures for adaptive management that require annual review of the status of the fishery and the effectiveness of the management measures. The FMP states that:

> The Plan Review Team will monitor the status of the fishery and the resource and report on that status to the Spiny Dogfish and Coastal Shark Management Board annually, or when directed to do so by the Management Board. The Plan Review Team will consult with the Technical Committee, the Stock Assessment Subcommittee and the Advisory Panel, if any, in making such review and report. The report will contain recommendations concerning proposed adaptive management revisions to the management program. The Spiny Dogfish and Coastal Shark Management Board will review the report of the Plan Review Team, and may consult further with Technical Committee, the Stock Assessment Subcommittee or the Advisory Panel. The Management Board may direct the PRT to prepare an addendum to make any changes it deems necessary. The addendum shall contain a schedule for the states to implement its provisions. The Plan Review Team will prepare a draft addendum as directed by the Management Board, and shall distribute it to all states for review and comment. A public hearing will be held in any state that requests one. The Plan Review Team will also request comment from federal agencies and the public at large. After a 30-day review period, the Plan Review Team will summarize the comments and prepare a final version of the addendum for the Management Board. The Management Board shall review the final version of the addendum prepared by the Plan Review Team, and shall also consider the public comments received and the recommendations of the Technical Committee, the Stock Assessment Subcommittee and the Advisory Panel; and shall then decide whether to adopt or revise and, then, adopt the addendum. Upon adoption of an addendum implementing adaptive management by the Management Board, states shall prepare plans to carry out the addendum, and submit them to the Management Board for approval according to the schedule contained in the addendum.

In addition, according to MSC guidance, external review for SG80 and SG100 could be by another department within an agency or by another agency or organization within the country. Considering this, the Council structure wherein NMFS and NOAA GC (other departments or agencies) review alternatives for management changes presented for Council decision-making can likely also be considered as “external review” of the management system for these purposes (MSC 2014). A variety of agencies and interest groups outside the fishery management system regularly review the system with regards to their particular field of interest. These include ETP Take Reduction Teams, the Department of Commerce Inspector General and others. On occasion, the U.S. Congress will direct the National Research Council to investigate some fishery management issues. The Congressional Research Service also reviews council actions pertaining to issues of interest to Members of Congress. There is a great deal of oversight of the management system, but the management system is not subject to regular, formal, external review.

There is a formal review in place to evaluate the impact of fisheries on ETP species, to measure the performance of the measures implemented and to take corrective actions as necessary. These reviews are documented in Biological Opinions (BO) given within the ESA Section 7 consultation.

The ASMFC Spiny Dogfish Plan Review Team conducts annual FMP Reviews that are available at: http://www.asmfc.org/species/spiny-dogfish .

3.5.5 Recognized Interest Groups

Arrangements for On-going Consultations

The Federal Fishery Management System

The fishery conservation and management system created by the MSFCMA is consultative by nature. Membership on the regional fishery management councils includes representatives of state fishery agencies and members of the public who are nominated by governors and appointed by the Secretary of Commerce (MSFCMA). The councils also establish advisory panels consisting of industry participants and other interested parties. All council actions must comply with the National Environmental Policy Act (NEPA), which requires that individual citizens, members of organized groups, or representatives of Tribal, State, or local government agencies be given an opportunity to participate in the assessment of environmental impacts conducted by Federal agencies (A Citizen's Guide to the NEPA, December 2007). NEPA requires assessment of impacts on social, cultural, and economic resources as well as natural resources.

All council meetings, including meetings of Council committees and advisory panels are open to the public and include opportunities for public comment either at the meetings or through formal public comment procedures. Councils maintain extensive mailing lists that are used to notify interested parties of upcoming meetings and issues. All councils maintain a web site through which the public can access information on past, present, and future council activities.

Atlantic States Marine Fisheries Commission

Representation

Each State is represented by three Commissioners: the director for the state's marine fisheries management agency, a state legislator, and an individual appointed by the governor. Commissioners participate in the deliberations in the Commission's five main policy arenas: Interstate fisheries management, research and statistics, fisheries science, habitat conservation, and law enforcement.

Stakeholder Input

ASMFC 2009 describes public participation and the need for stakeholders to review and comment upon problems and alternative solutions. A draft FMP, an amendment and its approval, and an emergency action require a minimum of four public hearings, including at least one in each state that specifically requests a hearing. The hearing document is made available to the public for review and comment at least 30 days prior to the date of the first public hearing. Written comments are accepted for 14 days following the date of the last public hearing. Records of the public hearings and summaries

of the written comments are made available to anyone requesting them as are summaries of verbal and written comments. Agendas for meetings of the management board/section, the ISFMP Policy Board, or the Commission, as appropriate, are available for public comment prior to the board, section, or Commission taking action on a fishery management issue. Public comments are evaluated and considered prior to deciding what modifications will be made to the draft FMP or amendment, or draft final FMP or amendment, and prior to approval of the FMP or amendment.

Documents are placed on the Council web site[1] for one month requesting public comment and to support public hearings.

Public hearings held to comment on changes in FMPs are hosted by the coastal states with an interest in a fishery. Hearings on Addendum 3 to the SD FMP were hosted by the RI Division of Fish and Wildlife, NY Dept. of Environmental Conservation, NJ Division of Fish and Wildlife, DE Dept. of Natural Resources and Environment Control, MD Dept. of Natural Resources, VA Marine Resources Commission and NC Division of Marine Fisheries. Any future changes in management will include similar public hearings.

Atlantic Coastal Fish Habitat Partnership

The Atlantic Coastal Fish Habitat Partnership is a geographically-focused and scientifically-based effort to conserve aquatic habitat along the East Coast. Formed under the National Fish Habitat Action Plan, the partnership includes 16 Atlantic coastal States from Maine to Florida with coastal river drainages, as well as federal agencies, Native American tribes, local governments, and non-profit organizations. The partnership's mission is to accelerate the conservation, protection, restoration, and enhancement of habitat for native Atlantic coastal, estuarine-dependent, and diadromous fish.

Planned Education and Training for Interest Groups

No education and training for interest groups is planned.

Non-fishery Uses or Activities and Arrangements for Liaison and Coordination

The UoA faces continual needs for liaison and co-ordination with other fishery and non-fishery ocean users. Various formal and informal venues are utilized to deal with these issues.

The MAFMC and spiny dogfish industry advisors participate in the ongoing deliberations of the NEFMC concerning the Omnibus Habitat Amendment.

4. Evaluation Procedure

4.1 Harmonized Fishery Assessment

In cases where fishery certification assessments overlap with existing certified fisheries, MSC requires harmonization of the assessments to assure consistency of assessments. For this assessment, in accordance with FCR 7.4.16 and FCR Annex PB, the team evaluated scores of overlapping fisheries for harmonization. The U.S. Atlantic Spiny Dogfish fishery shares a management system and spatial overlap with the Acadian Redfish, Haddock, and Pollock Trawl fishery, requiring harmonization consideration for Principles 2 (habitat impacts) and Principle 3 (3.1.1-3.1.3). The spiny dogfish fishery also shares a management system with the U.S. Atlantic Sea Scallop fishery, requiring further Principle 3 harmonization. The spiny dogfish fishery also overlaps spatially and by gear type and management system with the Acadian Redfish, Haddock, and Pollock Trawl fisher. Two fisheries under Assessment with which the fishery overlaps are the US Gulf of Maine and Georges Bank haddock, pollock and redfish trawl and the US Northeast Longfin Inshore Squid Bottom Trawl Fishery.

The basis for harmonization for each Principle is further described below. Harmonization was considered during initial scoring of the fishery, and justification of all different scoring outcomes are provided in Tables below.

Principle 1

No harmonization is required for P1, as there are no other MSC certified fisheries that target spiny dogfish.

Principle 2

The spiny dogfish fishery shares seabed with the surfclam and ocean quahog fishery, MSC certified in 2016, the Acadian Redfish, Haddock, and Pollock Trawl fishery, certified in 2016, and the U.S. Atlantic sea scallop fishery, MSC certified in 2013. The scallop and surfclam fisheries operate with different gear types than the spiny dogfish fishery, and therefore are not considered applicable for harmonization for those fisheries.

The trawl UoA in this assessment overlaps in terms of gear type with the US Gulf of Maine and Georges Bank haddock fishery (Under Assessment), the pollock and redfish trawl and the US Northeast Longfin Inshore Squid Bottom Trawl Fishery (Under Assessment) and the Acadian Redfish, Haddock, and Pollock Trawl fishery (certified). However the overlap with these fisheries is not identical, because the other fisheries evaluate components of the larger bottom trawl fishery in the Atlantic that are defined by elements such as mesh size and general region (Table 29). For this reason species classified as ‘main’ in one assessment are not classified as ‘main’ in all assessments, and the footprint of each fishery varies.

Additionally for the one already certified fishery (Acadian Redfish, Haddock, and Pollock Trawl) only federally managed species are evaluated vs. the US Atlantic Spiny Dogfish Fishery covered in this report, which also included a number of non-federally managed species classified as 'minor' due to their low volumes.

Table 29. Scope of UoA under P2 of overlapping fisheries

Fishery	Gear Type Under Assessment	Areas under Assessment
US Atlantic Spiny Dogfish Fishery	Small, Medium and Large Mesh Otter Trawl	Northeast and Mid-Atlantic
US Acadian Redfish, Haddock, and Pollock Otter Trawl	Large Mesh Otter Trawl	Northeast
GOM & GB Haddock, Pollock, & Redfish Trawl	Undetermined in publically available information	Northeast
US Northeastern Longfin Inshore Squid Small Mesh Bottom Trawl Fishery	Small Mesh Otter Trawl	Mid-Atlantic

For these reasons a harmonization at a PI score level not considered applicable for PIs under P2, particularly for retained/primary and bycatch/secondary species. However, the team did review the components all of the PIs that might be relevant to inform scoring (See Table 30).

Principle 3

The spiny dogfish fishery shares a management system (MAFMC-managed) with the surfclam and ocean quahog fishery, MSC certified in 2016. The spiny dogfish fishery included multiple units of certification. Those that share a management system with the surfclam and ocean quahog fishery are the fishery for spiny dogfish using gill net gear in federal waters, the fishery for spiny dogfish using long line gear in federal waters, and the fishery for spiny dogfish using trawl gear in federal waters. The spiny dogfish fishery also shares a management system with the Acadian Redfish, Haddock, and Pollock Trawl fishery.

Table 30. Fisheries in the MSC System Considered for Harmonization.

	Fishery	Status	Principles for Harmonization	Conformity Assessment Body
1	US Atlantic Sea Scallop	Certified 19 Dec 2013 CRV1.3	P 3(3.1.1-3.1.3	Intertek Moody
2	US Acadian Redfish, Haddock, and Pollock Otter Trawl	Certified July 2016 CRV1.3	P3 (3.1.1-3.2.4)	SAI Global
3	GOM & GB Haddock, Pollock, & Redfish Trawl	In Assessment	P3 (3.1.1-3.2.4)	Acoura
4	US Atlantic Surfclam and Ocean Quahog	Certified 16 December 2016 CRV2.0	P3 (3.1.1-3.1.3)	SCS Global Services
5	US Northeastern Longfin Inshore Squid Small Mesh Bottom Trawl Fishery	In Assessment	P3 (3.1.1-3.1.3)	SCS Global Services

Table 31. Alignment of Scores for Harmonization

PI	US Atlantic Spiny Dogfish OTB Fisheries	US Atlantic Sea Scallop Fishery	US Acadian Redfish, Pollock and Haddock (This assessment)	US Atlantic Surfclam and Ocean Quahog Fisheries	Gulf of Maine and Georges Bank Haddock, Pollock and Redfish Trawl	Longfin Squid Bottom Trawl Fishery	Comments
2.1.1	80		75				Scope of minor and main species is different, harmonization not feasible
2.1.2	90		75				
2.1.3	80		95				
2.2.1	80		95				
2.2.2	90		95				
2.2.3	80		95				
2.3.1	75		90				In most recent mortality estimate long-finned pilot exceeds PBR
2.3.2	85		90				
2.3.3	80		80				
2.4.1	80		80				
2.4.2	80		85				
2.4.3	80		95				Differences attributed to scale of impact of fishery
2.5.1	80		80				
2.5.2	80		80				
2.5.3	85		80				
3.1.1	90	95	95	100	100	100	Click here to enter text.
3.1.2	100	100	100	100	100	100	Click here to enter text.
3.1.3	100	100	100	100	100	100	Click here to enter text.
3.1.4*	100	100	100	NA	NA	NA	Click here to enter text.

* Only under V1.3

Most scores as shown in Table 31 are within 5 points of each other; with the exception of 3.1.4 which does not exist under V2.0 and scores under P2 which are not applicable to harmonization due to the

differences in the scope of the UoA. Therefore, harmonization discussions with other CABs to align scores was deemed unnecessary.

4.2 Previous assessments

The fishery was first certified to the MSC requirements in 2012 using the default assessment tree MSC Fisheries Assessment Methodology (FAM) (v2). The fishery full assessment and certification was conducted by Intertek Moody who also performed the first surveillance audit. The client fishery transferred the Certificate to SAI Global in August 2014 who undertook the 2nd and 3rd surveillance audits. The fishery transferred to SCS Global Services on 2016, who undertook the fourth surveillance audit and re-assessment.

At the initial assessment and certification, there were six units of certification involving three gear types (gillnet, trawl and longline) under two management areas (state and federal waters). Later on with the publication of a joint Fisheries Management Plan for Spiny Dogfish, the state and federal UoA were joined. Additionally, in February, 2013, the scope of the certificate was extended by adding the States of Connecticut, New York, Pennsylvania, Maryland and Delaware.

Because spiny dogfish is landed from trips targeting spiny dogfish and also when it's caught as bycatch in fisheries targeting other species or groups of species, there is no clearly delimited target fishery for spiny dogfish in the US Atlantic. For this reason the original assessment evaluated under for Principle 2 only the impact of the trips that had landed Spiny Dogfish. The fishery entered re-assessment under process CRV2.0, which introduces new requirements for defining the unit of assessment and unit of certification. Specifically clause 7.4.9 does not permit defining a UoA based on the species caught as observed at the time of landing. For this reason under re-assessment the UoA was expanded to include impacts of all trips operating with gillnet, trawl and longline.

The fishery originally received sixteen conditions in the 2012 full assessment; 14 of the conditions pertained to Principle 2 requirements related to outcome and information of main retained species (2.1.1 and 2.1.3), information for ETP species (PI 2.3.3), and two conditions under Principle 3 (PI 3.2.3).

The first surveillance audit report was posted on December 2013. The report found Conditions 15 and 16 (PI 2.3.3) to be behind target. The second surveillance audit was conducted December 2014 and the report was posted on February 19, 2015. The report concluded that the requirements set out in the Action Plan for Year 2 in relation to Conditions 1,2 (PI 2.1.1), 3-8, (PI 2.1.3), 9-14 (PIs 2.3.3) were behind target and 15,16 (3.2.3) were not back on track after being determined to be behind target during the first surveillance audit. Following the procedures in MSC CR 7.4.3 a Notice of Suspension was issued on February 19th 2015 requiring the client, within 90 days of the Notice of Suspension, to document a Corrective Action Plan that addressed the causes of suspension. The client submitted a documented corrective action plan to the CAB dated April 29th, 2015 within the 90 days from the date of Suspension.

SAI Global conducted a review of the activities undertaken by and the outcome of the Corrective Action Plan which were published in the MSC Verification Report for the Corrective Action Plan on May 2015. The team concluded that the corrective action plan and evidence provided places the fishery back on track to meet and to close conditions 15 and 16 of certification.

The third surveillance audit report was posted on March 2016. During this surveillance a harmonization was conducted with the US Acadian redfish/haddock/pollock otter trawl fisheries, and the trawl UoA in the US Atlantic spiny dogfish fishery. This harmonization resulted in the following changes for the trawl UoA in scoring: PI 2.1.3 there was a change in score from 80 to 95 and PI 2.1.3 scores changed from 65 to 80. In re-assessment the fishery was not harmonized with the US Acadian redfish/haddock/pollock otter trawl fisheries due to…

For the fourth surveillance the five remaining open conditions were closed.

Table 32. Summary of Previous Assessment Conditions

Condition	PI (s)	Year closed	Justification
Gillnet UoA			
1 & 2. The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species	2.1.1	Closed in 4th SA (2017)	The active management measures have resulted in an order of magnitude reduction in the Cod catch for the gill net UoA, demonstrating the effective management measures are in place such that the fishery does not hinder recovery and rebuilding of the cod stocks. The SG80 is met.
3 & 6. Information / monitoring: Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species	2.1.3	Closed in 3rd SA (2016)	From third Surveillance Report: "Having thoroughly considered the information reported by the client (see also Log of client activities and supplied information - Appendix 4) and that from the meetings held with state and federal managers, it is clear the fishery has put in significant effort in preparation for the implementation of the SBRM as required in the revised milestone above for the third annual audit. The Audit Team determines that the condition is **closed** because there is no justification to have this condition due to the management and data collecting mechanisms that are now in place e.g. SBRM as shown by the information that has been provided by the client and stakeholders."
9 &12 Information / monitoring. Relevant information is collected to support the management of fishery impacts on ETP species, including: information for the development of the management strategy; information to assess the effectiveness of the management strategy; and	2.3.3 SIb	Closed in 4th SA (2017)	NMFS Observer Program monitors bycatch of both ESA species and marine mammals (NOAA 2015). Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species. Observer coverage in this fishery is > 25%. Status of species covered under the ESA is reviewed periodically by NMFS Status Review Teams comprised of scientists from NMFS, the state agencies, and academia. The status of marine mammals is monitored by periodic NMFS stock assessments (Waring et al. 2014). These assessments include all

information to determine the outcome status of ETP species			known sources of mortality, as well as population trends. Information on entanglement cases for large whales is compiled for a number of resources within the Atlantic Large Whale disentanglement Network. The information provides some quantitative estimates of the impacts of gill nets in the Atlantic US coast on large whales. As the team has concluded that there is no specific "dogfish gill net fishery", the information at the broad gill net gear type is considered "is **sufficient** to determine whether the fishery **may** be a threat to protection and recovery of the ETP species." Improvements in gear marking have increased frequency of identification of country of origin of gear, but there is still a large number of entanglement events with uknown/unidentified gear type, and confirmed entanglement events are not considered to be a comprehensive. There is no information on the impacts of non-lethal entanglements on large whales. Due to the lack of accurate information on the magnitude of all impact mortalities for large whales, the fishery does not meet SG100 for large whales.
Bottom Trawl			
4 & 7. Information / monitoring: Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species	2.1.3	Closed in 3rd SA (2016)	From third Surveillance Report: "Having thoroughly considered the information reported by the client (see also Log of client activities and supplied information - Appendix 4) and that from the meetings held with state and federal managers, it is clear the fishery has put in significant effort in preparation for the implementation of the SBRM as required in the revised milestone above for the third annual audit. The Audit Team determines that the condition is **closed** because there is no justification to have this condition due to the management and data collecting mechanisms that are now in place e.g. SBRM as shown by the information that has been provided by the client and stakeholders."
10 & 13. Information / monitoring. Relevant information is collected to support the management of fishery impacts on ETP species, including: information for the development of the management strategy; information to assess the effectiveness of the management strategy; and information to determine the outcome status of ETP species	2.3.3	Closed in 3rd SA (2016)	Closed during harmonization with US Acadian redfish/pollock/haddock otter trawl fishery
Bottom Longline			

5& 8. Information / monitoring: Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species	2.1.3	Closed in 3rd SA (2016)	From third Surveillance Report: "Having thoroughly considered the information reported by the client (see also Log of client activities and supplied information - Appendix 4) and that from the meetings held with state and federal managers, it is clear the fishery has put in significant effort in preparation for the implementation of the SBRM as required in the revised milestone above for the third annual audit. The Audit Team determines that the condition is **closed** because there is no justification to have this condition due to the management and data collecting mechanisms that are now in place e.g. SBRM as shown by the information that has been provided by the client and stakeholders."
11 & 14. Information / monitoring. Relevant information is collected to support the management of fishery impacts on ETP species, including: information for the development of the management strategy; information to assess the effectiveness of the management strategy; and information to determine the outcome status of ETP species	2.3.3	Closed in 4th SA (2017)	From Fourth Surveillance Report: According to the 2017 Marine Mammal Protection Act List of Fisheries, for Northeast/Mid-Atlantic bottom longline/hook-and-line, there are no documented incidents of marine mammals killed or injured. This fishery is identified as "CATEGORY III", the lowest level of risk categorization given to a fishery, for which the annual mortality and serious injury of a stock in a given fishery is ≤1% of the PBR level. The team considers the evidence presented for conditions 9&12 is still applicable here. Given the level of risk of this gear type, the data collected on entanglements provides some quantitative estimates of the impacts of general fishing impacts on large whales, meeting SG80 for scoring issue b.
All UoA			
15 & 16 Compliance and enforcement: Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with	3.2.3	Closed in MSC Verification Report (2015)	The report of the first surveillance audit was posted on December 5, 2013 and reported that two conditions dealing with PI 3.2.3 were behind target. In the second year conditions for PI 3.2.3 were behind target for a second year following the procedures in MSC CR 7.4.3. SAI Global commenced suspension of the fishery Certificate. The client submitted a documented corrective action plan. The condition was closed in the 2015MSC Verification Report for the Corrective Action Plan: "The client has provided direct evidence and substantiation of exchange with the US Coast Guard providing evidence of the number of boardings, inspections and violations in the commercial dogfish fishery in the Northeast District 1 and the Southeast District 5, representing the geographical area of the units of certification. […] As a consequence, and by default, the data provided suggests there is no systematic non-compliance in this

			fishery and there is, therefore, no requirement for further action. The assessment team has concluded that: - The information presented fully addresses the cause of suspension. - The fishery has met all of the milestones of the conditions 15 and 16 and the conditions are now closed. […]"

4.3 Assessment Methodologies

This assessment was conducted by SCS Global Services, an accredited MSC certification body. The fishery was assessed using the MSC Certification Requirements Version 1.3, January 14 2013 and the reporting template used in this report is also V1.3. The default assessment tree was used without adjustments. The CAB has confirmed with MSC Fisheries Assessment Managers that the release of V2.0 FCR (April 1, 2015) and V2.1 GCR (Sept 1, 2015) are not binding for this fishery until during full assessment. The fishery will be subject to these updated process requirements (FCR 2.0 and GCR 2.1 or more up to date versions thereof) at the time of any next surveillance. The fishery will remain Part C of V1.3 of the Certification Requirements for all performance requirements (PISGs) for the five year duration of the certificate cycle, should the fishery be found capable of scoring at a level that confers certification.

4.4 Evaluation Processes and Techniques

4.4.1 Site Visits

The assessment team selected visit sites and interviewees based on information needed to assess management operations of the unit of assessment. The client group and other relevant stakeholders helped identify and contact fisheries management, research, compliance, and habitat protection personnel and agency representatives. Before the site visit and meetings were conducted, an audit plan was provided to the client and relevant stakeholders. The on-site meetings took place in North Dartmouth, MA, Woods Hole, MA, and Gloucester, MA. , between 31st May and 1st June 2017 .The assessment team visited agency offices including Woods Hole and GARFO and also visited the client's representative office.

Table 33. Key Attendees to meetings

Attendees Name	Role	Organization
Richard Allen	Lead auditor	Consultant, SCS
Gabriela Anhalzer	P2 Expert	SCS
John Musick	P1 Expert	Consultant, SCS
John Whiteside	Client Representative	Sustainable Fisheries Association
Jerry Winant	Client Representative	Whiteside Law
Michael Palmer	Stock assessment	NEFSC
Chris Legault	Stock assessment	NEFSC
Susan Wigley	Research Analyst	NEFSC
Gina Shield (by phone)	Fisheries Sampling Database Lead	NEFSC
Mike Ruccio	Fishery Management Specialist	NMFS GARFO
William Whitmore	Fishery Management Specialist	NMFS GARFO
Cynthia Hanson	Fishery Management Specialist	NMFS GARFO
Kevin Swiechowicz	Office of Law Enforcement	NOAA
Joseph Heckwolf	Enforcement Attorney	NOAA Office of General Counsel
Jason Didden (by phone)	Fishery Management Specialist	MAFMC
Max Appelman	Fishery Management Specialist	ASMFC
Toni Kerns	Fishery Management Specialist	ASMFC
David Gouveia	Protected Resources	NMFS GARFO
Ellen Keane	Sea Turtle Program	NMFS GARFO
Allison Rosner	Protected Species Monitoring specialist	NMFSGARFO

4.4.2 Consultations

In addition to the meetings and attendees list above (Section 4.4.1), consultations have included large numbers of phone and email exchanges. A number of key organizations were contacted in advance of the fishery's formal entry into public full assessment by the team leader, by phone. SCS also worked with in advance of the fishery entering full assessment to compile an extensive stakeholder list used for emailing announcements and assessment progress to stakeholders.

Prior to the onsite meeting, as well as following the onsite meeting, no written or verbal stakeholder comments were received.

4.4.3 Evaluation Techniques

Documentation and Information Gathering

One of the most critical aspects of the MSC certification process is ensuring that the assessment team gets a complete and thorough grounding in all aspects of the fishery under evaluation. In even the smallest fishery, the assessment team typically needs documentation in all areas of the fishery from the status of stocks, to ecosystem impacts, through management processes and procedures.

Under the MSC program, it is the responsibility of the applying organizations or individuals to provide the information required proving the fishery or fisheries comply with the MSC standards. It is also the responsibility of the applicants to ensure that the assessment team has access to any and all scientists, managers, and fishers that the assessment team identifies as necessary to interview in its effort to properly understand the functions associated with the management of the fishery. Last, it is the responsibility of the assessment team to make contact with stakeholders that are known to be interested, or actively engaged in issues associated with fisheries in the same geographic location.

Information for the assessment was gathered from stakeholder comments, prior to the onsite visit the team reached out individually to stakeholders with a working knowledge of the management operation and scientific information to meet with them during the onsite. Personnel from NOAA's Greater Atlantic Regional Fisheries Office (GARFO) and the Northeast Fisheries Science Center (NFSC) were key in providing operational and regulatory information and scientific analyses.

Scoring and Report Development Process

1. **Onsite Visit:** Scoring was initiated during the 2 day site visit held in May 2017 and completed iteratively through phone calls, emails and skype teleconferences between June and October 2017.

2. **Additional Document Submission/Guidance Request:** Following the onsite visit, the team compiled a list of requested documents for the client for submission within 2 weeks. The team experienced a delay in finalizing the Client Draft as additional time was required to gather and incorporate information related to the status of the Atlantic right whale. On 18th of September 2017 a key scientific paper with estimates of the Atlantic right whale population was published. Subsequently the assessment team gathered additional information on the status and management of this species, including the 5-Year Review of the North Atlantic Right Whale completed by National Marine Fisheries Service on October 2017 and the meeting notes of the Atlantic Large Whale Take Reduction Team Webinar held on November 30, 2017. Additionally, SCS seeking clarification from MSC regarding interpretation of limits for PI 2.3.1; submitting an interpretation request on November 2017.

3. **Client Draft:** Rationales and associated background was developed by respectively assigned assessment team members, and then cross read by team members and SCS staff for production of the client draft report. Scoring was completed by consensus through this review process and team meetings by phone and email. The fishery received a total of 3 conditions. The team finalized scoring and submitted the Client Draft in December 11th 2017. Following initial receipt of the client draft of the report, comments on the milestones for the conditions were submitted by the client group on December 27th 2017; the team made modifications to the milestones. From December 11th 2017 through January 12th the client fishery worked with SCS to generate an acceptable client action plan.

4. **Peer Review:** Based on comments from peer reviewers the team modified content related to Principles 1, 2 and 3. In Principle 1 no scores were adjusted but additional information was included to strengthen the robustness of the rational. Scores were adjusted for the following PIs for all three UoA: 3.2.5 from 85 to 90, 2.3.2 from 90 to 85 and PI 2.2.3 from SG100 to SG80. These changes were then submitted to the client to review prior to the publication of the PCDR. The PCDR was mounted March 2 2018 and subject to a 30 day stakeholder comment period that terminated on April 1, 2018.

5. **Stakeholder Comment on PCDR:**

Scoring Methodology

The assessment team followed guidelines in MSC FCR v2.0 Section 7.10 "Scoring the fishery". Scoring in the MSC system occurs via an Analytical Hierarchy Process and uses decision rules and weighted averages to produce Principle Level scores. There are 28 Performance Indicators (PIs), each with one or more Scoring Issues (SIs). Each of the scoring issues are considered at the 60, 80, and 100 scoring guidepost levels. The decision rule described in Table 34 determines the Performance Indicator score, which must always be in an increment of 5. If there are multiple 'elements[10]' under consideration (e.g. multiple main primary species), each element is scored individually for each relevant PI, then a single PI score is generated using the same set of decision rules described in Table 34.

[10] MSC FCRV2.0 7.10.7: In Principle 1 or 2, the team shall score PIs comprised of differing scoring elements (species or habitats) that comprise part of a component affected by the UoA.

Table 34. Decision Rule for Calculating Performance Indicator Scores based on Scoring Issues, and for Calculating Performance Indicator Scores in Cases of Multiple Scoring Elements. (Adapted from MSC FCRV2.0 Table 4)

Score	Combination of individual SIs at the PI level, and/or combining multiple element PI scores into a single PI score.
<60	Any scoring element/SI within a PI which fails to reach SG60 shall not be assigned a score as this is a pre-condition to certification.
60	All elements (as scored at the PI level) or SIs meet SG60 and only SG60.
65	All elements/SIs meet SG60; a few achieve higher performance, at or exceeding SG80, but most do not meet SG80.
70	All elements/SIs meet SG60; half* achieve higher performance, at or exceeding SG80, but some do not meet SG80 and require intervention action to make sure they get there.
75	All elements/SIs meet SG60; most achieve higher performance, at or exceeding SG80; only a few fail to achieve SG80 and require intervention action.
80	All elements/SIs meet SG80, and only SG80.
85	All elements/SIs meet SG80; a few achieve higher performance, but most do not meet SG100.
90	All elements/SIs meet SG80; half achieve higher performance at SG100, but some do not.
95	All elements/SIs meet SG80; most achieve higher performance at SG100, and only a few fail to achieve SG100.
100	All elements/SIs meet SG100.

**MSC FCRV2.0 uses the word 'some' instead of half. SCS considers 'half' a clearer description of the methodology utilized.*

When calculating the Principal Indicator scores based on the results of the Scoring Issues (SI), SCS interprets the terms in the Table 2 as following:

- **Few:** Less than half. Ex: if there are a total of three SIs, one SI out of 3 is considered few.
- **Some:** Equal to half. Ex: if there are a total of four SIs, two SIs out of 4 is considered some.
- **Most:** More than half. Ex: if there are a total of three SIs, two SIs out of 3 is considered most.

Elements evaluated in the scoring of the fishery are as follows:

Table 35. Scoring elements Gillnet

Component	Scoring elements	Main/Not main	Data-deficient or not
Retained	Winter Skate	Main	No
Retained	Monkfish	Main	No
Retained	Pollock	Main	No
Retained	For a complete list of species See	Minor	Some Species
Bycatch	For a complete list of species See Appendix 6 Additional Documentation	Minor	Some Species
ETP – Large Whales	Northern right whale, Humpback whale, Fin whale, Minke Whale	NA	No
ETP - Small Cetaceans	Bottlenose dolphin (several stocks), Common dolphin, Risso's dolphin White-sided dolphin, Harbor porpoise.	NA	No
ETP - Pinnipeds (Seals and Sea Lions)	Harbor seal, Harp seal Gray sea, Hooded seal,	NA	No
Sea Turtles	Leatherback, Kemp's ridley, Green, Hawksbill Loggerhead	NA	No
ETP- Fishes	Atlantic sturgeon	NA	No

Table 36. Scoring elements Trawl

Component	Scoring elements	Main/ Minor	Data-deficient or not
Retained	Skate, Little	Main	No
Retained	Scup	Main	No
Retained	Little skate/Winter Skate	Main	No
Retained	Winter Skate	Main	No
Retained	Silver Hake	Main	No
Retained	Redfish	Main	No
Retained	Longfin Squid, Monkfish, Butterfish, Red Hake Summer Flounder, Winter Flounder, Atlantic Cod For a complete list of species See Appendix 6 Additional Documentation	Minor	Some Species
Bycatch	For a complete list of species See Appendix 6 Additional Documentation	Minor	Some Species
ETP – Large Whales	Minke Whale	NA	No
ETP - Small Cetaceans	Bottlenose dolphin (several stocks), Common dolphin, Risso's dolphin White-sided dolphin,	NA	No
ETP - Pinnipeds (Seals and Sea Lions)	Harbor porpoise, Harbor seal, Harp seal Gray sea, Hooded seal,	NA	No
Sea Turtles	Leatherback, Kemp's ridley, Green, Hawksbill Loggerhead	NA	No
ETP- Fishes	Atlantic sturgeon	NA	No

Table 37. Scoring elements Bottom Longline

Component	Scoring elements	Main/ Minor	Data-deficient or not
Retained	Tilefish	Main	No
Retained	Haddock	Main	No
Retained	Cusk, Atlantic Cod For a complete list of species See Appendix 6 Additional Documentation	Minor	Some Species
Bycatch	For a complete list of species See Appendix 6 Additional Documentation	Minor	Some Species

The MSC provides a mandatory Excel template that facilitates the calculation of Principle level scores. Within the Excel template (and provided in Section 6.2) PIs are organized into components, where each PI within a component is weighted equally (**PI weight**), where the sum of PI weights per component equals 1. Multiple components make up each Principle, and components are likewise weighted (evenly, except in Principle 1) (**Component weight**), where the sum of component weights per Principle equals 1. The PI weight within the component multiplied by the component weight within the Principle provides a weight for each PI within the Principle (**PI weight * Component weight= PI Principle weight**). Each PI score is then multiplied by its weight within the Principle (**PI Principle weight**), and all weighted PI values are summed to generate a Principle level score, reported to the nearest one decimal place in accordance with MSC FCRV2.0 (7.10.3)

The decision rule for MSC certification is based on the resulting Principle level scores and is as follows:

- No PIs score below 60
- The aggregate score for each Principle, rounded to the nearest whole number, is 80 or above

5. Traceability

5.1 Eligibility Date

The target eligibility date is March 2, 2017. This date is within 6 months of the expected date of release of the Public Comment Draft Report. The traceability and segregation systems that are required to ensure the separation of any certified product from non-certified product are believed to be already in place for the client fleet.

5.2 Traceability within the Fishery

Intertek Moody evaluated traceability for the initial certification of the UoC/UoA covering the gill net, longline, and bottom trawl fleets permitted to catch and land spiny dogfish. Their evaluation and additional information collected by the team during re-assessment is presented here:

The CAB has to determine if the systems of tracking and tracing in the fishery are sufficient to make sure all fish and fish products identified and sold as certified by the fishery originate from the certified fishery. The CAB considers the following points and their associated risk for the integrity of certified products8.

Capture of Product

- Vessels land SD in a large number of places along the east coast of the USA from Maine in the north to Florida in the south. All vessels must have a federal fishery permit, vessel operators must have a vessel operator permit, and vessels must sell to licensed dealers.
- VTRs Catch Reporting and Vessel Trip Reports (VTR): Owner/operators participating in the Spiny Dogfish fishery and other overlapping federally permitted fisheries must submit trip reports weekly.
- Vessel Monitoring System (VMS) Requirements: The owner or operator of a vessel must report catch (retained and discarded) = via VMS.
- VTRs: Copies of fishing log reports must be kept on board the vessel and available for review for at least 1 year, and must be retained for a total of 3 years after the date the fish were last possessed, landed, and sold..

Product Unloading

- Fish is purchased by agents who sell and transport the fish. Vessel trip reports are cross checked with fish buyer reports to allow enforcement officials to forensically check data and identify discrepancies between declared landing data and fish buying data.
- Dealers that buy and sell from federally-permitted vessels must have a federal permit issued by NOAA Fisheries. Dealers must report transactions weekly and annually through the Internet. Required dealer records must be kept for three years. (http://www.greateratlantic.fisheries.noaa.gov/regs/infodocs/.pdf)
- Federally permitted dealers, and any individual acting in the capacity of a dealer, must submit to the Regional Administrator or to the official designee a detailed report of all fish purchased or received for a commercial purpose, other than solely for transport on land, on a weekly basis, by one of the available electronic reporting mechanisms approved by NMFS, unless otherwise

directed by the Regional Administrator. The following information, and any other information required by the Regional Administrator, must be provided in each report (USOFR 2016a):

> (i) All dealers issued a dealer permit must provide: Dealer name; dealer permit number; name and permit number or name and hull number (U.S. Coast Guard documentation number or state registration number, whichever is applicable) of vessel(s) from which fish are purchased or received; trip identifier for each trip from which fish are purchased or received from a commercial fishing vessel permitted for the fishery; date(s) of purchases and receipts; units of measure and amount by species (by market category, if applicable); price per unit by species (by market category, if applicable) or total value by species (by market category, if applicable); port landed; cage tag numbers for surfclams and ocean quahogs, if applicable; disposition of the seafood product; and any other information deemed necessary by the Regional Administrator. If no fish are purchased or received during a reporting week, a report so stating must be submitted.

Product Transport

- The fish that will be exported is transported from the point of landing to the fish processors located in New Bedford and Gloucester.

Product Storage

- Chain of custody would need to be established after the first point of landing to ensure that first hand buyers and agents have the procedures in place to reduce the potential for contaminating certified product with non-certified product.

Product Sale and First Change of Ownership

- Dogfish only be sold to licensed dealers. A copy of the VTR is provided to the dealer at the first change of ownership.

Table 38. Traceability Factors within the Fishery:

Traceability Factor	Description of risk factor if present. Where applicable, a description of relevant mitigation measures or traceability systems (this can include the role of existing regulatory or fishery management controls)
Potential for non-certified gear/s to be used within the fishery	This risk is considered low, the main gear types evaluated in this fishery (gillnet, trawl and bottom longline) account for the main commercial landings. The other non-certified gear types are mainly hand-line and rod and reel, which are utilized by recreational fishers, and cannot be sold commercially to federally permitted dealers. When the processors buy dogfish the sales document will clearly state: (i) the state where the fish is landed; (ii) that the supplying vessel is part of the unit of certification; (iii) and that the harvest was made by one of the gears covered by the unit of certification.

Potential for vessels from the UoC to fish outside the UoC or in different geographical areas (on the same trips or different trips)	The risk is considered very low, and the UoC encompasses both state and federal waters.
Potential for vessels outside of the UoC or client group fishing the same stock	The risk is low, as only vessels that are federally permitted can land dogfish.
Risks of mixing between certified and non-certified catch during storage, transport, or handling activities (including transport at sea and on land, points of landing, and sales at auction)	Low, as buyers (dealers) are required to also be federally permitted.
Risks of mixing between certified and non-certified catch during processing activities (at-sea and/or before subsequent Chain of Custody)	There is no processing at sea, there is no risk of mixing
Risks of mixing between certified and non-certified catch during transhipment	In the past, occasionally SD would be trans-shipped at-sea if the vessel was above its landing quota; however if this would occur it would be between vessels within the UoC
Any other risks of substitution between fish from the UoC (certified catch) and fish from outside this unit (non-certified catch) before subsequent Chain of Custody is required	There are a large number of landing places; however product is sourced at a limited number due to the low value of the product and the high cost of transport

5.3 Eligibility to Enter Further Chains of Custody Eligibility to Enter Further Chains of Custody

The team has concluded and determined that the product originating from the UoC will be eligible to enter further certified chains of custody and be sold as MSC certified or carry the MSC ecolabel. The point

of intended change of ownership of product is the point where the client group takes ownership of the product, and this is the point where Chain of Custody begins.

In the case of the client group buying the product directly from the vessel, either at a client group facility or at a remote offloading site, the change of ownership takes place when the product is offloaded from the vessel and Chain of Custody commences at that point. In the case of product purchased from a UoA vessel by a licensed dealer other than a client group member[11] (that is not a member of the client group but whose operations are described above), and the product is subsequently sold to a member of the client group, the fishery certificate will cover such dealer in this trading operation, such that CoC will begin at the point of change of ownership to a member of the client group. The assessment team considers that interim dealer operations described above may be included in the scope of the certificate on the basis of extremely low to no risk that volume of non-UoA product is landed, as the current UoA includes all commercial gears across both state and federal waters.

Parties/categories of parties whose product will be eligible to use the fishery certificate and sell product as MSC certified with the blue eco-label include companies listed under the Sustainable Fisheries Association, Inc.

5.4 Eligibility of Inseparable or Practicably Inseparable (IPI) stock(s) to Enter Further Chains of Custody

No IPI stocks were identified.

6. Evaluation Results

6.1 Principle Level Scores

Table 39. Final Principle Scores

Final Principle Scores	
Principle	**Score**
Principle 1 – Target Species	95
Principle 2 – Ecosystem -	
Trawl	81.7
Gillnet	81.7
Bottom Longline	83.3
Principle 3 – Management System	97.0

6.3 Summary of PI Level Scores

Table 40. Summary of Performance Indicator Scores and Associated Weights Used to Calculate Principle Scores.

Component	Wt (L2)	PI No.	Performance Indicator (PI)	Wt (L3)	Weight in Principle	Score Trawl	Score Gillnet	Score Bt. LL.
				Either				
Outcome	0.5	1.1.1	Stock status	0.5	0.25	100	100	100
		1.1.2	Reference points	0.5	0.25	90	90	90
		1.1.3	Stock rebuilding					
Management	0.5	1.2.1	Harvest strategy	0.25	0.125	100	100	100
		1.2.2	Harvest control rules & tools	0.25	0.125	90	90	90
		1.2.3	Information & monitoring	0.25	0.125	90	90	90
		1.2.4	Assessment of stock status	0.25	0.125	100	100	100
Retained species	0.2	2.1.1	Outcome	0.333	0.0667	80	80	80
		2.1.2	Management	0.333	0.0667	90	90	90
		2.1.3	Information	0.333	0.0667	80	80	80
Bycatch species	0.2	2.2.1	Outcome	0.333	0.0667	80	80	80
		2.2.2	Management	0.333	0.0667	90	90	90
		2.2.3	Information	0.333	0.0667	80	80	80
ETP species	0.2	2.3.1	Outcome	0.333	0.0667	75	75	95
		2.3.2	Management	0.333	0.0667	85	85	85
		2.3.3	Information	0.333	0.0667	80	75	80
Habitats	0.2	2.4.1	Outcome	0.333	0.0667	80	80	80
		2.4.2	Management	0.333	0.0667	80	80	80
		2.4.3	Information	0.333	0.0667	80	80	80
Ecosystem	0.2	2.5.1	Outcome	0.333	0.0667	80	80	80
		2.5.2	Management	0.333	0.0667	80	80	80
		2.5.3	Information	0.333	0.0667	85	85	85
Governance and policy	0.5	3.1.1	Legal & customary framework	0.25	0.125	100	100	100
		3.1.2	Consultation, roles & responsibilities	0.25	0.125	100	100	100
		3.1.3	Long term objectives	0.25	0.125	100	100	100
		3.1.4	Incentives for sustainable fishing	0.25	0.125	100	100	100
Fishery specific management system	0.5	3.2.1	Fishery specific objectives	0.2	0.1	100	100	100
		3.2.2	Decision making processes	0.2	0.1	100	100	100
		3.2.3	Compliance & enforcement	0.2	0.1	80	80	80
		3.2.4	Research plan	0.2	0.1	100	100	100
		3.2.5	Management performance evaluation	0.2	0.1	90	90	90

6.4 Summary of Conditions

Table 41. Summary of Conditions

Condition number	Condition	Performance Indicator	Related to previously raised condition? (Y/N/NA)
2-1	2-1 By the fourth surveillance the fishery shall provide evidence that (1) the effects of the bottom trawl UoA on long-finned pilot whales are known and are highly likely to be within limits of national requirements for protection of marine protected mammals (Marine Mammal Protection Act, MMPA); (2) it's is highly likely that the bottom trawl fishery meets MMPA requirements, there would be direct demonstration that requirements for protection and rebuilding are being achieved.	2.3.1 (Trawl)	No
2-2	2-2. By end of the next certificate cycle the fishery shall provide evidence that (1) the effects of the gillnet UoA on Atlantic right whales are known and are highly likely to be within limits of national requirements for protection of marine protected mammals (Marine Mammal Protection Act, MMPA); (2) it's is highly likely that the gillnet fishery meets MMPA requirements, there would be direct demonstration that requirements for protection and rebuilding are being achieved.	2.3.1 (Gillnet)	No
2-3	By the fourth annual surveillance the fishery shall provide evidence that (A) sufficient information is available to allow fishery related mortality to be quantitatively estimated for Atlantic right whales AND (B) information is sufficient to support a full strategy to manage impacts on Atlantic right whales.	2.3.3 (Gillnet)	Yes

6.5 Determination, Formal Conclusion and Agreement

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8. Appendices

8.1 Appendix 1. Scoring and Rationales

8.1.1 Principle 1

Evaluation Table for PI 1.1.1 – Stock status

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue		SG 60	SG 80	SG 100
a	Stock status relative to recruitment impairment			
	Guidepost	It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.
	Met?	Y	Y	Y
	Justification	There is a high degree of certainty that the stock is above the point where recruitment would be impaired. A review by the NEFMC's Statistics and Scientific Committee (SSC) in 2011 was conducted to establish its endorsement of a fishing mortality reference point that defines when overfishing is occurring (Fmsy). The updated fishing mortality reference point provided by the NEFSC is Fmsy = 0.2439. All accountable sources of removals contribute to the estimate of fishing mortality (F) under the current assessment. For the most recent assessment year (2010), these include U.S. commercial landings (12.346 M lb), Canadian commercial landings (6 mt), U.S. dead discards (8.997 M lb), and U.S. recreational landings (46,297 lb). Total removals in 2010 were approximately 21.330 M lb corresponding to an F estimate of 0.09, well below Fmsy = 0.2439. In updating the assessment, the NEFSC estimated a 100% probability that overfishing was not occurring (F2010 < Fthreshold) (MAFMC 2014). The Bmsy reference point defines when the stock is rebuilt (above Bmsy) and overfished (below½ Bmsy). For spiny dogfish, Bmsy (proxy) is the spawning stock biomass that maximizes recruitment (SSBmax) in a Ricker type (dome-shaped) stock-recruitment model. SSBmax is estimated to be 159,288 mt (351 M lb) with ½ of that target corresponding to the biomass threshold (79,644 mt; 175.5 M lb). In September 2011, the NEFSC updated their assessment of the spiny dogfish stock using catch data (2010), and results from the 2011 trawl survey. The updated estimate of SSB for 2011 was 169,415 mt (373.496 M lb), about 6% above SSBmax (159,288 mt). In updating the assessment, the NEFSC estimated a 100% probability that the stock is not overfished.		
b	Stock status in relation to achievement of MSY			
	Guidepost		The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue		SG 60	SG 80	SG 100
	Met?		Y	Y
	Justification	There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years. Assessments of spiny dogfish are based on NEFSC spring survey indices expanded to swept area biomass estimates. Uncertainty of the biomass estimates incorporates the sampling variability of the individual surveys, uncertainty in the area swept per tow, and inter-annual variation over a 3-year moving average. Reference points for spiny dogfish are based on the female spawning stock biomass (i.e., ≥ 80 cm) and the rate of fishing mortality applied to the fully vulnerable stock. The stock was severely overfished and was managed under a rebuilding program until 2010 when it was deemed recovered by NMFS. Since this the Biomass estimates have been fluctuating around the target. See fig 5 above The biomass target is based on the relationship between indices of recruitment (≤ 36 cm) and spawning stock biomass (females ≥ 80 cm). A Ricker stock-recruitment relationship was used to estimate the relative biomass at which recruitment is maximized. The relative biomass can be rescaled to swept area biomass using a conversion factor based on the nominal average area swept per tow (Rago and Sosebee 2006). Because 2014 survey data were unavailable (research vessel problems) the Council's SSC utilized an alternative smoothing approach (Kalman filter) for survey data in 2015. The Bmsy reference point defines when the stock is rebuilt (above Bmsy) and overfished (below½ Bmsy). For spiny dogfish, Bmsy (proxy) is the spawning stock biomass that maximizes recruitment (SSBmax) in a Ricker type (dome-shaped) stock-recruitment model. SSBmax is estimated to be 159,288 mt (351 M lb) with ½ of that target corresponding to the biomass threshold (79,644 mt; 175.5 M lb). In September 2011, the NEFSC updated their assessment of the spiny dogfish stock using catch data (2010), and results from the 2011 trawl survey. The updated estimate of SSB for 2011 was 169,415 mt (373.496 M lb), about 6% above SSBmax (159,288 mt). In updating the assessment, the NEFSC estimated a 100% probability that the stock is not overfished. Spiny Dogfish stock assessments are conducted at Northeast Regional Stock Assessment Workshops (SAW). "SAW" is a formal scientific peer review process for evaluating and presenting stock assessment results to managers. The SAW protocol is used to prepare and review assessments for fish and invertebrate stocks in the offshore US waters of the northwest Atlantic. Assessments are prepared by SAW working groups (federally led assessments) or Atlantic States Maine Fisheries Commission technical assessment committees (state led assessments) and peer reviewed by an independent panel of stock assessment experts called the Stock Assessment Review Committee or "SARC". The SAW/SARC process began in 1985 The SARC panel may accept or reject an assessment. Final SAW documents include a Stock Assessment Report, a Stock Assessment Summary Report and the SARC panelist reports. Final SAW assessment reports are published by the Northeast Fisheries Science Center online at http://www.nefsc.noaa.gov/publications/ and http://www.nefsc.noaa.gov/nefsc/saw/. Recent assessments (approved by the SARC) have shown that the SD stock is not overfished and overfishing is not occurring.		
References		MAFMC 2017c, Rago and Sosebee 2006, http://www.nefsc.noaa.gov/publications/, http://www.nefsc.noaa.gov/nefsc/saw/.		

PI 1.1.1	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue	SG 60	SG 80	SG 100
Stock Status relative to Reference Points			
	Type of reference point	**Value of reference point**	**Current stock status relative to reference point**
Target reference point	SSBmax	159288 mt	169415 mt
Limit reference point	OFL	29,218 mt	8,514 mt (Landings)
OVERALL PERFORMANCE INDICATOR SCORE:			**Score**
CONDITION NUMBER (if relevant): Click here to enter text.			**100**

Evaluation Table for PI 1.1.2. Reference Points

PI 1.1.2		Limit and target reference points are appropriate for the stock		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	
	Met?	Y	YY	
	Justification	In federal waters, spiny dogfish are managed jointly by the Mid-Atlantic and New England Fishery Management Councils under a single fishery management plan (FMP). An open access commercial dogfish permit is required to possess, land, or sell dogfish. The primary management tool is the specification of an annual catch limit (ACL). Under the Magnuson-Stevens Act, the Annual Catch Limit (ACL) must be set less than or equal to the Acceptable Biological Catch (ABC) (to account for management uncertainty), which must be set less than or equal to the Overfishing Level (OFL) (to account for any scientific uncertainty in the stock assessment) (Federal Register 2009)). The MAFMC and its SSC jointly developed a control rule to determine ABCs for MAFMC-managed stocks that considers both how uncertainty is handled in assessments and the biological characteristics of the stock in question. In conjunction with the Council's risk policy, the control rule uses a probabilistic approach to specify ABCs for stocks with stock assessments in three categories and ad hoc approaches for Catch-based ABC assessments. Stock assessments are categorized among four levels based primarily on 1) whether an estimate of the OLF is available and accepted by the SSC and 2) how uncertainty in the OFL is characterized in the assessment. Furthermore, the MAFMC-adopted control rule uses the Council's risk policy to determine an acceptable probability of overfishing (P*) as a function of the stock biomass and life history of the species. Lower stock size and/or life history characteristics that increase susceptibility to overfishing (and are not incorporated into assessments) require greater confidence that overfishing will be avoided (via larger buffers). The probabilistic approach was adopted for three of the levels because it explicitly incorporates uncertainty and the MAFMC's acceptable probability of overfishing in determining ABCs. It was also recognized that uncertainty would be very difficult (or impossible) to fully and quantitatively characterize in some situations. The Catch-based ABC portion of the control rule was designed to accommodate these cases (MAFMC, SSC 2016) The probabilistic approach adopted by the MAFMC and its SSC is based on Prager and Shertzer (2010). . The current (May 1, 2016 – April 30 2019) quotas are derived from the recommendations of the Council's Scientific and Statistical Committee (SSC) for Acceptable Biological Catch (ABC), and how various components of fishing mortality are handled by the spiny dogfish fishery management plan.		
b	Guidepost		The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of precautionary issues.
	Met?		Y	Y

PI 1.1.2		Limit and target reference points are appropriate for the stock		
	Justification	The assessment is based on mature female stock biomass according to the details given in PI 1.1.1 above: 1. SSB is estimated each year from NEFSC Groundfish surveys 2. Survey data are analyzed in Stock assessment workshops to produce stock assessments that estimate Fmsy and Bmsy. 3. Stock assessments are peer reviewed by an independent panel of stock assessment experts. 4. Approved assessments are passed on to the MAFMC SSC for recommendations for the ABC and related specifications including quota as detailed above. 5. Assuming that damage to the reproductive potential of stock might occur when OFL is exceeded, the fishery will be closed when ABC is reached. 6. ABC is set below OFL.		
c	Guidepost		The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.
	Met?		Y	N
	Justification	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome. . The target and reference points do not take into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.		
d	Guidepost		For key low trophic level stocks, the target reference point takes into account the ecological role of the stock.	
	Met?		Not relevant	
	Justification	Not relevant, not a low trophic level stock		
References		MAFMC 1999, 2017a, Rago and Sosebee 2010, GARFO 2017		
OVERALL PERFORMANCE INDICATOR SCORE:				90
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 1.1.3 – Stock rebuilding

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding within a specified timeframe.		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Where stocks are depleted rebuilding strategies, which have a reasonable expectation of success, are in place.		Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete within the specified timeframe.
	Met?	(Y/N)		(Y/N)
	Justification	Not Applicable		
b	**Guidepost**	A rebuilding timeframe is specified for the depleted stock that is the shorter of 30 years or 3 times its generation time. For cases where 3 generations is less than 5 years, the rebuilding timeframe is up to 5 years.	A rebuilding timeframe is specified for the depleted stock that is the shorter of 20 years or 2 times its generation time. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.	The shortest practicable rebuilding timeframe is specified which does not exceed one generation time for the depleted stock.
	Met?	(Y/N)	(Y/N)	(Y/N)
	Justification	Not Applicable		
c	**Guidepost**	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within a specified timeframe.	There is evidence that they are rebuilding stocks, or it is highly likely based on simulation modelling or previous performance that they will be able to rebuild the stock within a specified timeframe.	
	Met?	(Y/N)	(Y/N)	
	Justification	Not Applicable		
References		[List any references here]		
OVERALL PERFORMANCE INDICATOR SCORE:				**NA**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 1.2.1 – Harvest strategy

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.
	Met?	Y	Y	Y
	Justification	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points. In federal waters, spiny dogfish are managed jointly by the Mid-Atlantic and New England Fishery Management Councils under a single fishery management plan (FMP). The Harvest Strategy is predicated on specification of an annual catch limit (ACL). Under the Magnuson-Stevens Act, the Annual Catch Limit (ACL) must be set less than or equal to the Acceptable Biological Catch (ABC) (to account for management uncertainty), which must be set less than or equal to the Overfishing Level (OFL) (to account for any scientific uncertainty in the stock assessment (Federal Register 2009). The MAFMC and its SSC jointly developed a control rule to determine ABCs for MAFMC-managed stocks that considers both how uncertainty is handled in assessments and the biological characteristics of the stock in question. In conjunction with the Council's risk policy, the control rule uses a probabilistic approach to specify ABCs for stocks with stock assessments in three categories and ad hoc approaches for Catch-based ABC assessments. Stock assessments are categorized among four levels based primarily on 1) whether an estimate of the OFL is available and accepted by the SSC and 2) how uncertainty in the OFL is characterized in the assessment. Furthermore, the MAFMC-adopted control rule uses the Council's risk policy to determine an acceptable probability of overfishing (P*) as a function of the stock biomass and life history of the species . Lower stock size and/or life history characteristics that increase susceptibility to overfishing (and are not incorporated into assessments) require greater confidence that overfishing will be avoided (via larger buffers). The probabilistic approach was adopted for three of the levels because it explicitly incorporates uncertainty and the MAFMC's acceptable probability of overfishing in determining ABCs. It was also recognized that uncertainty would be very difficult (or impossible) to fully and quantitatively characterize in some situations. The Catch-based ABC portion of the control rule was designed to accommodate these cases (MAFMC, SSC 2016) The probabilistic approach adopted by the MAFMC and its SSC is based on Prager and Shertzer (2010). . The The current (May 1, 2016 – April 30 2019) quotas are derived from the recommendations of the Council's Scientific and Statistical Committee (SSC) for Acceptable Biological Catch (ABC), and how various components of fishing mortality are handled by the spiny dogfish fishery management plan (See Table 10 above). The stock is monitored annually by groundfish trawl surveys from the NEFSC. Data is also collected on size/age composition of the survey catch including recruitment. The commercial catch and landings are monitored by at sea observers, and timely dockside collection of actual landings, and Vessel Trip Reports. When the quota is		

		reached the fishery is shut down until the next fishing year. Since the quota is set well below the OFL the overfishing limit has never been approached.		
b	**Guidepost**	The harvest strategy is likely to work based on prior experience or plausible argument.	The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
	Met?	Y	Y	Y
	Justification	The performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels. Biomass estimates are estimated from NEFS surveys annually, and the performance of the fishery relative to FMP specifications (ABC etc.) are reviewed and adjusted. These reviews include: Estimates of fishing mortality, spawning stock biomass, and total stock biomass for the current year and characterization of the uncertainty of those estimates and If possible, estimates for earlier years; Either updates or re-estimates of biological reference points (BRPs), as appropriate; Evaluation of current stock status with respect to the existing BRPs, as well as with respect to new or re-estimated BRPs; Performance of sensitivity analyses to determine the impact of uncertainty Recommendations as to what modeling approaches and data should be used for conducting single and multi-year stock projections, and for computing and BRPs. The success of this Harvest Strategy is best demonstrated by the stock stability and the fact that the OFL has never been approached.		
c	**Guidepost**	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	Y		
	Justification	Monitoring is in place that is expected to determine whether the harvest strategy is working. Biomass estimates are estimated from NEFS surveys annually, and the performance of the fishery relative to FMP specifications (ABC etc.) are reviewed and adjusted annually. Fishery dependent data are recorded by observers, and dockside landings to assure the quota is not exceeded.		
d	**Guidepost**			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			Y
	Justification	The harvest strategy is periodically reviewed and improved as necessary. Biomass estimates are derived from NEFS surveys annually, and the performance of the fishery relative to FMP specifications (ABC etc.) are reviewed and adjusted annually. Since the stock was declared recovered in 2010 the quota harvest strategy has resulted in landings that are on target or below target every year. The overfishing limit has never been approached. More substantial changes in the Harvest Strategy may be reviewed and implemented periodically through Amendments to the FMP. The original Spiny Dogfish FMP was established in 2000, since then		

		5 amendments have been made to the FMP, the last one in 2017 was part of the omnibus amendment that implemented management measures to prevent the development of new, and the expansion of existing, commercial fisheries on certain forage species in the Mid-Atlantic.		
e	**Guidepost**	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	Y	Y	Y
	Justification	Sharks must be landed with fins attached to the carcass by law (NMFS HMS 2017). In 2010 Congress passed the Shark Conservation Act (SCA), which requires that all sharks landed in the United States be brought to shore with their fins naturally attached. As part of SCA NOAA created regulations for its implementation. The NMFS Office of Law Enforcement (OLE) conducts inspections to enforcing the Shark Finning Prohibition Act (SFPA) of 2000 and implement the ensuing regulations. The observer program also monitors compliance with the 2000 Shark Finning Prohibition Act. In the spiny dogfish fishery are in place regulations pertaining to record keeping and reporting of the landing, sale, transfer, purchase, or other disposition of fins or shark carcasses. All federally permitted seafood dealers are required to report the purchase of dogfish. Lastly, SD is not processed at sea. No tailing or finning is allowed in this fishery, and there are no incentives to fin this small species at sea.		
References		MAFMC 2017a, , NMFS HMS 2017 Shark Finning Report to Congress http://www.nmfs.noaa.gov/sfa/laws_policies/sca/shark_finning_reports.html		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 1.2.2 – Harvest control rules and tools

PI 1.2.2		There are well defined and effective harvest control rules in place		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Generally understood harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.	
	Met?	Y	Y	
	Justification	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached. Catch and discard data in the fishery are collected by onboard NMFS Fisheries Observers, and coverage is >25% of all dogfish trips (Wigley et al. 2016). The primary responsibility for the collection of fishery dependent information from commercial fishery operations for most federally managed species from Maine through Virginia lies with The Fisheries Data Services Division (FDSD) in the Northeast Region of NMFS. For some species this responsibility extends throughout the entire range of the commercial fisheries on the Atlantic and Gulf coasts of the United States. In addition, the FDSD has responsibility for establishing quality standards for fisheries dependent data collections that are managed by the Northeast Regional Office, improving the quality of fishery dependent data and the collection of biological information from commercial catches. The FDSD acquires data through mandatory reporting programs to provide timely and accurate landings and effort data on the federally regulated fisheries in the northeast for in-season management and analysis. Tasks include dockside collection of catch data, biological samples from commercial fishing trips, and producing finished data products to support fisheries management and scientific analyses (NMFS FDSD 2015). The quota is established annually based upon the estimated size of the dogfish population and sustainable harvest rates. The quota and other BRPs are ultimately based on the OFL which is calculated from annual survey estimates of stock size, uncertainty and the MAFMC's acceptable probability of overfishing. In Federal waters, the quota is allocated coast-wide for the fishing year May 1-April 30. All spiny dogfish landings, whether from Federal or state waters, are counted toward that quota and monitored by NMFS. When the annual quota is fully harvested, the dogfish fishery will be closed for the remainder of the fishing year. Commercial landings are not permitted following a closure announcement. This quota –based Control Rule is precautionary because the quota is et well below the OFL. Weekly landings reports are available at http://www.greateratlantic.fisheries.noaa.gov/aps/ monitoring/spinydogfish.html. The NMFS may close a fishery as the quota is approached. This has not been necessary in the SD fishery. (https://www.greateratlantic.fisheries.noaa.gov/regs/infodocs/spinydogfactsheet.pdf)		
b	**Guidepost**		The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules takes into account a wide range of uncertainties.

PI 1.2.2		There are well defined and effective harvest control rules in place		
	Met?		Y	N
	Justification	The selection of the harvest control rules takes into account the main uncertainties. The Magnusson Act requires that FMPs set the acceptable biological catch (ABC) well below the overfishing limit (OFL) to account for assessment uncertainty. Then it requires the average % overage over the previous years to be subtracted from the ABC to yield an annual catch target (ACT) to account for management uncertainty (MAFMC 2017). The SSC determined that the 2010 spiny dogfish assessment (Rago and Sosebee 2010a, 2010b, 2010c) should be considered a Level 3 assessment. The principal reasons for this categorization include the fact that no distribution of OFL was provided and that considerable uncertainties relating to stock size, and the relationship between pup survival and the sex ratio in the stock and the size distribution of mature female dogfish were not fully incorporated into the OFL estimation (MAFMC, SSC 2010). Thus the fishery fails to meet 100.		
c	Guidepost	There is some evidence that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.	Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.
	Met?	Y	Y	Y
	Justification	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules. Biomass estimates are derived from NEFS surveys annually, and the performance of the fishery relative to FMP specifications (ABC etc.) are reviewed and adjusted annually. Since the stock was declared recovered in 2010 the quota harvest strategy has resulted in landings that are on target or below target every year. The overfishing limit has never been approached. (MAFMC 2017)		
References		NMFS FDSD 2015, MAFMC 2017a, Wigley et al. 2016		
OVERALL PERFORMANCE INDICATOR SCORE:				90
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 1.2.3 – Information and monitoring

PI 1.2.3		Relevant information is collected to support the harvest strategy		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information (such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
	Met?	Y	Y	Y
	Justification	A comprehensive range of information on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information (such as environmental information), including some that may not be directly related to the current harvest strategy, is available. SD in US waters are managed as a unit stock and much information is available on productivity and abundance (Rago and Sosebee 2006, MAFMC 2017). Information on fleet composition and fishery removals is available. through the NMFS Observer and Vessel Trip reporting, and Port Sampling programs (Wigley et al. 2016) coordinated by the Fisheries Data Services Division (FDSD) in the Northeast Region of NMFS (NMFS FDSD 2015). Environmental information on SD is available at http://www.nefsc.noaa.gov/publications/tm/tm203/tm203.pdf, and in Sagarese et al. (2014a).		
b	**Guidepost**	Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.	All information required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty.
	Met?	Y	Y	N
	Justification	Stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule. Biomass of SD is monitored yearly on NEFSC Groundfish Survey cruises and analyzed at the NEFSC. Catch and bycatch information is collected by several ongoing NMFS programs to insure the quota is not exceeded. Stating that ALL information is monitored with a high degree of certainty is a high bar to cross. High variability in annual SD biomass estimates due to contagious distribution and migration contribute to uncertainty. The fishery does not meet SG 100		

PI 1.2.3		Relevant information is collected to support the harvest strategy		
c	Guidepost		There is good information on all other fishery removals from the stock.	
	Met?		Y	
	Justification	Data are collected and analyzed on US domestic commercial landings and discards as well as Canadian commercial landings and US recreational landings.		
References		Rago and Sosebee 2006, MAFMC 2017, Sagarese et al. 2014a,. Wigley et al. 2016, http://www.nefsc.noaa.gov/publications/tm/tm203/tm203.pdf.		
OVERALL PERFORMANCE INDICATOR SCORE:				90
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 1.2.4 – Assessment of stock status

PI 1.2.4		There is an adequate assessment of the stock status		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost		The assessment is appropriate for the stock and for the harvest control rule.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.
	Met?		Y	Y
	Justification	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery. Assessments of spiny dogfish are based on NEFSC spring survey indices expanded to swept area biomass estimates. Uncertainty of the biomass estimates incorporates the sampling variability of the individual surveys, uncertainty in the area swept per tow, and inter-annual variation over a 3-year moving average. Reference points for spiny dogfish are based on the female spawning stock biomass (i.e., ≥ 80 cm) and the rate of fishing mortality applied to the fully vulnerable stock. The biomass target is based on the relationship between indices of recruitment (≤ 36 cm) and spawning stock biomass (females ≥ 80 cm). A Ricker stock-recruitment relationship was used to estimate the relative biomass at which recruitment is maximized. The relative biomass can be rescaled to swept area biomass using a conversion factor based on the nominal average area swept per tow (Rago and Sosebee 2006). Biological reference points for fishing mortality are based on joint effects of size at entry into the fishery and the rate of fishing mortality applied to the fully-recruited size class. A life history model is used to estimate the size specific fishing mortality rate corresponding to a lifetime female production of 1.0—the rate at which each female is expected to replace itself in the next generation. Size-specific estimates of fishing mortality are based upon the relationship between the composite length-frequency distribution of landings and discards and the length frequency of the NEFSC spring trawl survey. The size-specific pattern of selectivity varies annually resulting such that the fishing mortality applied to the fully recruited size classes will also vary annually (Rago and Sosebee 2006).		
b	Guidepost	The assessment estimates stock status relative to reference points.		
	Met?	Y		
	Justification	Biological reference points for fishing mortality are based on joint effects of size at entry into the fishery and the rate of fishing mortality applied to the fully-recruited size class. A life history model is used to estimate the size specific fishing mortality rate corresponding to a lifetime female production of 1.0—the rate at which each female is expected to replace itself in the next generation. Size-specific estimates of fishing mortality are based upon the relationship between the composite length-frequency distribution of landings and discards and the length frequency of the NEFSC spring trawl survey. The size-specific pattern of selectivity varies annually resulting such that the fishing mortality applied to the fully recruited size classes will also vary annually (Rago and Sosebee 2006). In September 2011,		

		the NEFSC updated their assessment of the spiny dogfish stock using catch data (2010), and results from the 2011 trawl survey. The updated estimate of SSB for 2011 was 169,415 mt (373.496 M lb), about 6% above SSBmax (159,288 mt).		
c	**Guidepost**	The assessment identifies major sources of uncertainty.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.
	Met?	Y	Y	Y
	Justification	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way. Spiny Dogfish stock assessments are conducted at Northeast Regional Stock Assessment Workshops (SAW). "SAW" is a formal scientific peer review process for evaluating and presenting stock assessment results to managers. Assessments of spiny dogfish are based on NEFSC spring survey indices expanded to swept area biomass estimates. Uncertainty of the biomass estimates incorporates the sampling variability of the individual surveys, uncertainty in the area swept per tow, and inter-annual variation over a 3-year moving average. In September 2011, the NEFSC updated their assessment of the spiny dogfish stock using catch data (2010), and results from the 2011 trawl survey. The updated estimate of SSB for 2011 was 169,415 mt (373.496 M lb), about 6% above SSBmax (159,288 mt). The SAW protocol is used to prepare and review assessments for fish and invertebrate stocks in the offshore US waters of the northwest Atlantic. Assessments are prepared by SAW working groups (federally led assessments) or Atlantic States Maine Fisheries Commission technical assessment committees (state led assessments) and peer reviewed by an independent panel of stock assessment experts called the Stock Assessment Review Committee or "SARC". The SAW/SARC process began in 1985 The SARC panel may accept or reject an assessment. Final SAW documents include a Stock Assessment Report, a Stock Assessment Summary Report and the SARC panelist reports. Final SAW assessment reports are published by the NEFSC online at http://www.nefsc.noaa.gov/publications/ and http://www.nefsc.noaa.gov/nefsc/saw/		
d	**Guidepost**			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?			Y
	Justification	The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored. Assessments are prepared by SAW working groups (federally led assessments) or Atlantic States Maine Fisheries Commission technical assessment committees (state led assessments) and peer reviewed by an independent panel of stock assessment experts called the Stock Assessment Review Committee or "SARC". The SAW/SARC process began in 1985 The SARC panel may accept or reject an assessment. Final SAW documents include a Stock Assessment Report, a Stock Assessment Summary Report and the SARC panelist reports. Final SAW assessment reports are published by the NEFSC online at http://www.nefsc.noaa.gov/publications/ and http://www.nefsc.noaa.gov/nefsc/saw/		
e	**Guidepost**		The assessment of stock status is subject to peer review.	The assessment has been internally and externally peer reviewed.

	Met?		Y	Y
	Justification	Assessments are prepared by SAW working groups (federally led assessments) or Atlantic States Maine Fisheries Commission technical assessment committees (state led assessments) and peer reviewed by an independent panel of stock assessment experts called the Stock Assessment Review Committee or "SARC". The SAW/SARC process began in 1985 The SARC panel may accept or reject an assessment.		
References		MAFMC 2017a, Rago and Sosebee 2006. at http://www.nefsc.noaa.gov/publications/, http://www.nefsc.noaa.gov/nefsc/saw/		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

8.1.2 Principle 2

Evaluation Table for PI 2.1.1 – Retained species outcome

<table>
<tr><td colspan="2">PI 2.1.1</td><td colspan="3">The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species</td></tr>
<tr><td colspan="2">Scoring Issue</td><td>SG 60</td><td>SG 80</td><td>SG 100</td></tr>
<tr><td rowspan="3">a</td><td>Guidepost</td><td>Main retained species are likely to be within biologically based limits (if not, go to scoring issue c below).</td><td>Main retained species are highly likely to be within biologically based limits (if not, go to scoring issue c below).</td><td>There is a high degree of certainty that retained species are within biologically based limits and fluctuating around their target reference points.</td></tr>
<tr><td>Met?</td><td>Otter Trawl: Y
Gillnet: Y
Bottom Longline: Y</td><td>Otter Trawl: Y
Gillnet: Y
Bottom Longline: Y</td><td>Otter Trawl: N
Gillnet: N
Bottom Longline: N</td></tr>
<tr><td>Justification</td><td colspan="3">Main retained species for each UoA are identified in Table 11. Main retained species for all UoA are highly likely to be within biologically based limits. Management of all main species (regardless of UoA or gear) falls under the same stringent management system as for the P1 species. In federal waters, retained species are managed by the Mid-Atlantic or New England Fishery Management Councils under various fishery management plans (FMPs). In state waters species are managed by the ASMFC under complimentary FMPs. Fishery fails to meet GP 100 because not all (minor) retained species meet criterion.

Species FMP Overfished Overfishing UoA
Winter Skate NEFMC Skate No No GN, OT
Monkfish NEFMC Monkfish No No GN
Pollock NEFMC Northeast Multispecies No No GN
Little Skate NEFMC Skate No No OT
Scup MAFMC Flounder, Scup, Seabass No No OT
Silver Hake NEFMC Small mesh Multispecies No No OT
Redfish NEFMC Northeast Multispecies No No OT
Tilefish MAFMC Tilefish No No LL
Haddock NEFMC Northeast Multispecies No No OT

For further details on the stock status of each species please refer to the Background: Section3.4, Status of Main Retained Species, p.37.</td></tr>
<tr><td rowspan="2">b</td><td>Guidepost</td><td></td><td></td><td>Target reference points are defined for retained species.</td></tr>
<tr><td>Met?</td><td></td><td></td><td>Otter Trawl: N
Gillnet: N
Bottom Longline: N</td></tr>
</table>

PI 2.1.1		The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species		
	Justification	Under the Magnuson-Stevens Act, the Annual Catch Limit (ACL) must be set less than or equal to the Acceptable Biological Catch (ABC) (to account for management uncertainty), which must be set less than or equal to the Overfishing Level (OFL) (to account for any scientific uncertainty in the stock (Federal Register 2009). Quotas are derived from the recommendations of the Council's Scientific and Statistical Committee (SSC) for Acceptable Biological Catch (ABC), and how various components of fishing mortality are handled by the various FMPs. Target reference points are set for some but not all minor retained species.		
c	**Guidepost**	If main retained species are outside the limits there are measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species.	If main retained species are outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding.	
	Met?	NA	NA	
	Justification	None of the main retained species for all three UoA are outside the limits, this Scoring Issue is not applicable MAFMC 2016b, 2017b, NEFMC. 2017a,b,c,,d, NEFSC 2017a,c		
d	**Guidepost**	If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery.		
	Met?	Y		
	Justification	Most of the main retained Species are managed through FMPs regulated by the NEFMC, MAFMC, ASMFC, or HMS NOAA Fisheries. Many of these species have scientifically based biological reference points, and are within those limits or are rebuilding. For those species without biological reference points there is catch accounting Minor Species not managed under an FMP are represented in the annual catches by 2000 individuals or less from a geographic area measuring thousands of square kilometers (Appendix 6). It is highly unlikely that the SD Fishery is posing a risk of serious or irreversible harm or preventing recovery of these species. The Fisheries Data Services Division (FDSD) in the Northeast Region of NMFS. For some species this responsibility extends throughout the entire range of the commercial fisheries on the Atlantic and Gulf coasts of the United		

PI 2.1.1	The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species	
References	MAFMC 2016b, 2017b, NEFMC. 2017a,b,c,,d, NEFSC 2017a,c	
OVERALL PERFORMANCE INDICATOR SCORE:		
	Otter Trawl	80
	Gillnet	80
	Bottom Longline	80
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 2.1.2 – Retained species management strategy

PI 2.1.2		There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place, if necessary, that are expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a partial strategy in place, if necessary, that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a strategy in place for managing retained species.
	Met?	Otter Trawl: Y Gill net: Y Bottom Longline: Y	Otter Trawl: Y Gill net: Y Bottom Longline: Y	Otter Trawl: N Gill net: N Bottom Longline: N
	Justification	There is a partial strategy in place, if necessary, that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. Main retained species are managed by the Mid-Atlantic or New England Fishery Management Councils under various fishery management plans (FMPs). In state waters species are managed by the ASMFC under complimentary FMPs. Federal FMPs are required to comply with the 10 National Standards for fisheries management. These standards include measure to prevent overfishing and that are based on the best scientific information available. For federally managed species overhisihng and overfished determinations are established, and acceptable biological catch and annual catch limits are established. Catch and discard data in the fishery are collected by onboard NMFS Fisheries Observers, and coverage is >25% of all dogfish trips (Wigley et al. 2016). The primary responsibility for the collection of fishery dependent information from commercial fishery operations for most federally managed species from Maine through Virginia lies with The Fisheries Data Services Division (FDSD) in the Northeast Region of NMFS. For some species this responsibility extends throughout the entire range of the commercial fisheries on the Atlantic and Gulf coasts of the United States. In addition, the FDSD has responsibility for establishing quality standards for fisheries dependent data collections that are managed by the Northeast Regional Office, improving the quality of fishery dependent data and the collection of biological information from commercial catches. The FDSD acquires data through mandatory reporting programs to provide timely and accurate landings and effort data on the federally regulated fisheries in the northeast for in-season management and analysis. Tasks include dockside collection of catch data, biological samples from commercial fishing trips, and producing finished data products to support fisheries management and scientific analyses (NMFS FDSD 2015).		

		When the annual quota is fully harvested, the fishery will be closed for the remainder of the fishing year. Commercial landings are not permitted following a closure announcement. Fishery fails to meet SG 100 because minor retained species that are not managed under federal FMPs do not meet this criterion.		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved.
	Met?	Otter Trawl: Y Gill net: Y Bottom Longline: Y	Otter Trawl: Y Gill net: Y Bottom Longline: Y	Otter Trawl: N Gill net: N Bottom Longline: N
	Justification	There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved. Under management many of these stocks have been rebuilt, and none of the main species is overfished nor is overfishing occurring. The same is true for many of the minor retained species covered by FMPs They are neither overfished nor is overfishing occurring or they are being managed for recovery. Some minor species are not covered under an FMP and so do not meet this criterion.		
c	**Guidepost**		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Otter Trawl: Y Gill net: Y Bottom Longline: Y	Otter Trawl: Y Gill net: Y Bottom Longline: Y
	Justification	There is clear evidence that the strategy is being implemented successfully. Under management many of these stocks have been rebuilt, and none of the main species is overfished nor is overfishing occurring. Most of the Minor Retained Species are managed through FMPs regulated by the NEFMC, MAFMC, ASMFC, or HMS NOAA Fisheries. Many of these species have scientifically based biological reference points, and are within those limits or are rebuilding. Minor Species not managed under an FMP are represented in the annual catches by 2000 individuals or less from a geographic area measuring thousands of square kilometers (Appendix 6). It is highly unlikely that the SD Fishery is posing a risk of serious or irreversible harm or preventing recovery of these species.		

d	**Guidepost**			There is some evidence that the strategy is achieving its overall objective.
	Met?			Otter Trawl: Y Gill net: Y Bottom Longline: Y
	Justification	There is some evidence that the strategy is achieving its overall objective. Under management many of these stocks have been rebuilt, and none of the main species is overfished nor is overfishing occurring. Most of the Minor Retained Species are managed through FMPs regulated by the NEFMC, MAFMC, ASMFC, or HMS NOAA Fisheries. Some ofthese species have scientifically based biological reference points, and are within those limits or are rebuilding. Minor Species not managed under an FMP are represented in the annual catches by 2000 individuals or less from a geographic area measuring thousands of square kilometers (Appendix 6). It is highly unlikely that the SD Fishery is posing a risk of serious or irreversible harm or preventing recovery of these species		
e	**Guidepost**	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: Y Bottom Longline: Y
	Justification	Sharks must be landed with fins attached to the carcass by law (NMFS HMS 2017). In 2010 Congress passed the Shark Conservation Act (SCA), which requires that all sharks landed in the United States be brought to shore with their fins naturally attached. As part of SCA NOAA created regulations for its implementation. The NMFS Office of Law Enforcement (OLE) conducts inspections to enforcing the Shark Finning Prohibition Act (SFPA) of 2000 and implement the ensuing regulations. The observer program also monitors compliance with the 2000 Shark Finning Prohibition Act. In the spiny dogfish fishery are in place regulations pertaining to record keeping and reporting of the landing, sale, transfer, purchase, or other disposition of fins or shark carcasses.		
References		MAFMC 2016a, 2017b, NEFMC. 2017a,b,c,,d, NEFSC 2017a,c		

OVERALL PERFORMANCE INDICATOR SCORE:	
CONDITION NUMBER (if relevant):	
Otter Trawl	**90**
Gillnet	**90**
Bottom Longline	**90**

Evaluation Table for PI 2.1.3 – Retained species information

PI 2.1.3		Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Qualitative information is available on the amount of main retained species taken by the fishery.	Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery.	Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations.
	Met?	Y	Y	N
	Justification	All main primary species are federally managed and are subject to the same monitoring and information systems. The following rationale therefore applies to all main primary species: Accurate and verifiable information is available on the catch of all retained species is available, but not the consequences of catches of those species not managed under an FMP. Information on catches is available. through the NMFS Observer and Vessel Trip reporting, and Port Sampling programs (Wigley et al. 2016) coordinated by the Fisheries Data Services Division (FDSD) in the Northeast Region of NMFs (NMFS FDSD 2016). The biggest area of uncertainty pertains to discarded species. There is not 100% observer coverage and thus discards on observed trips are extrapolated in the SBRM to estimate discards for the entire fleet. The SBRM annual reports provide the CV for the discard estimates for each species by gear type. The goal of the SBRM is to achieve a discard estimate with a precision of 30% coefficient of variation (CV) across all species and fleets. In a review of the 2017 SBRM report (Wigley & Tholke 2017). There are not discard mortality estimates available for most species, and discards comprise a significant amount of total catch for some main primary. The consequences for the status of affected populations, in particular minor retained species is not available. The SG80, but not the SG100, is met		
b	**Guidepost**	Information is adequate to qualitatively assess outcome status with respect to biologically based limits.	Information is sufficient to estimate outcome status with respect to biologically based limits.	Information is sufficient to quantitatively estimate outcome status with a high degree of certainty.
	Met?	Y	Y	N
	Justification	Information is sufficient to estimate outcome status with respect to biologically based limits, but not with a high degree of certainty for all retained species. Information on catches for all retained species is available. through the NMFS Observer and Vessel Trip reporting, and Port Sampling programs (Wigley et al. 2015) coordinated by the Fisheries Data Services Division (FDSD) in the Northeast Region of NMFS (NEFOP 2016). Catch data for main species is then to the compared to the ABC to assess fishery performance (MAFMC 2017)		

PI 2.1.3		Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species		
c	Guidepost	Information is adequate to support measures to manage main retained species.	Information is adequate to support a partial strategy to manage main retained species.	Information is adequate to support a strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?	Y	Y	N
	Justification	Information is adequate to support a partial strategy to manage main retained species. But not all retained species. Thus the fishery fails GP 100. Under management many of these stocks have been rebuilt, and none of the main species is overfished nor is overfishing occurring.		
d	Guidepost		Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator score or the operation of the fishery or the effectiveness of the strategy)	Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species.
	Met?		Y	N
	Justification	Information continues to be collected on catches for all retained species through the NMFS Observer and Vessel Trip reporting, and Port Sampling programs (Wigley et al. 2016) coordinated by the Fisheries Data Services Division (FDSD) in the Northeast Region of NMFS (NMFS FDSD 2016). Catch data for main species is then to the compared to the ABC to assess fishery performance (MAFMC, 2016, 2017b). The monitoring of discarded species not conducted in sufficient detail to assess all mortalities thus the SG100 is not met.		
References		MAFMC,2016, 2017b, NMFS FDSD 2016, Wigley et al. 2016		

OVERALL PERFORMANCE INDICATOR SCORE:	
Otter Trawl	**80**
Gillnet	**80**
Bottom Longline	**80**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.2.1 – Bycatch species outcome

PI 2.2.1		The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Main bycatch species are likely to be within biologically based limits (if not, go to scoring issue b below).	Main bycatch species are highly likely to be within biologically based limits (if not, go to scoring issue b below).	There is a high degree of certainty that bycatch species are within biologically based limits.
	Met?	NA	NA	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	There are no main bycatch species. Since there were a high number of 'minor' species, the team elected not to score minor species at SG100 as individuals, but instead used an 'all or none' approach to scoring. If any of the minor species, didn't achieve 100, then all of the minor species stay at SG80. Within each UoA there is at least one species for which there is not a high degree of certainty that they are within biologically based limits: ▪ Porbeagle Shark (recorded in bottom longline and gillnet UoAs) is considered overfished, though overfishing is not occurring. ▪ Sand Tiger (recorded in gillnet and bottom trawl UoAs): is included in included in the Endangered Species Act (ESA) Species of Concern List due to their low productivity and high levels of uncertainty in life history parameters and relative abundance trends (Carlson 2009). ▪ Ocean Pout (recorded in bottom trawl and bottom longline UoAs) is considered overfished and overfishing is not occurring. A complete list of all bycatch species may be found in the Appendices. The SG100 is not met		
b	**Guidepost**	If main bycatch species are outside biologically based limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding.	If main bycatch species are outside biologically based limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding.	
	Met?	NA	NA	
	Justification	No main bycatch species were recorded		

PI 2.2.1		**The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups**		
c	**Guidepost**	If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the bycatch species to be outside biologically based limits or hindering recovery.		
	Met?	Otter Trawl: Y Gillnet: Y Bottom Longline: Y		
	Justification	There are a number of measures and practices in place expected to result in the fishery not causing the bycatch species to be outside biologically based limits or hindering recovery, some of these measures include: There are several measures and efforts intended to reduce bycatch, these include the Northeast Fisheries Observer Program, the ESA designations, gear modifications to reduce bycatch and collaborative research initiatives with fisheries such as the Bycatch Reduction Engineering Program (BREP), which supports development of technological solutions to minimize bycatch and bycatch mortality. In 2016 NOAA published the National Bycatch Reduction Strategy, which includes as one of its main goals: Monitor and estimate the rates of bycatch and bycatch mortality in fisheries to understand the level of impact and the nature of the interaction and Conserve and manage fisheries and protected species by implementing measures to reduce bycatch and its adverse impacts.		
References				

OVERALL PERFORMANCE INDICATOR SCORE:	
Otter Trawl	**80**
Gillnet	**80**
Bottom Longline	**80**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.2.2 – Bycatch species management strategy

PI 2.2.2		There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place, if necessary, that are expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a partial strategy in place, if necessary, that is expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a strategy in place for managing and minimizing bycatch.
	Met?	NA	NA	Otter Trawl: Y Gillnet: Y Bottom Longline: Y
	Justification	There are no main bycatch species. There are a number of measures in place to contribute to the management of all non-target species in the UoA, in alignment with the national strategy for bycatch management in US fisheries. Fishery Management Plans contemplate bycatch effects of existing and planned conservation and management measures, meeting the U.S. National Standard Guidelines requirements for FMPs to include considerations to reduce bycatch. The Northeast Fisheries Observer Program directs trips to collect information onboard vessels, based on a number of days per fleet determined in evaluation according to the standardized bycatch reporting methodology (SBRM) Amendment. Onboard observers are required to document catch composition and present annual discard reports to the Fishery Management Councils which are used to implement management measures via amendments across the various FMPs that encompass the gillnet, bottom trawl and bottom longline UoAs. Thus it could be said that for federally managed species there is a strategy in place. Bycatch estimates from the observer program are used to compile and publish the National Bycatch Report. Stocks of all fish and invertebrate stocks managed under the MSA that meet the following criteria: have high bycatch levels, are important to management, and/or for which there are stock status concerns are designated as key stocks. Since the three UoAs operate as part of federally fisheries, and for these fisheries there is in place monitoring of bycatch via the observer program, which results in management actions via amendments for federally managed species or other measures for non-federally managed species, this is considered to be a cohesive strategy, meeting SG100.		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (e.g. general	There is some objective basis for confidence that the partial strategy will work, based on some	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved.

PI 2.2.2		There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations		
		experience, theory or comparison with similar fisheries/species).	information directly about the fishery and/or species involved.	
	Met?	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	There is an objective basis for confidence that the strategy for federally managed species is working primarily on the basis of the stock status of the main species. For non-federally managed species, there is monitoring in place that should provide sufficient information to support additional management action where needed, and the lack of prevalence of non-federally-managed species in significant volume in the fishery provides confidence that the strategy as focused on federally managed species is appropriate and will work. The SG80 is met.		
c	**Guidepost**		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	There is some evidence that the partial strategy is being implemented: the observer program is in place and the percentage of minor bycatch species across all UoA is less than 1% of catch, indicating that the management system has developed FMPs for those species that contribute to a large share of the catch.		
d	**Guidepost**			There is some evidence that the strategy is achieving its overall objective.
	Met?			Otter Trawl: Y Gillnet: Y Bottom Longline: Y
	Justification	The operation of the observer program, and the inclusion of management measures for those species with high bycatch and/or vulnerable status demonstrates that the strategy is achieving is achieving its overall objectives.		
References		National Marine Fisheries Service. 2016. U.S. National Bycatch Report First Edition Update 2 [L. R. Benaka, D. Bullock, J. Davis, E. E. Seney, and H. Winarsoo, Editors]. U.S. Dep.		

PI 2.2.2	There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations
	Commer., 90 p
OVERALL PERFORMANCE INDICATOR SCORE:	
Otter Trawl	**90**
Gillnet	**90**
Bottom Longline	**90**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.2.3 – Bycatch species information

PI 2.2.3		Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Qualitative information is available on the amount of main bycatch species taken by the fishery.	Qualitative information and some quantitative information are available on the amount of main bycatch species taken by the fishery.	Accurate and verifiable information is available on the catch of all bycatch species and the consequences for the status of affected populations.
	Met?	NA	NA	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	The observer program provides accurate and verifiable information on the catch of all bycatch species. However, as there is no status information for many of the bycatch species the SG100 is not met.		
b	**Guidepost**	Information is adequate to broadly understand outcome status with respect to biologically based limits	Information is sufficient to estimate outcome status with respect to biologically based limits.	Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty.
	Met?	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	Information is sufficient to *estimate* outcome status with respect to biologically based limits, but not with a high degree of certainty for all retained species. Information on catches for all retained species is available through the NMFS Observer. Most minor bycatch species are not directly managed by state or federal agencies, and therefore stock assessments/ stock status information is not available for all of these species, thus there is not sufficient information to quantitatively estimate outcome status, the SG100 is not met.		
c	**Guidepost**	Information is adequate to support measures to manage bycatch.	Information is adequate to support a partial strategy to manage main bycatch species.	Information is adequate to support a strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N

PI 2.2.3		**Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch**		
	Justification	Information collected via the Observer program is adequate to support the partial strategy, however because coverage of the observer program is focused primarily on federally managed species and there is limited information on life history of a number of bycatch species, a high degree of certainty is not achieved. The SG100 is not met.		
d	**Guidepost**		Sufficient data continue to be collected to detect any increase in risk to main bycatch species (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectively of the strategy).	Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species.
	Met?		Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	The coverage and consistent of the observer program provides sufficient information to assess mortalities of main bycatch species. However, because the allocation of the observer program prioritizes federally managed species, the team considers that current coverage is not conducted in sufficient detail to assess ongoing mortalities of non-federally managed bycatch species.		
References				

OVERALL PERFORMANCE INDICATOR SCORE:	
Otter Trawl	**80**
Gillnet	**80**
Bottom Longline	**80**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.3.1 – ETP species outcome

PI 2.3.1		The fishery meets national and international requirements for the protection of ETP species The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species.		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species.	The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species.	There is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species.
	Met?	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: Y
	Justification	The Potential Biological Removal (PBR) Level is defined by the US Marine Mammal Protection Act (MMPA) and the Incidental Take Statements (ITSs) issued for Endangered Species Act (ESA) listed species are <u>not</u> considered to be quantitative limits (e.g. similar to harvest control rules). In practice PBRs and ITSs are used as triggers for additional management actions, these are considered to be "requirements for protection and rebuilding provided through the national legislation" (MSC CRv1.3 CB3.11.3). Because both PBRs and ITTs are not hard quantitative limits, in this SI the assessment team interprets "within limits" as in compliance with requirements to reduce take. If a species is above a PBR or ITTs limit, but there are in place requirements to reduce take, the fishery is considered to comply with the intent of this SI[12]. The PBRs and ITTs requirements are generally applied to the aggregated impacts of all fisheries within a region, rather than at an individual fishery-level. For this reason the team relied mostly on estimated effects based on an aggregated assessments of fishery interactions based on region and/or gear type (MSC Interpretation Log Date: 24/05/2016 ID: 2299). Estimates of the effects of fishery on ETP species are derived primarily from the observer program data, stranding reports and sometimes opportunistic observations; Both observed deaths and injuries were considered to be known **LARGE WHALES** <u>*Gillnet Fishery*</u> The gillnet UoA affects four species of large whales: the Western Northern Atlantic right whale stock (*Eubalaena glacialis*), the Gulf of Maine humpback whale stock, the Canadian		

[12] **MSC Interpretation Date: 24/05/2016 ID: 2299** "In scoring issue (a) of PI 2.3.1, it is required that effects of the fishery are…"within limits of national and international requirements for protection of ETP species". The MSC does not specify what is meant by 'limits' in this case. Limits that are part of binding regulatory requirements that the fishery needs to comply with (e.g. similar to harvest control rules) should always be considered as 'limits of national and international requirements' by assessment teams. In cases, however, where guidance reference levels are used in concert with protection requirements, the main element to address is whether the requirements themselves are being met. For example, if a Potential Biological Removal

		East Coast minke whale stock (*Balaenoptera acutorostrata*) and the Western North Atlantic fin whale stock (*Balaenoptera physalus*). The mortality and serious injury (known) effects of fisheries on humpback, minke and fin whales stocks are informed by observer program data, stranding reports and opportunistic observations. For the period 2010 through 2014, the minimum annual rate of fishery-caused mortality and serious injury for the minke whale stock was below 50% of their prescribed PBR. For the humpback and fin whales stocks, the minimum annual fishery morality was below their prescribed PBR, but above their 50% threshold, driving the classification of Category I for the Northeast sink gillnet fleet (Table 18). The 2016 Marine Mammal Stock Assessments indicates a positive population trend for the Gulf of Maine humpback whale stock; a trend analysis has not been conducted for the fin whale stock. (Hayes et al. 2016). The Atlantic Large Whale Take Reduction Plan (ALWTRP) has in place regulations aimed at reducing bycatch in gillnet fisheries in the western North Atlantic for humpback and fin whales. The effects of the gillnet fishery on humpback, minke and fin whale stocks are known and considered highly likely to be within MMPA limits, thus the SG80 is met for these species. Because fishery mortality are minimum estimates, considered to be biased low and because the effects on non-lethal entanglement for humpback whales in the US East Coast are not well understood, an SG100 is not met. Recent estimates indicate an abundance decline of the Western North Atlantic stock of right whale since 2011 (Pace et al. 2017). Between 2010 and 2014, the fishery-caused mean annual serious injury and mortality for this stock was estimated to be 4.65; significantly higher than the prescribed PBR of one. Confirmed fishery-caused mortality and injury events are considered a minimum; not all entangled whales are discovered or reported. Entanglement events for this species are unobserved; In the majority of the cases, no gear was documented or recovered, or the whale was carrying sections (line or rope) of unknown/undetermined gear type. Over 95% of mortality/serious injury events recorded between 2010 and 2014 did not have sufficient information to assign the event to a specific fishery/gear type. During this period no mortalities were attributed to the gillnet fishery. Nonetheless, there is evidence which indicates that Atlantic right whales may be susceptible to entanglement in gear employed by gillnet fisheries. Between 1975 and 1993 there are records of past entanglements events attributed to gillnets (Hayes et al. 2016). There also appears to be some spatial overlap between the areas where acoustic tracks have recorded right whales distribution and where fishing effort with US gillnets occurs. The MMPA cites annual mortality and serious injury to North Atlantic right whale from the Northeast sink gillnet >50%PBR as part of the basis for classifying this fishery as Category I. Consequently, this fishery is under the Atlantic Large Whale Take Reduction Plan (ALWTRP). The ALWTRP consists of regulatory measures to reduce incidental take of right whales including spatial and seasonal closures, gear modifications and gear marking requirements. At the November 2017 'Atlantic Large Whale Take Reduction Team Monitoring Webinar' the United States Coast Guard (USCG) reported on "… three cases involving violations of gillnet vessels in the Northeast and mid-Atlantic. These cases included failure to have an anchor, buoy lines with no markings, and failure to use weak links." Across all fisheries, there is an 87.4% compliance rate with gear regulations (NMFS 2017b). The SG80 requires a 'highly likely' probability (80th percentile). The interpretation of likelihood levels may be either qualitative (plausible argument, empirical observation of

(PBR) is used as a trigger for additional management action to reduce the take of a given species (as it is in the US Marine Mammal Protection Act), the key thing is that the fishery is complying with the requirements to reduce the take (as monitored by the national requirements)."

		sustainability and qualitative risk) or quantitative (measured data relevant to the fishery, statistical analysis, quantitative risk assessment) (MSC v2.0 GSA 3.2.4). The overall compliance rate across all fisheries >80% suggests that the gillnet fishery is likely complying with the requirements to reduce take, meeting SG60. However, the limitations of verification of compliance, the high-risk states of Atlantic right whales, the limited information on entanglement events, and evidence of some non-compliance events, reduce the confidence that the gillnet fishery is highly likely to be complying with national requirements for protection and rebuilding (MSC CR v2.0 GSA3.2). The fishery does not meet SG80. *Trawl Fishery* The trawl UoA affects minke whales. For the period 2010 through 2014, the minimum annual rate of fishery-caused mortality and serious injury for the minke whale stock was below 50% of their prescribed PBR, but >10%PBR, correspondingly the Mid-Atlantic and Northeast bottom trawl fisheries are designated by the MMPA as Category II fisheries. The effects of the fishery on minke whales are known and are highly likely to be within MMPA limits, meeting SG80. As a result of limited information on all effects of the fishery on minke whales and uncertainty surrounding the status of minke whales, the high degree of certainty (SG100) is not achieved. *Bottom Longline Fishery* Bottom longlines pose a potential threat to whales that feed near the bottom, and "injuries and entanglements can occur from vertical lines attached to surface buoys and in derelict gear" (NMFS 2014b). There are no documented interactions for the bottom longline UoA with large whales. This fishery is identified as "Category III", the lowest level of risk categorization given to a fishery, for which the annual mortality and serious injury of a stock in a given fishery is ≤1% of the PBR level. Given the low risk of this fishery and the absence of any potential interaction there is a high degree of certainty that the known effects of the bottom longline fishery on large whales are within limits of MMPA requirements, meeting SG100. **Large Whales –** Gillnet (**SG60**), Trawl (SG80), Bottom Longline (SG100) **SMALL CETACEANS** *Gillnet Fishery* The gillnet UoA affects the West North Atlantic white-sided dolphin (*Lagenorhynchus acutus*) stock and the common bottlenose dolphin (*Tursiops truncatus*) and harbor porpoises (*Phocoena phocoena*). For the period 2010 through 2014, the minimum annual rate of fishery-caused mortality and serious injury for the Atlantic white-sided dolphins stock was below 50% of their prescribed PBR (Table 18). The estimated mean annual mortality of harbor porpoise to sink gillnets surpasses the 50% PBR. For this stock there is in place the Harbor Porpoise Take Reduction Plan (HPTRP) which has a number of regulations in place to reduce take of harbor porpoises by the fishery, including seasonal closure areas and use of pingers.

		In the North Atlantic the Common bottlenose dolphin consists of four distinct stocks; because these four stocks overlap it is not always possible to assign a mortality to a specific stock, and thus all four stocks are included as potentially impacted by the fishery. For the Northern Migratory Coastal Stock estimated fishery-mortality ranges (2010-2014) are < 50%PBR, for the Southern Migratory Coastal Stock estimated fishery-mortality ranges (2010-2014) are < 50%PBR, for the both the Northern NC estuarine system (NNCES) stock and southern NC estuarine system (SNCES) stocks there is a possibility that fishery mortalities (2010–2014) are above their PBR. The Mid-Atlantic gillnet fishery is classified as Category I and there is in place a Bottlenose Dolphin Take Reduction Plan (BDTRP). The BDTRP includes regulatory management measures: gear modifications, time and area closures, and limited soak durations. Because there are in place actions to reduce take triggered by the PBR, the effects of the gillnet fishery on common bottlenose dolphins are considered highly likely to be within limits of MMPA requirements for protection, meeting the SG80. Due to biased low mortality estimates and sparse observer coverage for certain regions the SG100 is not met *Trawl Fishery* The trawl UoA affects Atlantic white-sided dolphins, common dolphins, Risso's dolphin, long finned pilot whales and harbor porpoises. Common dolphins and Risso's dolphin are under their prescribed PBRs. The estimated mortality of harbor porpoises assigned to the North Atlantic Bottom fishery is of four, which is below the Zero Mortality Rate Goal (ZMRG) of 10%PBR. The 2010-2014 average annual mortality of long-finned pilot whales attributed to the northeast bottom trawl was 33.2 animals (CV=0.15). The PBR for long-finned pilot whales is of 35 whales; the total reported takes across all fisheries exceeded this at 38. Annual mortality and serious injury of a stock in a given fishery higher than 50% of the PBR merits a designation of Category I under the MMPA. As of the 2017 List of Fisheries (LOF), this fishery continues to be classified under Category II; and there is no evidence that additional management actions to reduce take are being developed or implemented. The assessment team acknowledges that there is significant uncertainty in the stock assessment informing the PBR and that the 2017 stock assessment report states survey results are impartial and likely underestimate overall abundance of this species. Nonetheless, the published stock assessment is expected to represent the best available information used for management. Due to the inconsistency between the estimated annual mortality to its PBR and the MMPA categorization of the trawl fishery does not meet the SG80. *Bottom Longline Fishery* There are no documented potential interactions for the bottom longline UoA with small cetaceans. As explained previously the bottom longline fishery is identified as "Category III". Given the low risk of annual mortality/serious injury of this fishery on small cetaceans and the absence of any potential interaction, there is a high degree of certainty that the effects of the bottom longline fishery are within limits of national and international requirements, meeting SG100. **Small Cetaceans–** Gillnet(SG80), **Trawl (SG60),** Bottom Longline (SG100) **PINNIPEDS** *Gillnet Fishery*

		Gillnet fisheries have recorded interactions with a number of seal species: hooded, harp, harbor and gray seals. Estimated mortalities of these species either below the prescribed PBRs or the total fishery-related mortality and serious injury for these stock can be considered insignificant and approaching zero mortality and serious injury rate. The SG80 is met for the gillnet UoA. *Trawl Fishery* There are potential for interactions for the trawl fishery with gray, harbor and harp seals. Estimated mortalities of these species either below the prescribed PBRs or the total fishery-related mortality and serious injury for these stock can be considered insignificant and approaching zero mortality and serious injury rate. The SG80 is met for the trawl UoA. *Bottom Longline Fishery* There are no potential for interactions of bottom long line and pinnipeds. Given the low risk of annual mortality/serious injury of this fishery on pinnipeds and the absence of any potential interaction, there is a high degree of certainty that the effects of the bottom longline fishery are within limits of national and international requirements, meeting SG100. **Pinnipeds–** Gillnet(SG80), Trawl (SG80), Bottom Longline (SG100) **SEA TURTLES** *Gillnet Fishery* Sink gillnet are recorded as interacting mostly with loggerhead and to a lesser extent with other hard-shelled sea turtle species (kemp's ridley, green and hawksbill). Due to the low number of interactions there is low risk that the fishery is impacting the other hard-shelled sea turtle species. For sink gillnet loggerhead total annual interactions from 2007-2011 were estimated to be 89 (CV = 0.26, 95% CI=29-82) with an estimated 52 interactions resulting in mortality. In the latest 2013 Biological Opinion on ESA-listed the anticipated number of sea turtle interactions and the mortality expected to occur annually in gillnets is 269 interactions (167 mortalities). The 2018 Annual Determination proposed to improve observer coverage of the Mid-Atlantic Gillnet fishery, to obtain more basic information on loggerhead bycatch. The known interaction of gillnet fisheries are below the Incidental Take Statement (ITS) and are in line with the current biological opinion expectations that interactions from this fishery do not hinder recovery of loggerhead or other sea turtle species, meeting S80. *Trawl Fishery* Bottom trawl are recorded as interacting mostly with loggerhead and to a lesser extent with other hard-shelled sea turtle species (kemp's ridley, green and hawksbill). Due to the low number of interactions there is low risk that the fishery is impacting the other hard-shelled sea turtle species. Estimated interactions of commercial trawl fisheries and loggerheads occur mostly in the in U.S. Mid-Atlantic in warm and shallow waters. Average annual estimates of sea turtle interactions and in U.S. Mid-Atlantic bottom trawl fishery 2009 to 2013 are at 231 (CV=0.13), out of which 96 interactions are estimated to have resulted in mortality.

		The ITS interaction levels are formally evaluated on a 5-year basis, on an annual basis observed takes of loggerhead turtles to consider trends in takes and look for patterns and changes in take levels. In the latest 2013 Biological Opinion on ESA-listed the anticipated number of sea turtle interactions and the mortality expected to occur annually in trawl fisheries is 204 interactions (67 mortalities). The anticipated lethal removal of loggerhead is not likely to result in any appreciable decline to the Loggerhead North West Atlantic DPS. Despite the high number of interactions for the trawl UoA, the data available on UoA interactions that is in line with current biological opinion expectations indicate that the trawl fishery is not hindering recovery of loggerhead or other sea turtle species, meeting S80. *Bottom Longline Fishery* Bottom longline is not considered to be an important source of interaction and mortality for sea turtles, meeting SG80 is considered. Uncertainty in data on interactions and the level of ongoing interactions prevents the UoA from meeting the SG100 criteria. **Sea Turtles–** Gillnet(SG80), Trawl (SG80), Bottom Longline (SG80) **FISHES** *Gillnet & Bottom trawl Fishery* The U.S. populations of Atlantic sturgeon is divided into five distinct population segments (DPS). In 2012 all five DPs are listed under ESA. Atlantic sturgeon are known to be captured in sink gillnet and drift gillnets and in bottom trawl gear. Of these gear types, sink gillnet gear poses the greatest known risk of mortality for bycaught sturgeon. Allocating of takes of Atlantic sturgeon to individual Fishery Management Plans (FMPs) is difficult, thus the NEFSC allocates takes to otter vs. sink gillnet (NEFMC 2012). Miller & Shepherd (2011) estimated that between 2006 and 2010, a total of 7,848 lbs. of Atlantic sturgeon were captured and discarded by sink gillnet gear and a total of 7,740 lbs. by otter trawls. Based on observer data, discard mortality in gillnets is estimated to be 20%, for gillnets where the primary target species is monkfish the mortality rate increases to 27%. In otter trawls discard mortality is estimated to be only 5% (NEFMC 2012). In 2017 the stock assessment subcommittee (SAS) conducted an evaluation of the status of Atlantic sturgeon along the U.S. Atlantic coast relative to relative abundance and total mortality. The assessment found that the coastwide estimate (grouping all five DPSs) of total mortality was below the $Z_{50\%EPR}$ threshold, suggesting current levels of mortality for the entire meta-population are sustainable. The assessment found that mortality levels at the individual DPS-level, are above the Z threshold for four of the five DPSs, however, these estimates are considered highly uncertain because affected animals are rarely genotyped, making it challenging to assign mortalities to an individual DPS(ASMFC, 2017a). The 2013 Biological Opinion concluded that the projected incidental capture may adversely affect, but are not likely to reduce the likelihood that the status of the five DPSs of Atlantic sturgeon can improve to the point where it is recovered and could be delisted any of the ESA.

		Since Atlantic sturgeon were listed under the ESA, several measures have been implemented aimed at recovery of Atlantic sturgeon, including available guidance for commercial fishermen on sturgeon resuscitation, continuous studies to assess modified gillnet gears to reduce interactions, review of distribution models, state's increase in observer coverage. The assessment team considers that the effects of both gillnets and bottom trawl on Atlantic sturgeon are known. Given that the Biological Opinion concludes that projected incidental capture will not reduce the likelihood of recovery, and that the coast wide metapopulation is considered to be below the Z threshold, the team concludes that both gillnet and bottom trawl UoA meet SG80. Due to the uncertainty surrounding status of individual DPSs and considerations that bycatch mortality is likely underestimated for Atlantic sturgeon (ASMFC, 2017a), the SG100-level is not achieved. *Bottom Longline Fishery* Bottom longline is not considered to be a source of mortality for Atlantic Sturgeon, Given the low risk of annual mortality/serious injury of this fishery on Atlantic Sturgeon and the absence of any potential interaction, there is a high degree of certainty that the effects of the bottom longline fishery are within limits of national and international requirements, meeting SG100. **Fishes–** Gillnet(SG80), Trawl (SG80), Bottom Longline (SG100) **Seabirds** There are no limits on seabird interactions. SIa is therefore not scored for these ETP elements. Summary of scores for SIa for each scoring element: **Large Whales –** Gillnet (**SG60**), Trawl (SG80), Bottom Longline (SG100) **Small Cetaceans–** Gillnet (SG80), **Trawl (SG60),** Bottom Longline (SG100) **Pinnipeds–** Gillnet (SG80), Trawl (SG80), Bottom Longline (SG100) **Sea Turtles–** Gillnet (SG80), Trawl (SG80), Bottom Longline (SG80) **Fishes–** Gillnet (SG80), Trawl (SG80), Bottom Longline (SG100)		
b	**Guidepost**	Known direct effects are unlikely to create unacceptable impacts to ETP species.	Direct effects are highly unlikely to create unacceptable impacts to ETP species.	There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on ETP species.
	Met?	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: Y

	Justification	Where there are requirements for protection and rebuilding, provided through the national legislation, MSC requires the team interpret "unacceptable impacts" as the likelihood that the fishery meets these protection requirements (MSC CR v1.3 Clause CB3.11.3.1)[13]. The Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA) requirements are both set to achieve both protection and rebuilding and thus considered to meet the overall intent of PI 2.3.2 that "the fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species" (See MMPA Background Information & ESA Background Information). Because SIa already focuses on assessing compliance with the limits of national requirements for protection and rebuilding; the scoring criteria, and consequently scores/rationales, of SIb match those of SIa and are thus not repeated here. Seabirds Observer data provided to the assessment team included low levels of incidental interactions with several protected species of migratory seabirds. There is no indication that these fisheries are having a population level impact on these seabird species, though there is a lack of ongoing monitoring of impacts by Northeast fleets on seabird populations. From the information available, it is highly likely the UoA is not hindering recovery of any of the seabird species with which interactions have been recorded, but there is not a high degree of confidence due to uncertainties in the extent of interactions and population impacts in the Northeast. Summary of scores for SIb for each scoring element: **Large Whales –** Gillnet (**SG60**), Trawl (SG80), Bottom Longline (SG100) **Small Cetaceans–** Gillnet (SG80), **Trawl (SG60),** Bottom Longline (SG100) **Pinnipeds–** Gillnet (SG80), Trawl (SG80), Bottom Longline (SG100) **Sea Turtles–** Gillnet (SG80), Trawl (SG80), Bottom Longline (SG80) **Fishes–** Gillnet(SG80), Trawl (SG80), Bottom Longline (SG100) **Seabirds–** Gillnet(SG80), Trawl (SG80), Bottom Longline (SG80)		
c	**Guidepost**		Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.	There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.
	Met?		(Y)	(N)

[13] MSC Certification Requirements V1.3 CB3.11.3.1. The team shall interpret "unacceptable impacts" as: […] At SG80, where it is highly likely that the fishery meets the requirements, there would be direct demonstration that requirements for protection and rebuilding are being achieved.

	Justification	The primary indirect effects of the UoA on the identified ETP species would include critical habitat disturbance and trophic impacts. Indirect impacts have been considered for ETP species via stock assessments, designation of critical habitat under the ESA, and various studies of the trophic ecology of the NES LME and role of forage species (e.g. Houde et al 2014). **Large Whales** – Gillnet(SG80), Trawl (SG80), Bottom Longline (SG80) **Small Cetaceans**– Gillnet(SG80), Trawl (SG80), Bottom Longline (SG80) **Pinnipeds**– Gillnet(SG80), Trawl (SG80), Bottom Longline (SG80) **Sea Turtles**– Gillnet(SG80), Trawl (SG80), Bottom Longline (SG80) **Fishes**– Gillnet(SG80), Trawl (SG80), Bottom Longline (SG80) **Seabirds–** Gillnet(SG80), Trawl (SG80), Bottom Longline (SG80)
References		

OVERALL PERFORMANCE INDICATOR SCORE:	
Otter Trawl (2 elements <SG80, 14 elements ≥SG80) *All elements meet SG60; most achieve higher performance, at or exceeding SG80; only a few fail to achieve SG80 and require intervention action.*	**75**
Gillnet (2 elements <SG80, 14 elements ≥SG80) *All elements meet SG60; most achieve higher performance, at or exceeding SG80; only a few fail to achieve SG80 and require intervention action.*	**75**
Bottom Longline (11 elements ≥SG100, 5 elements ≥SG80) *All elements meet SG80; most achieve higher performance at SG100, and only a few fail to achieve SG100.*	**95**
CONDITION NUMBER (if relevant): **2-1** By the fourth surveillance the fishery shall provide evidence that (1) the effects of the bottom trawl UoA on long-finned pilot whales are known and are highly likely to be within limits of national requirements for protection of marine protected mammals (Marine Mammal Protection Act, MMPA); (2) it's is highly likely that the bottom trawl fishery meets MMPA requirements, there would be direct demonstration that requirements for protection and rebuilding are being achieved. **2-2**. By end of the next certificate cycle[14] the fishery shall provide evidence that (1) the effects of the gillnet UoA on Atlantic right whales are known and are highly likely to be within limits of national requirements for protection of marine protected mammals (Marine Mammal Protection Act, MMPA); (2) it's is highly likely that the gillnet fishery meets MMPA requirements, there would be direct demonstration that requirements for protection and rebuilding are being achieved.	

[14] The assessment team considers that it will take longer than the period of certification for the US gillnet fishery UoA to achieve a performance level of 80 for PIs 2.3.1 required to close the conditions. For this reason the condition is extended beyond this certification cycle to the end of the next certificate cycle (MSC CR V2.0 G7.24.2.2). The rationale behind this explanation is justified in Appendix 1.3 Conditions & Client Action Plan

Evaluation Table for PI 2.3.2 – ETP species management strategy

PI 2.3.2		The fishery has in place precautionary management strategies designed to: • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species.		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place that minimise mortality of ETP species, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a comprehensive strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to achieve above national and international requirements for the protection of ETP species.
	Met?	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	**MARINE MAMMALS (including Large whales, small cetaceans, and pinnipeds)** All marine mammals under the Marine Mammal Protection Act (MMPA) undergo stock assessments and are assigned a PBR level that is the product of the following factors: the minimum population estimate of the stock; one-half the maximum theoretical or estimated net productivity rate of the stock at a small population size; and a recovery factor of between 0.1 and 1.0. PBR is designed as a metric to be used when comparing all estimated annual, anthropogenic mortalities. Stocks for which the level of direct human-caused mortality exceeds the potential biological removal level, are considered as 'strategic stocks' requiring the formation of a 'Take Reduction Team/Plan' to reduce bycatch below the PBR. The U.S. Office of Protected Resources List of Fisheries (LOF) classifies U.S. commercial fisheries into one of three Categories according to the level of incidental mortality or serious injury of marine mammals. The categorization in the LOF determines whether participants in that fishery are subject to certain provisions of the MMPA such as registration, observer coverage, and take reduction plan requirements. The categorization is updated annually an informed by the production of the annual NOAA's Marine Mammal Stock Assessment Reports (SARs). The cohesive arrangement of monitoring, analysis, management measures and analysis, qualifies the MMPA as a comprehensive strategy, meeting the SG80. This strategy is designed to achieve national requirements and not to achieve *above* national and international requirements, thus the SG100 is not met. **Large Whales –** Gillnet(SG80), Trawl (SG80), Bottom Longline (SG80) **Small Cetaceans–** Gillnet(SG80), Trawl (SG80), Bottom Longline (SG80) **Pinnipeds–** Gillnet(SG80), Trawl (SG80), Bottom Longline (SG80)		

		SEA TURTLES, FISH and SEABIRDS The ESA, signed on 1973, provides for the conservation of species that are endangered or threatened the conservation of the ecosystems on which they depend. NOAA has jurisdiction over 159 endangered and threatened marine species and works with the U.S. Fish and Wildlife Service (USFWS) to manage ESA-listed species. Generally, NOAA manages marine species, while USFWS manages land and freshwater species. When a species is listed as endangered it is illegal to "take" (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to do these things) that species. Section 10 of the ESA allows NOAA Fisheries Service to issue permits for incidental take, with the requirement of a conservation plan to minimize and mitigate impacts to the affected species. NMFS' Office of Law Enforcement works with the U.S. Coast Guard and other partners to enforce and prosecute ESA violations (NOAA). A 2013 Biological Opinion on seven fishery management plans, and the associated revised (2016) incidental take statement provide for an operationalized strategy for managing impacts of 7 federally managed fisheries, including the Squid Mackerel Butterfish FMP, on ETP species. This BiOp includes an incidental take statement that includes an expected number of interactions and required 'reasonable and prudent measures' to be undertaken by the fisheries to minimize impacts on sea turtles and Atlantic sturgeon. The ITS was updated in 2016. This meets the requirements of a "comprehensive strategy" as "a complete and tested strategy made up of linked monitoring, analyses, and management measures and responses." The SG80 is met. Seabird management under is administered by the US FWS. The linkage of protections under the federally managed fisheries to commercial fisheries is not formally established as in the FMP(s) and ESA, but there is evidence of successful implementation of seabird impact mitigation initiatives in US fisheries such as the Pacific pelagic longline fishery. There is ongoing monitoring of interactions via the observer program and evidence of consideration of commercial fishery impacts. Seabirds are also considered in the NOAA National Bycatch Report. The evidence of monitoring and studies on impacts (e.g. Hatch 2017) along with the legislative protections and seabird management initiatives at the US FWS is sufficient to meet the requirements for a strategy, but is cannot be considered a comprehensive strategy due to the lack of a formal linkages between the fishery and US FWS initiatives with commercial fisheries management monitoring by NMFS. SG80, only, is met. This strategy is designed to achieve national requirements and not to achieve *above* national and international requirements, thus the SG100 is not met. **Sea Turtles–** Gillnet(SG80), Trawl (SG80), Bottom Longline (SG80) **Fishes–** Gillnet(SG80), Trawl (SG80), Bottom Longline (SG80) **Seabirds–** Gillnet(SG80), Trawl (SG80), Bottom Longline (SG80)		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved.	The strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work.
	Met?	Otter Trawl: Y Gillnet: Y	Otter Trawl: Y Gillnet: Y	Otter Trawl: Y Gillnet: Y

		Bottom Longline: Y	Bottom Longline: Y	Bottom Longline: Y
	Justification	**MARINE MAMMALS** The MMPA strategy is mainly based on information directly about the fishery and the marine mammal species involved, the use of the observer program and abundance surveys of the species, provide quantitative data which support a high confidence that the strategy works. **Large Whales –** Gillnet(SG100), Trawl (SG100), Bottom Longline (SG100) **Small Cetaceans–** Gillnet(SG100), Trawl (SG100), Bottom Longline (SG100) **Pinnipeds–** Gillnet(SG100), Trawl (SG100), Bottom Longline (SG100) **SEA TURTLES, FISH and SEABIRDS (ESA)** The ESA strategy is mainly based on information directly about the fishery and the marine species involved, the use of the observer program and of nesting surveys provide quantitative data which support a high confidence that the strategy works. **Sea Turtles–** Gillnet(SG100), Trawl (SG100), Bottom Longline (SG100) **Fishes–** Gillnet(SG100), Trawl (SG100), Bottom Longline (SG100) **Seabirds–** Gillnet(SG100), Trawl (SG100), Bottom Longline (SG100)		
c	**Guidepost**		There is evidence that the strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	**MARINE MAMMALS** Evidence of implementation of the MMPA is provided via the annually updated stock assessments for marine mammals and the associated annually updated LOF classifications where fisheries are classified based on their interactions with marine mammals, relative to their established PBRs. Additional evidence of implementation is the creation of the take reduction teams (TRT) and the recommendations and plans derived from the TRT which inform the implementation of management measures and regulations, meeting the SG80. Because compliance with MMPA regulations has room for improvement the SG100 is not met. **Large Whales** – Gillnet(SG80), Trawl (SG80), Bottom Longline (SG80) **Small Cetaceans**– Gillnet(SG80), Trawl (SG80), Bottom Longline (SG80) **Pinnipeds**– Gillnet(SG80), Trawl (SG80), Bottom Longline (SG80) **SEA TURTLES, FISH and SEABIRDS (ESA)** There is some evidence that the ESA strategy has been implemented successfully, as a Biological Opinion has been issued covering the FMPs to which the UoA applies that subjects		

		the fishery to an ITS and specific 'reasonable and prudent measures'. There is at least some evidence of ongoing monitoring of fishery impacts and consideration of further mitigation measures seen in the historic and recent testing of TED configurations that could be implemented in the bottom trawl fleet (see background). This is not considered 'clear' evidence because of the uncertainty in the status of loggerheads, the ongoing rate of interactions of the fleet with sea turtles, and the broad gear-level designation of the ITS that combined with relatively low observer coverage makes does not allow the assessment team to draw any clear conclusion regarding the UoA specifically. SG80 only is met for trawl. Some evidence is available that the strategy for seabirds is being implemented successfully in the form of observer data and FWS identification of select birds of conservation and management concern and plans for focal species (including greater shearwater and red-throated loons). None of these sources of information indicate that the UoA is of primary impact concern such that specific management measures are merited. On this basis, SG80 is considered met. However, the lack of cohesiveness between the FWS management and NMFS monitoring means there is not clear evidence that the management strategy is being implemented successfully. **Sea Turtles**– Gillnet(SG80), Trawl (SG80), Bottom Longline (SG100) **Fishes**– Gillnet(SG80), Trawl (SG80), Bottom Longline (SG100) **Seabirds–** Gillnet(SG80), Trawl (SG80), Bottom Longline (SG100)		
d	**Guidepost**			There is evidence that the strategy is achieving its objective.
	Met?			Otter Trawl: N Gillnet: N Bottom Longline: Y
	Justification	**MARINE MAMMALS** Because the MMPA has not been successful at reducing the take of all marine mammals under the PBR or the long-term goal is to reduce bycatch to levels approaching a zero mortality, for this reason it is considered that the strategy is not achieving its objective, the SG100 is not met. **Large Whales** – Gillnet(SG80), Trawl (SG80), Bottom Longline (SG100) **Small Cetaceans**– Gillnet(SG80), Trawl (SG80), Bottom Longline (SG100) **Pinnipeds**– Gillnet(SG80), Trawl (SG80), Bottom Longline (SG100) **SEA TURTLES AND FISH (ESA)** Because the annual incidental take for loggerheads by trawls has been exceeded it's not considered that the strategy is not achieving its objective for sea turtles, the SG100 is not met for the sea turtle element. **Sea Turtles**– Gillnet(SG80), Trawl (SG80), Bottom Longline (SG100) **Fishes**– Gillnet(SG80), Trawl (SG80), Bottom Longline (SG100) **Seabirds–** Gillnet(SG80), Trawl (SG80), Bottom Longline (SG100)		

References	
OVERALL PERFORMANCE INDICATOR SCORE:	
Otter Trawl *All elements meet SG80; a few achieve higher performance, but most do not meet SG100.*	**85**
Gillnet *All elements meet SG80; a few achieve higher performance, but most do not meet SG100.*	**85**
Bottom Longline *All elements meet SG80; a few achieve higher performance, but most do not meet SG100.*	**85**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.3.3 – ETP species information

PI 2.3.3		**Relevant information is collected to support the management of fishery impacts on ETP species, including:** • **Information for the development of the management strategy;** • **Information to assess the effectiveness of the management strategy; and** • **Information to determine the outcome status of ETP species.**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Information is sufficient to qualitatively estimate the fishery related mortality of ETP species.	Sufficient information is available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species.	Information is sufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty.
	Met?	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: N Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	The UoA related mortality and impact on all ETP species is provided primarily via the observer program data. Observer coverage is relatively low, but can be extrapolated to provide estimates of total impacts. There is significant uncertainty in the population status and trends of several ETP species such that establishing biologically based limits for fisheries impacts may likewise be uncertain. The uncertainties in estimating population status and trends for many ETP species is not easily overcome, and the assessment team considers that the management systems use the available quantitative information to assess fishery impacts in a precautionary manner. The management system also allows for observer placements to be made on the basis of some sea turtle and MMPA impact considerations- which are the impacts of greatest concern to this fishery- to increase the available quantitative data on fishery impacts as needed. Observer coverage for the fleet is around 10%. The SBRM annual reports provide the CV for the discard estimates for each species by gear type. The goal of the SBRM is to achieve a		

		discard estimate with a precision of 30% coefficient of variation (CV) across all species and fleets. There are not discard mortality estimates available for most species, and discards comprise a significant amount of total catch for some main primary species (skates and spiny dogfish in particular The assessment team concludes that there is sufficient information available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for most ETP elements, meeting SG80. Atlantic right whales entanglement occurrences are rarely observed during fishing operations. Consequently, there are difficulties in attributing mortalities to specific fisheries. Recorded entanglement incidents are considered a minimum, since not all entangled whales are discovered or reported. Entangled animals are usually not found in the same location where it was initially entangled, making it at times impossible to identify the gear type and area where the entanglement occurred. In the majority of the cases, no gear was documented or recovered, or the whale was carrying sections (line or rope) of unknown/undetermined gear type. Though the majority of mortalities for right whales has no identified gear type, there is evidence that right whales are susceptibility to entanglement in gear employed by gillnet fisheries (See PI 2.3.1 SIa). Because available information is not sufficient to allow the gillnet fishery-related mortality and the impact of fishing to be quantitatively estimated for Atlantic right whales the SG80 is not met. **Large Whales** – **Gillnet(SG60),** Trawl (SG80), Bottom Longline (SG80) **Small Cetaceans**– Gillnet(SG100), Trawl (SG100), Bottom Longline (SG80) **Pinnipeds**– Gillnet(SG100), Trawl (SG100), Bottom Longline (SG80) **Sea Turtles**– Gillnet(SG100), Trawl (SG100), Bottom Longline (SG80) **Fishes**– Gillnet(SG100), Trawl (SG100), Bottom Longline (SG80)		
b	**Guidepost**	Information is adequate to broadly understand the impact of the fishery on ETP species.	Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species.	Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species.
	Met?	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	The data collected from the observer program, stranding reports and surveys on abundance of ETP species are sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species, meeting SG80. However, because of the uncertainties in estimating population status of all ETP species, quantifying all unobserved mortalities and assigning mortalities to different fisheries, the assessment team concludes there that there is no accurate and verifiable information on the magnitude of all impacts. The SG100 is not met. **Large Whales** – Gillnet(SG80), Trawl (SG80), Bottom Longline (SG80)		

		Small Cetaceans– Gillnet(SG100), Trawl (SG100), Bottom Longline (SG80) **Pinnipeds**– Gillnet(SG100), Trawl (SG100), Bottom Longline (SG80) **Sea Turtles**– Gillnet(SG100), Trawl (SG100), Bottom Longline (SG80) **Fishes**– Gillnet(SG100), Trawl (SG100), Bottom Longline (SG80)		
c	**Guidepost**	Information is adequate to support measures to manage the impacts on ETP species.	Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species.	Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.
	Met?	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: N Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	The information as described above is sufficient to support the associated strategies to manage impacts on ETP species. The U.S. Office of Protected Resources requires regular monitoring of the status of all federally listed ETP species and, where applicable, management measures (e.g. careful handling or gear modifications) and limits are put in place to ensure requirements for protection and rebuilding are met. There is sufficient evidence of historical implementation of management measures when indicated by monitoring to meet the SG80. Any conclusion with a high degree of certainty cannot be made due to the relatively low levels of observer coverage and uncertainty regarding the population status and trends of several ETP species. SG80 is met for most of the elements. The limited information on the specific fisheries/gear type on mortalities of Atlantic right whales (See SIa of this PI), impedes the development of reduction measures that effectively target the appropriate fishing areas/gear types/fisheries. Given the susceptibility of Atlantic right whales to gillnet fisheries, the available information is not considered sufficient to support a full strategy to manage the impacts of this fishery on this stock. **Large Whales** – **Gillnet(SG60),** Trawl (SG80), Bottom Longline (SG80) **Small Cetaceans**– Gillnet(SG100), Trawl (SG100), Bottom Longline (SG80) **Pinnipeds**– Gillnet(SG100), Trawl (SG100), Bottom Longline (SG80) **Sea Turtles**– Gillnet(SG100), Trawl (SG100), Bottom Longline (SG80) **Fishes**– Gillnet(SG100), Trawl (SG100), Bottom Longline (SG80)		
References				

OVERALL PERFORMANCE INDICATOR SCORE:	
Otter Trawl	**80**
Gillnet	**75**
Bottom Longline	**80**

CONDITION NUMBER (if relevant):	
2-3. By the fourth annual surveillance the fishery shall provide evidence that (A) sufficient information is available to allow fishery related mortality to be quantitatively estimated for Atlantic right whales AND (B) information is sufficient to support a full strategy to manage impacts on Atlantic right whales.	

Evaluation Table for PI 2.4.1 – Habitats outcome

PI 2.4.1		**The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
	Met?	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. Bottom fishing gears have the potential to impact habitat complexity, cause changes in benthic communicates and reduce productivity. However, the impact of bottom trawls is dependent on a number of variables including the intensity of the fishing effort, the type of substrate and the recovery time of that ecosystem. Habitats with long recovery time and higher vulnerability to fishing impacts are found in low-energy habitats dominated by granule-pebble, cobble and boulder substrates. Approximately >20% of the distribution of areas assumed to be fishable by generic trawl gear are considered to have vulnerable habitats. Recovery rates for some biological and structural features associated with these habitats are estimated to be >5 years. Thus following the MSC guidance which considers damage requiring 5-20 years to recover as 'serious or irreversible'. Thus bottom trawls may reduce a small proportion of the certain elements of habitat structure and reduction to what MSC considers to be serious or irreversible harm. However, because the granule-pebble, cobble and boulder substrates associated with vulnerable features represent only ~20% of assumed fishable areas for trawl. Furthermore, there are in place closed areas to protect essential fish habitat, and because the adverse effects of otter trawls has significantly decreased over the last two decades, the team concludes that the trawl UoA is highly unlikely to impact all features of habitat structure and function to a point where there would be serious or irreversible harm, meeting the SG80. Due to concentrated adverse effects in certain areas, and the limitations on information on substrate distribution and more information on specific effects of fishing activities across different substrates, the SG100 is not met. Recovery values for biological and structural features impacted of gillnets and bottom longlines are mostly under 2 year. A few habitat features, such as piled cobble and boulders		

PI 2.4.1		The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function
		have recovery values> 5 years, however, the susceptibility of these habitat features to these fishing gears is low. The team concludes the bottom longline and gillnet are highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm, meeting SG80. Due to the lack of specific information on the interaction of these gear types with habitat features, the SG100 is not met.
References		

OVERALL PERFORMANCE INDICATOR SCORE:	
Otter Trawl	**80**
Gillnet	**80**
Bottom Longline	**80**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.4.2 – Habitats management strategy

PI 2.4.2		There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.	There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.	There is a strategy in place for managing the impact of the fishery on habitat types.
	Met?	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	There is a partial strategy in place for managing impacts on habitat, primarily founded in Essential Fish Habitat (EFH) requirements in the MSFCMA. Every federally managed fishery is required to identify EFH and evaluate all potential adverse effects of fishing on EFH designated within the FMP as well as all other EFH of federally managed fisheries, including consideration of cumulative impacts. The EFH Regulatory Guidelines further require each FMP to minimize such adverse effects to the extent practicable, and to review all EFH information at least once every five years, and as recommended by the Secretary. (50 CFR Ch. VI § 600.815). There a number of measures in place for Habitat protection to minimize adverse effect of bottom trawls, these include habitat closed areas in the multispecies and scallop FMPs, groundfish mortality areas (with associated gear restrictions) and overall reductions in effort and/or increased use of rotational management. The Draft of the Omnibus Essential Fish Habitat Amendment 2 was developed to fulfill the essential fish habitat requirements of the MSA and integrate habitat management measures across all NEFMC-managed fisheries. The Draft of the Amendment was submitted to NMFS GARFO on September 6, 2016 and is currently undergoing review. The MSA, primarily via the EFH requirements, lays out a strategic arrangement for habitat impacts to be evaluated relative to prioritized habitats (EFH) and managed actions to be considered with the objective of minimizing adverse impacts. Such a cohesive arrangement may be considered to meet the MSC requirements for a 'strategy'; however, the EFH designations and considerations do not extent beyond federally managed species, and non-federally managed (i.e. state or ASFMC managed) fisheries are not required apply the EFH-driven habitat management strategy. Therefore, it cannot be said that there is a strategy in place for all MSC UoAs and non-MSC UoAs. SG80, only, is met		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats).	There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or habitats involved.

PI 2.4.2		There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types		
	Met?	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	Studies on recovery of habitats in areas closed to bottom tending gear and the significantly decreasing trend in estimated adverse effects of otter trawl are considered as evidence directly about the fishery providing some objective basis for confidence that the partial strategy will work, meeting the SG80. Due to the occurrence of concentrated adverse effects in certain areas and the lack of a clear measurable threshold for "testing" whether the strategy will work or not, the SG100 is not met.		
c	**Guidepost**		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	The implementation of the closure areas, the gear restrictions, and the implantation of the reviews of EFH impacts conducted via the FMPs, and the current development of the Omnibus Essential Fish Habitat Amendment 2, are indicative that the partial strategy is being implemented successfully. The SG80 is met.		
d	**Guidepost**			There is some evidence that the strategy is achieving its objective.
	Met?			Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	Without any measurable thresholds for achieving the requirements to minimize adverse effects it's difficult to definitely conclude whether the strategy is or not achieving its objective.		
References				

OVERALL PERFORMANCE INDICATOR SCORE:	
Otter Trawl	**80**
Gillnet	**80**
Bottom Longline	**80**

PI 2.4.2	There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types	
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 2.4.3 – Habitats information

PI 2.4.3		Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	There is basic understanding of the types and distribution of main habitats in the area of the fishery.	The nature, distribution and vulnerability of all main habitat types in the fishery are known at a level of detail relevant to the scale and intensity of the fishery.	The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types.
	Met?	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	There is at least a basic understanding of the types and distribution of main habitats in the area of the fishery, and information is adequate to broadly understand the nature of the main impacts of gear use on these habitats, including spatial overlap of habitat with fishing gear (SG 60 requirements). Relative vulnerability is modeled based on inferred geological and biological features and modelled energy levels to assign susceptibility and recovery scores under the SASI approach. Priority areas were selected on the basis of the amount of EFH designations covered in an area relative to fishing effort in the same area. A Habitat Protection Index was calculated for top habitats identified as vulnerable to adverse fishing impacts based on an estimate of EFH protected in the given alternative over the total amount of EFH designated. These efforts have provided information on the nature, distribution, and vulnerability of main habitats, but there is not sufficiently detailed information on the distribution of habitats to achieve the SG100.		
b	Guidepost	Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear.	Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear.	The physical impacts of the gear on the habitat types have been quantified fully.

PI 2.4.3		Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types		
	Met?	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	The information available from observational and experimental studies of bottom trawls (see NEFMC 2011) is sufficient to identify the main impacts of the UoA on its main habitats of interaction. The spatial extent of interaction and timing and location of use of fishing gear is generally available from VMS and VTR data. Impact modelling via SASI does not differentiate between the gear specifically for different trawl and gillnet configurations, and there is still need to improve detail of information on distribution of habitats and recovery rates, thus the SG100 is not met.		
c	Guidepost		Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).	Changes in habitat distributions over time are measured.
	Met?		Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	As noted in the discussions above adequate information continues to be collected to detect any increase in risk to the main habitats, thus meeting the SG 80 level. This information includes ongoing monitoring of distribution of fishing effort, and consideration of impacts of any updates to fishery management plans on habitat. However, changes in habitat distributions over time have not been measured, therefore the fishery does not meet the SG 100 level for SIc.		
References				

OVERALL PERFORMANCE INDICATOR SCORE:	
Otter Trawl	**80**
Gillnet	**80**
Bottom Longline	**80**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.5.1 – Ecosystem outcome

PI 2.5.1		The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The fishery is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is evidence that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
	Met?	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	The UoAs reside within what NOAA identifies as the Northeast U.S. Continental Shelf Large Marine Ecosystem (NES LME), which spans the area from Cape Hatteras to the Gulf of Maine and is considered a highly productive and dynamic ecosystem. The two ecological criteria considered key ecosystem elements that may be affected by fisheries are primary and secondary productivity and trophically linked populations. Spiny Dogfish are not considered to be key species for ecosystem functioning. There are numerous ecosystem research and management initiatives that directly evaluate trends in ecosystem components and associated stressors, including the ecological communities and trophic structures in the NES LME. These are primarily summarized in the NEFSC Ecosystem Status Report- available online at https://www.nefsc.noaa.gov/ecosys/ecosystem-status-report/, and key findings have been summarized in the Background on Ecosystem Impacts of this report. While there have been significant shifts in phytoplankton and zooplankton community structure in the NES LME, evidence does not indicate that base food web productivity is driven by top down forces such as fishing pressure. Historical trend data on fish community structure provides evidence that fisheries can have a significant effect on the ecological community, and the ecosystem is also undergoing significant changes due to the changing ocean climate. This evidence also indicates that management has had success in rebuilding some stocks, suggesting that such overfishing impacts can be considered 'reversible'. Importantly, none of the main species caught in the three UoAs are considered overfished (See PIs 2.1.1-2.2.3). Because there is no clear evidence that bottom trawl, bottom longline and gillnet are highly unlike to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. The SG100 is not met.		
References				
OVERALL PERFORMANCE INDICATOR SCORE:				
Otter Trawl				**80**

Gillnet	**80**
Bottom Longline	**80**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.5.2 – Ecosystem management strategy

PI 2.5.2		**There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place, if necessary.	There is a partial strategy in place, if necessary.	There is a strategy that consists of a plan, in place.
	Met?	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: Y Bottom Longline: Y
	Justification	As described in the background, there are several policies, ongoing research activities, and management practices that work to restrain impacts of the UoA on the ecosystem and that address all main impacts of the UoA. There is not an ecosystem strategy in place, but this is not necessary per SA3.17.3.2 where there are individual strategies addressing other components under P1 and P2. There is a broad management framework available that looks after ecosystem impacts of fishing as a whole, when the 10 National Standards are taken together as management objectives. Impacts of the fishery on identified 'valued ecosystem components' are considered for all Council actions. The MAFMC adopted an objective for an ecosystem approach to fisheries management in 2011. The Council has adopted ecosystem approaches as an objective in their strategic plan, and there is evidence of consideration of plans to operationalize this objective; however to date no operational plan is in place. The New England Fisheries Management Council (NEFMC) is also working in exploring Ecosystem-Based Fishery Management (EBFM). In addition to monitoring and evaluation systems to manage ecosystem components (e.g. stock assessments, SBRM reports, EFH designations), NEFSC publishes an ecosystem status report encompassing the entire LME, and considering differences at a sub-regional level. Many, though not all, of the above measures are designed with ecosystem-based management as an objective. Although the Ecosystem Approach is under development by the Councils, there are existing strategies targeted at the ecosystem components reflected in Principles 1 and 2 that together work to maintain ecosystem structure and function. These strategies, described in the background and under PIs 2.X.2, in conjunction with the efforts at the Council to integrate towards an Ecosystem Approach, is sufficient to meet the SG100.		

PI 2.5.2		There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function		
b	Guidepost	The measures take into account potential impacts of the fishery on key elements of the ecosystem.	The partial strategy takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.	The strategy, which consists of a plan, contains measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem. This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm.
	Met?	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	The partial strategy takes into account available information from the fishery from stock assessments, SBRM reports and EFH designations. Because the ecosystem strategy operates at a federal level and influences all the FMPs that are included in the three UoAs involved in this fishery, it is considered that this partial strategy is expected to restrain impacts of the fishery on the ecosystem, meeting SG80. There are also measures which are part of the strategy, that are already in place (i.e. catch limits for federally managed species, EFH designations, and on-board observer programs). However, because the plans for ecosystem management for both fisheries councils are still under-development it cannot be said that there is a plan based on a well-understood functional relationships between the fishery and the components and elements of the ecosystem, thus the SG100 is not met.		
c	Guidepost	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).	The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).	The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved.
	Met?	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N

PI 2.5.2		There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function		
	Justification	Under the 10 National Standards, federal fisheries are managed to minimize impacts on components of the ecosystem, though the focus of this management is on federally managed commercial species, versus ecological communities. In this UoA, federally managed species comprise the majority of the catch, and all main species have a healthy stock status. Reporting on catch composition across all fleets is published annually. Habitat impacts have been modeled for consideration of impacts on designated EFH for all federally managed species. ETP species are also monitored with regulatory mechanisms to spur management response when impacts exceed biological limits. This ongoing monitoring linked with management mechanisms provides an objective basis for confidence that the partial strategy will work. However, as noted above much of this management focuses on particular components of the ecosystem rather than the overarching ecosystem structure and function. There is not yet a cohesive ecosystem-based management plan that has been operationalized or accordingly that has been tested. SG80, only, is met.		
d	Guidepost		There is some evidence that the measures comprising the partial strategy are being implemented successfully.	There is evidence that the measures are being implemented successfully.
	Met?		Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	There is some evidence that the partial strategy is being implemented successfully. PIs 2.1.2, 2.2.2, 2.3.2, and 2.4.2 provide examples of implementation of management measures to meet objectives for each of these ecosystem components. There is also evidence via the Ecosystem Status Report that fishery interventions can affect ecosystem-level indicators (e.g. the recovery of groundfish populations). However, without explicit and operationalized objectives and metrics for ecosystem based management within the fishery, it cannot be said that there is clear evidence that objectives for ecosystem-based management are being achieved.		
References				

OVERALL PERFORMANCE INDICATOR SCORE:	
Otter Trawl	**80**
Gillnet	**80**
Bottom Longline	**80**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.5.3 – Ecosystem information

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Information is adequate to identify the key elements of the ecosystem (e.g., trophic structure and function, community composition, productivity pattern and biodiversity).	Information is adequate to broadly understand the key elements of the ecosystem.	
	Met?	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	
	Justification	There is substantial information available on the key elements of the ecosystem, primarily available from the NEFSC Ecosystem Status Report website. This report summarizes the key ecosystem elements, both abiotic and biotic, which are monitored regularly. Supporting and additional information is available from the monitoring efforts associated with the management of the ecosystem components as described in Pis2.1.3, 2.2.3, and 2.4.3. SG80 is met.		
b	**Guidepost**	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, and have not been investigated in detail.	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail.	Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated in detail.
	Met?	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	Main impacts of the UoA can be inferred, and some have been investigated in detail. The management system considers fishery impacts on 'valued ecosystem components' with each management action, and particular impacts by the fishery may be investigated in detail when considering alternative management actions (such as closures or gear modifications). There are also available studies that investigate the trophic web of the NES LME (e.g. Bowman et al 2000). However, it cannot be said that all main interactions have been investigated in detail. SG80, only, is met.		

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem		
c	Guidepost		The main functions of the Components (i.e., target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known.	The impacts of the fishery on target, Bycatch, Retained and ETP species are identified and the main functions of these Components in the ecosystem are understood.
	Met?		Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: N Gillnet: N Bottom Longline: N
	Justification	All main species evaluated under Retained and Bycatch considerations are federally managed, and are thus subject to their own FMPs, regular stock assessment, and EFH designations. For non-federally managed bycatch species catch/discard information is collected, and monitored. ETP species also undergo stock assessments and fishery impacts are categorized annually via the LOF. Key habitats are identified for all federally managed species as EFH. Biological and physical habitat impacts have been modeled for main gear types and federally managed fleets. The SG100 is not completely met because of the gaps in understanding of the main functions of components in the ecosystem. SG100 is not met.		
d	Guidepost		Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred.	Sufficient information is available on the impacts of the fishery on the Components and elements to allow the main consequences for the ecosystem to be inferred.
	Met?		Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: Y Bottom Longline: Y
	Justification	As noted above, the main functions of the ecosystem components as defined by the MSC are known, and there is adequate information for the impact of the UoAs on these components to be inferred. SG100 requires that information be adequate for all elements of all components, including minor elements. Secondary minor elements include several species that are not subject to federal or state management, and for which there are no stock assessments available. Still, information from all fleets subject to observer coverage means that there is information available on impacts of the UoA and main consequences to the ecosystem can be inferred based on more ecosystem status monitoring and inferences from more in-depth considerations undertaken for federally managed species.		

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem		
e	Guidepost		Sufficient data continue to be collected to detect any increase in risk level (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).	Information is sufficient to support the development of strategies to manage ecosystem impacts.
	Met?		Otter Trawl: Y Gillnet: Y Bottom Longline: Y	Otter Trawl: Y Gillnet: Y Bottom Longline: Y
	Justification	There is sufficient information available and collected to detect any increase in risk level. More information on the target species population dynamics, spawning distribution, and impacts of the fishery would benefit a strategy to directly manage for ecosystem impacts, but there is sufficient information to support the development of a strategy. SG100 is met.		
References				

OVERALL PERFORMANCE INDICATOR SCORE:	
Otter Trawl	**85**
Gillnet	**85**
Bottom Longline	**85**
CONDITION NUMBER (if relevant):	

8.1.3 Principle 3

Evaluation Table for PI 3.1.1 – Legal and/or customary framework

PI 3.1.1		The management system exists within an appropriate legal and/or customary framework which ensures that it: • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and • Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and • Incorporates an appropriate dispute resolution framework.		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There is an effective national legal system and a framework for cooperation with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2	There is an effective national legal system and organised and effective cooperation with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and binding procedures governing cooperation with other parties which delivers management outcomes consistent with MSC Principles 1 and 2.
	Met?	Y	Y	Y
	Justification	The U.S. federal fishery management system operates under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), the National Environmental Protection Act, the Administrative Procedures Act, and various executive orders. Each of these governing statutes create binding procedures regarding cooperating between the branches and levels of government, stakeholders, and the public. The National Standard Guidelines for National Standard 3 in the MSFCMA speaks directly to cooperation with other parties where necessary to deliver appropriate management outcomes: "Cooperation and understanding among entities concerned with the fishery (e.g., Councils, states, Federal Government, international commissions, foreign nations) are vital to effective management. Where management of a fishery involves multiple jurisdictions, coordination among the several entities should be sought in the development of an FMP. Where a range overlaps Council areas, one FMP to cover the entire range is preferred. The Secretary designates which Council(s) will prepare the FMP, under section 304(f) of the Magnuson-Stevens Act." This system has proven to be effective at maintaining and re-establishing healthy populations of targeted species and maintaining the integrity of ecosystems. The spiny dogfish fishery meets the requirements for SG 100.		

PI 3.1.1		The management system exists within an appropriate legal and/or customary framework which ensures that it: • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and • Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and • Incorporates an appropriate dispute resolution framework.		
b	Guidepost	The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the fishery.	The management system incorporates or subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective.
	Met?	Y	Y	Y
	Justification	U.S. law, including the MSFMCA, provides a transparent mechanism for the resolution of legal disputes. NMFS has legal responsibility for implementing MSA, and can be subject to lawsuits, during which the public "administrative record" (the basis for decision making—including everything in the public record on all fisheries related issues) is used to demonstrate how NMFS made its decisions. NMFS also has legal responsibility for reviewing and approving (or not) FMPs, implementing and enforcing regulations, and administering supporting programs. This system has been tested and proven to be effective in multiple instances The spiny dogfish fishery meets the requirements for SG 100.		
d	Guidepost	The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to observe_the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
	Met?	Y	Y	Y

	Justification	The MSFCMA contains ten national standards that guide the development of fishery management plans in the U.S. The Act also requires NMFS to develop National Standard Guidelines that further interpret the National Standards and give guidance to the regional fishery management councils on how to comply with the National Standards. National standard Number 8 states that: "Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities by utilizing economic and social data that meet the requirements of paragraph (2), in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities." The National Standard Guidelines state that: "All other things being equal, where two alternatives achieve similar conservation goals, the alternative that provides the greater potential for sustained participation of such communities and minimizes the adverse economic impacts on such communities would be the preferred alternative." The guidelines also say that "The term ''sustained participation'' means continued access to the fishery within the constraints of the condition of the resource." The MSFCMA requires a provision in all fishery management plans to: "… assess, specify, and analyze the likely effects, if any, including the cumulative conservation, economic, and social impacts, of the conservation and management measures on, and possible mitigation measures for— (A) participants in the fisheries and fishing communities affected by the plan or amendment; (B) participants in the fisheries conducted in adjacent areas under the authority of another Council, after consultation with such Council and representatives of those participants;…" Fishery management plans that establish a limited access system for the fishery in order to achieve optimum yield require the Council and the Secretary of Commerce to take into account— (A) present participation in the fishery; (B) historical fishing practices in, and dependence on, the fishery; (C) the economics of the fishery; (D) the capability of fishing vessels used in the fishery to engage in other fisheries; (E) the cultural and social framework relevant to the fishery and any affected fishing communities; (F) the fair and equitable distribution of access privileges in the fishery; and (G) any other relevant considerations. The make-up of the regional fishery management councils and their advisory panels, together with public meetings in the region, assure that existing arrangements will be taken into account in the development of fishery management plans. These provisions of the law do not guarantee that existing legal or customary rights will be incorporated into a management plan but fishery management plans can formally commit to the legal rights(B) historical fishing practices in, and dependence on, the fishery; (C) the economics of the fishery; (D) the capability of fishing vessels used in the fishery to engage in other fisheries; (E) the cultural and social framework relevant to the fishery and any affected fishing communities;

PI 3.1.1		**The management system exists within an appropriate legal and/or customary framework which ensures that it:** • **Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and** • **Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and** • **Incorporates an appropriate dispute resolution framework.**
		(F) the fair and equitable distribution of access privileges in the fishery; and (G) any other relevant considerations. The make-up of the regional fishery management councils and their advisory panels, together with public meetings in the region, assure that existing arrangements will be taken into account in the development of fishery management plans. These provisions of the law do not guarantee that existing legal or customary rights will be incorporated into a management plan but fishery management plans can formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2. Any failure to recognize existing legal rights would be subject to challenge in the courts and the law is written so as to encourage consideration of customary rights. The nature of the consultative process of FMP development insures that customary rights will be given consideration. The spiny dogfish fishery therefore has the formal commitment mechanism necessary to meet the requirement of SG 100. The spiny dogfish fishery therefore has the formal commitment mechanism necessary to meet the requirement of SG 100.
References		MSFCMA http://www.nmfs.noaa.gov/sfa/laws_policies/national_standards/index.html Administrative Procedure Act (5 U.S.C. Subchapter II) Available at: http://www.archives.gov/federal-register/laws/administrative-procedure/ (March 2016
OVERALL PERFORMANCE INDICATOR SCORE:		**100**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 3.1.2 – Consultation, roles and responsibilities

PI 3.1.2		The management system has effective consultation processes that are open to interested and affected parties. The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction.
	Met?	Y	Y	Y
	Justification	The Magnuson-Stevens Fishery Conservation and Management Act (MSA) created eight regional fishery management councils (councils) responsible for the fisheries that require conservation and management in their region. The councils are composed of both voting and non-voting members representing the commercial and recreational fishing sectors in addition to environmental, academic, and government interests. The roles and responsibilities of the respective Councils, their committees and staff, and the regional NMFS science centers are clear and understood by all relevant parties. Key roles and functions for spiny dogfish are as follows: • National Marine Fisheries Service ("NMFS") (NOAA) – final approving authority for the Spiny Dogfish Fishery Management Plan ("FMP") and amendments thereto; final approving authority for annual quotas; authority for issuance of administrative rules implementing management decisions. • Northeast Fisheries Science Center (NEFSC/Woods Hole) – responsible for at sea surveys, estimating volume of biomass, age/length relationships, recruitment, etc.; responsible for periodic formal (peer reviewed) stock assessments, evaluating all characteristics of the biomass, based on the at sea surveys, and providing projections of future volume of biomass under varying hypothetical harvest scenarios, all for the use of regulators in setting quotas. • Mid-Atlantic Fishery Management Council ("MAFMC") – entity with jurisdiction under the Magnuson Act for the development of management measures for the spiny dogfish fishery through the initiation, development, and approval of all amendments to the FMP, as well as the setting of annual quotas (see website www.mafmc.org). • Scientific and Statistical Committee ("SSC") of the MAFMC – a group of approximately 15 scientists and academics required by the Magnuson Act to review annual reports from the MAFMC staff and NEFSC regarding the status of the stocks, and then to set the ABC ("Acceptable Biological Catch") for each species. The ABC is the maximum level at which the MAFMC may set the harvest quota each year. The SSC additionally recommends improvements for the assessments and notes parameters – such as biological reference points – that they believe need further study.		

		• Spiny Dogfish Committee of the MAFMC – committee comprised of MAFMC and NEFMC members charged with initial responsibility for interacting with industry, and for recommending to the full Council proposed changes in FMP/management regulations and proposed annual quotas.		
b	**Guidepost**	The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used.
	Met?	Y	Y	Y
	Justification	The Council process is fully public and there are regular opportunities for public involvement. Public notification procedures are specified by law and all meetings must be open to the public. The consultation process includes a formal advisory panel that meets regularly and provides an opportunity for relevant information, including local knowledge, to be brought forth and considered in the development and adjustment of fishery management plans. Council committee meetings and council meetings provide opportunities for input of relevant information. Open council discussions inform the public how their input is being used. Additionally, before adopting any fishery management plan or regulation, NMFS notifies the public through the Federal Register op proposed actions and provides an opportunity for public comment. Final rules include responses to public comments, explaining how input was used. The spiny dogfish fishery therefore meets the requirements of SG 100.		
c	**Guidepost**		The consultation process provides opportunity for all interested and affected parties to be involved.	The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.
	Met?		Y	Y
	Justification	The fishery management councils maintain web sites that provide information to the public on all council activities and meetings. In addition, the councils maintain contact lists of interested parties to whom they send notices of meetings and information relevant to upcoming actions. Interested and affected parties can attend council meetings in person or by way of conference calls and webinars. Members of council advisory panels have their meeting expenses paid by the councils. The spiny dogfish fishery meets the requirements of SG 100.		
References		MSFCMA MAFMC Statement of Organization, Practices, and Procedures Revised December 2015		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**

CONDITION NUMBER (if relevant):	

Evaluation Table for PI 3.1.3 – Long term objectives

PI 3.1.3		The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Long-term objectives to guide decision-making, consistent with the MSC Principles and Criteria and the precautionary approach, are implicit within management policy	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach are explicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within and required by management policy.
	Met?	Y	Y	Y
	Justification	The MSFCMA established clear long-term objectives to guide the development of fishery management plans by the regional fishery management councils. The National Standards for fishery management and the National Standard Guidelines require that: “The fishing mortality rate does not jeopardize the capacity of a stock or stock complex to produce MSY.” The national standards are further interpreted through the National Standard Guidelines, required by the MSFCMA and developed and published by NMFS. The National Standard Guidelines for National Standard 1 require that: “when specifying limits and accountability measures intended to avoid overfishing and achieve sustainable fisheries, Councils must take an approach that considers uncertainty in scientific information and management control of the fishery. These guidelines describe how to address uncertainty such that there is a low risk that limits are exceeded.” Since 2007, the MSFCMA has required that all FMPs include catch limits and accountability measures that are intended to insure that overfishing can’t reduce a stock below the level that will produce MSY on a continuing basis. These provisions of law and policy are consistent with the MSC fisheries standard and the precautionary approach. They are explicit and required by management policy. Therefore, the spiny dogfish fishery meets the requirements of SG 100.		
References		MSFCMA http://www.nmfs.noaa.gov/sfa/laws_policies/national_standards/index.html		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.1.4 – Economic and Social Incentives

PI 3.1.4		The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that perverse incentives do not arise.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure they do not contribute to unsustainable fishing practices.
	Met?	Y	Y	Y
	Justification	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure they do not contribute to unsustainable fishing practices. Statutory management planning by the Council gives certainty about the rules and goals of management in accordance with principles of sustainability, meeting the SG60 and SG80 scoring issues. Planning Development Team (PDT) of the Council conducts a regular review of the management plan to determine if objectives are being met. Action is taken through amendments to the Spiny Dogfish Fishery Management Plan and incentives for sustainable fishing are explicitly considered through Accountability Measures including reductions in quotas in subsequent years if the Annual Catch Limit is exceeded, meeting the requirements of the SG100 scoring issue.		
References		MSFCMA Magnuson-Stevens Act Provisions; National Standard Guidelines https://www.federalregister.gov/documents/2016/10/18/2016-24500/magnuson-stevens-act-provisions-national-standard-guidelines		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.2.1 Fishery-specific objectives

PI 3.2.1		The fishery-specific management system has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2.		
Scoring Issue		SG 60	SG 80	SG 100
a	Objectives			
	Guidepost	**Objectives**, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **implicit** within the fishery-specific management system.	**Short and long-term objectives**, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **explicit** within the fishery-specific management system.	**Well defined and measurable short and long-term objectives**, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery-specific management system.
	Met?	Y	Y	Y
	Justification	The overall goal of the federal spiny dogfish FMP is to conserve spiny dogfish in order to achieve optimum yield from the resource. To meet the overall goal, the following objectives were adopted in the initial spiny dogfish FMP, adopted in 1999: 1. Reduce fishing mortality to ensure that overfishing does not occur. 2. Promote compatible management regulations between state and Council jurisdictions and the USA 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. ASMFC Spiny Dogfish FMP 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. In support of this goal, the following objectives were adopted for the Spiny Dogfish Fishery Management Plan: • Reduce fishing mortality and rebuild the spawning stock biomass to prevent recruitment failure and support a more sustainable fishery. • Coordinate management activities between state, federal and Canadian waters to ensure complementary regulations throughout the species range. • Minimize the regulatory discards and bycatch of spiny dogfish within state waters. • Allocate the available resource in biologically sustainable manner that is equitable to all the fishers.		

PI 3.2.1		The fishery-specific management system has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2.
		• 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.
References		MAFMC & NEFMC, 1999. Spiny Dogfish Fishery Management Plan. Mid-Atlantic Fishery Management Council and the New England Fishery Management Council in cooperation with the National Marine Fisheries Service. Final approval by NOAA: 29 September 1999. Accessed online March 2017 at: https://static1.squarespace.com/static/511cdc7fe4b00307a2628ac6/t/53e3c49ee4b08bd3408a6a50/1407435934901/Spiny_Dogfish_FMP.pdf ASMFC, 2002. Interstate Fishery Management Plan for Dogfish. Atlantic States Marine Fisheries Commission, Washington, DC. http://www.asmfc.org/uploads/file/spinyDogfishFMP.pdf
OVERALL PERFORMANCE INDICATOR SCORE:		**Score**
CONDITION NUMBER (if relevant): **Condition**		**100**

Evaluation Table for PI 3.2.2 – Decision-making processes

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery.		
Scoring Issue		SG 60	SG 80	SG 100
a	Decision-making processes			
	Guidepost	There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are **established** decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	
	Met?	Y	Y	
	Justification	Federal fisheries in the U.S. are managed under the MSFCMA, which sets out the decision-making process to be used by regional fishery management councils in the development of fishery management plans. FMPs contain measures and strategies to achieve the fishery-specific objectives. The spiny dogfish fishery meets the requirements of SG 80.		
b	Responsiveness of decision-making processes			
	Guidepost	Decision-making processes respond to **serious issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and	Decision-making processes respond to **serious and other important issues** identified in relevant research, monitoring, evaluation and consultation,	Decision-making processes respond to **all issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and

		adaptive manner and take some account of the wider implications of decisions.	in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	adaptive manner and take account of the wider implications of decisions.
	Met?	(Y	Y	Y
	Justification	The MAFMC, the NEFMC and the NMFS have in place processes to respond to all issues identified in relevant research, monitoring, evaluation and consultation. The process is transparent and is timely to the extent that taking into account the wider implications of decisions allows. This meets the SG100 requirements.		
c	Use of precautionary approach			
	Guidepost		Decision-making processes use the precautionary approach and are based on best available information.	
	Met?		Y	
	Justification	The regional fishery management councils and NMFS operate under the MSFCMA and the National Standard Guidelines. National Standard 2 requires that: "conservation and management measures shall be based upon the best scientific information available." The National Standard Guidelines specify that: "Scientific information that is used to inform decision making should include an evaluation of its uncertainty and identify gaps in the information. Management decisions should recognize the biological (e.g., overfishing), ecological, sociological, and economic (e.g., loss of fishery benefits) risks associated with the sources of uncertainty and gaps in the scientific information." The councils' Statistical and Scientific Committees (SSCs) are responsible for developing acceptable biological catch (ABC) recommendations for the councils. The National Standard Guidelines for National Standard 2 state that: "The SSC is expected to take scientific uncertainty into account when making its ABC recommendation (§600.310(f)(4))." The MAFMC formally incorporated the precautionary approach into the spiny dogfish FMP through Amendment 2. The spiny dogfish fishery meets the requirements of SG 80.		
d	Accountability and transparency of management system and decision-making process			
	Guidepost	Some information on the fishery's performance and management action is generally available on request to stakeholders.	**Information on the fishery's performance and management action is available on request**, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	Formal reporting to all interested stakeholders **provides comprehensive information on the fishery's performance and management actions** and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.

	Met?	Y	Y	Y
	Justification	Accountability and transparency of the management system is required by multiple laws and Executive Orders. The National Standard Guidelines for National Standard 2 specifically require transparency in the provision of scientific information for fishery management. Under the heading "Transparency and openness," the NS Guidelines state that: "The Magnuson-Stevens Act provides broad public and stakeholder access to the fishery conservation and management process, including access to the scientific information upon which the process and management measures are based. Public comment should be solicited at appropriate times during the review of scientific information. Communication with the public should be structured to foster understanding of the scientific process." They further require that: "Scientific information products should describe data collection methods, report sources of uncertainty or statistical error, and acknowledge other data limitations. Such products should explain any decisions to exclude data from analysis. Scientific products should identify major assumptions and uncertainties of analytical models. Finally, such products should openly acknowledge gaps in scientific information." The management system provides comprehensive information on the fishery's performance and management actions through open meetings, mailed and emailed notices, written copies of relevant documents, and a comprehensive web site through which interested parties can obtain almost every document associated with the management of the fishery. Where research, monitoring, evaluation and review activity result in management actions, interested parties are informed of proposed rules and provided an opportunity to comment. Final rules include explanations of how the agency responded to comments. The spiny dogfish fishery meets the requirements of SG 100.		
e	Approach to disputes			
	Guidepost	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.
	Met?	NA	Y	Y
	Justification	The management system for spiny dogfish has not been subject to continuing court challenges. The fishery management system is legally obliged to comply with judicial decisions and does so. The fishery management system receives continuing legal advice and acts proactively to avoid legal disputes and rapidly implements judicial decisions arising from legal challenges. The spiny dogfish fishery meets the requirements for SG 100.		
References				
OVERALL PERFORMANCE INDICATOR SCORE:				**Score**
CONDITION NUMBER (if relevant):				**100**

Condition	

Evaluation Table for PI 3.2.3 – Compliance and enforcement

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with.		
Scoring Issue		SG 60	SG 80	SG 100
a	MCS implementation			
	Guidepost	Monitoring, control and surveillance **mechanisms** exist, and are implemented in the fishery and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance **system** has been implemented in the fishery and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A **comprehensive** monitoring, control and surveillance system has been implemented in the fishery and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
	Met?	Y	Y	N
	Justification	The National Marine Fisheries Service (NMFS) and the United States Coast Guard (USCG) share responsibility for the enforcement of fishing laws and regulations by U.S. vessels. These agencies have land-based and seagoing enforcement officers and a complete system of monitoring, control and surveillance (MCS) for the spiny dogfish fishery, including: At-sea surveillance by patrol vessels and fixed-wing aircraft; Prescribed on-board observer coverage with protocols to monitor catch, species, etc; Unannounced dockside monitoring of landings; Submission of vessel fishing log books; And, potential catch seizure and significant fines and loss of fishing privileges for violations of regulations. Whereas no existing documents demonstrated the ability of the monitoring, control and surveillance system to enforce relevant management measures, strategies, and/or rules, the client filed a Freedom of Information Act Request (FOIA) with the NMFS Office of Law Enforcement (OLE) seeking records related to enforcement actions in the spiny dogfish fishery. Without further evidence regarding the MCS system over this period of time, the system may not be considered to have demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules. The spiny dogfish fishery meets the requirements for SG 80.		
b	Sanctions			
	Guidepost	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, **are consistently applied** and	Sanctions to deal with non-compliance exist, are consistently applied and

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with.		
			thought to provide effective deterrence.	**demonstrably** provide effective deterrence.
	Met?	Y	Y	N
	Justification	There is an explicit and statutory sanction framework that is applied for violations of fishery regulations. Sanctions to deal with non-compliance are listed in the Code of Federal Regulations and can be severe, consisting of: Significant monetary penalties; Confiscation of catch; Permit cancellations or suspensions; Permanent prohibitions on participation in the fishery. Other than assaults on fishery officers, violations of federal fishery regulations are treated as civil cases, using a "preponderance of the evidence" rule. Cases are adjudicated by a limited number of administrative law judges who have expertise in fishery laws, providing consistency in approach. On the basis of interviews with federal enforcement and prosecution officials it can be said that sanctions to deal with noncompliance exist, are consistently applied and are thought to be effective, meeting the requirements for SG 80. However, the information provided to the assessment team thus far is not sufficient to verify that sanctions are demonstrably effective, which is required for SG 100.		
c	Compliance			
	Guidepost	Fishers are **generally thought** to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	**Some evidence exists** to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a **high degree of confidence** that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.
	Met?	Y	Y	N
	Justification	Anecdotal information and the expert opinion of law enforcement officers indicate that fishers comply with the management system under assessment and provide information of importance to the effective management of the fishery. The spiny dogfish fishery meets the requirements of SG 80. The scarcity of records of enforcement efforts compared to enforcement actions does not allow the assessment team to say that there is a "high degree of confidence that fishers comply with the management system," which is a requirement for SG 100.		
d	Systematic non-compliance			
	Guidepost		There is no evidence of systematic non-compliance.	
	Met?		Y	

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with.
	Justification	On the basis of information available for the assessment, there is no evidence of systematic non-compliance. The spiny dogfish fishery meets the requirements of SG 80.
References		USOFR (U.S. Office of the Federal Register). 1998. Enforcement Policy. Code of Federal Regulations, Title 50, Part 600.740. U.S. Government Printing Office, Washington, D.C. https://foiaonline.regulations.gov/foia/action/public/home DOC-NOAA-2016-000889
OVERALL PERFORMANCE INDICATOR SCORE:		Score
CONDITION NUMBER (if relevant): Condition		80

Evaluation Table for PI 3.2.4 – Research Plan

PI 3.2.4		The fishery has a research plan that addresses the information needs of management		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.	A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.	A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.
	Met?	Y	Y	Y
	Justification	The Magnuson-Stevens Reauthorization Act of 2006 requires each regional fishery management council to develop a five-year research priority plan (MSFCMA 1996). The MAFMC's overall Research Plan and its research agenda specific to spiny dogfish is described on page 117. Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2, meeting SG 60. A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2, meeting SG 80. A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2, and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2, meeting SG 100.		
b	Guidepost	Research results are available to interested parties.	Research results are disseminated to all interested parties in a timely fashion.	Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available.
	Met?	Y	Y	Y

PI 3.2.4		The fishery has a research plan that addresses the information needs of management	
	Justification	Research results are disseminated to all interested parties in a timely fashion and are widely and publicly available through presentations at Council and Commission meetings, stock assessment workshops, and web sites, meeting SG 100.	
References		http://www.mafmc.org/research-priorities/, MSFCMA 1996, MAFMC 2016a	
OVERALL PERFORMANCE INDICATOR SCORE:			100
CONDITION NUMBER (if relevant):			

Evaluation Table for PI 3.2.5 – Monitoring and management performance evaluation

PI 3.2.5		There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives There is effective and timely review of the fishery-specific management system		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	The fishery has in place mechanisms to evaluate some parts of the management system.	The fishery has in place mechanisms to evaluate key parts of the management system	The fishery has in place mechanisms to evaluate all parts of the management system.
	Met?	Y	Y	Y
	Justification	The management system is regularly reviewed and amended if necessary through the MAFMC council process. The following entities continually evaluate all parts of the fishery-specific management system and initiate changes when required: Mid-Atlantic Fishery Management Council ("MAFMC") – entity with jurisdiction under the Magnuson Act for operational management of the spiny dogfish fishery, including review/approval of all amendments to the FMP, as well as the setting of annual quotas (see website www.mafmc.org). Scientific and Statistical Committee ("SSC") of the MAFMC – a group of approximately 15 scientists and academics required by the Magnuson Act to review annual reports from the MAFMC staff and NEFSC regarding the status of the stocks, and then to set the ABC ("Acceptable Biological Catch") for each species. The ABC is the maximum level at which the MAFMC may set the harvest quota each year. The SSC additionally recommends improvements for the assessments and notes parameters – such as biological reference points – that they believe need further study. Spiny Dogfish Committee of the MAFMC – committee comprised of MAFMC and NEFMC members charged with initial responsibility for interacting with industry, and for recommending to the full Council proposed changes in FMP/management regs and proposed annual quotas.		

		Spiny Dogfish Advisory Panel (AP)– composed of members of the public representing interested parties. The AP meets at least annually to review the performance of the fishery and to report to the Council on the performance of the fishery and challenges facing the fishery. Northeast Fishery Science Center – performs periodic stock assessments. The spiny dogfish fishery meets the requirements for SG 100.		
b	**Guidepost**	The fishery-specific management system is subject to occasional internal review.	The fishery-specific management system is subject to regular internal and occasional external review.	The fishery-specific management system is subject to regular internal and external review.
	Met?	Y	Y	N
	Justification	The management system is designed and organized to provide regular internal and external review. Many of the participants in the system do not work for the government and represent a wide range of interests and competencies. Stock assessments are always peer-reviewed by outside experts. MAFMC council staff and officers participate in periodic meetings of the Council Coordination Committee (CCC). The CCC consists of the chairs, vice chairs, and executive directors from each regional fishery management council, or other staff, as appropriate. This committee meets twice each year to discuss issues relevant to all councils, including issues related to the implementation of the MSA. NOAA Fisheries is committed to the timely implementation of all provisions of the MSA. Regular face-to-face meetings or conferences between NOAA Fisheries and the leadership of the eight councils are critical to ensure administrative and MSA priorities are met. In addition, according to MSC guidance, external review for SG80 and SG100 could be by another department within an agency or by another agency or organization within the country (GSA4.10.1). Considering this, the Council structure wherein NMFS and NOAA GC (other departments or agencies) review alternatives for management changes presented for Council decision-making might also be considered as “external review” of the management system for these purposes. A variety of agencies and interest groups outside the fishery management system regularly review the system with regards to their particular field of interest. These include ETP Take Reduction Teams, the Department of Commerce Inspector General and others. On occasion, the U.S. Congress will direct the National Research Council to investigate some fishery management issue. The Congressional Research Service also reviews council actions pertaining to issues of interest to Members of Congress. The management system is clearly subject to a high degree of oversight, but there is no regular, formal external review of the overall management system. The spiny dogfish fishery meets the requirements for SG 80, but does not quite meet the requirements for SG 100 because there is no regular external review.		
References				

OVERALL PERFORMANCE INDICATOR SCORE:	**90**
CONDITION NUMBER (if relevant):	

8.2 Appendix 1.3 Conditions & Client Action Plan

For a summary of previously raised conditions in the last assessment see Table 32. The fishery initially received sixteen conditions during the 2012 full assessment; all conditions were closed by the fourth surveillance. During this re-assessment a total of three conditions concerning to Principle 2 were raised in two Principal Indicators (PI) and under three different Scoring Issues (SI): PI 2.3.1 SIa (Trawl) for long-fin pilot whales and PI 2.3.1 SIb (Gillnet) and PI SIc 2.3.3 (Gillnet) for Atlantic right whales.

One of the conditions (Condition 2-3) raised in this re-assessment on PI 2.3.3 is related to a condition raised previously during the full assessment on the PI 2.3.3 SIb. In the 2011 full assessment, the team noted that due to the difficulties in assigning interactions/mortalities of Atlantic right whales to a specific fishery; there wasn't sufficient data available to allow the gillnet UoA related mortality and the impact of fishing to be quantitatively estimated for Atlantic right whales. During the fourth surveillance, this condition was closed on account that the available information from abundance surveys was sufficient to estimate the decline in the North Atlantic right whale stock, calculate Potential Biological Removal (PBR), and evaluate fishery entanglement interactions to quantify the impact of fisheries in general.

Upon closer examination of this requirement during the re-assessment the team elected to re-open this condition both on SI b and c:

- PI 2.3.3 SI b at SG80: Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species.
- PI 2.3.3 SI c at SG80: Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species.

Part of the reasoning behind the re-opening on the condition was that the scope of the gillnet UoA was expanded to include all trips of the New England and Mid-Atlantic gillnet fishery, even those trips when the fishery is not landing spiny dogfish. In the previous assessment this condition was limited to interactions of the trips were spiny dogfish was landed. Given the increased scale of the impacts on ETP species of the new UoA, the team saw it necessary to re-open the condition. (For more details on the Scope of the UoA See 3.1 Unit(s) of Assessment (UoA) and Scope of Certification Sought).

Due to the degree of uncertainty related to occurrence of impacts, the available information has not proven to be sufficient to support the creation of mitigation measures that are effective in reducing Atlantic right whale entanglements. For this reason in the re-assessment Condition 2-3 was expanded to include Sic and a condition (Condition 2-2) was also placed on PI 2.3.1:

- PI 2.3.1 SIa at SG80: Direct effects are highly unlikely to create unacceptable impacts to ETP species.

Since Conditions 2-2 and 2-3 are closely related; Condition 2-3 has as a goal to reducing uncertainty regarding interactions of the gillnet UoA with Atlantic right whales and Condition 2-2 has as a goal to reduce the confidence that the gillnet fishery is highly likely to be complying with national requirements

for protection and rebuilding, these two conditions are responded under the same client action plan (See Table 43).

The north Atlantic right whale population has been the focus of numerous research and conservation efforts aimed at reducing ship strikes and entanglements with fishing gear. Despite an overall positive trend from 1980–2012 (Waring et al. 2016), recent abundance estimates suggest a decline (Hayes et al. 2016). The 2017 5-year review of the status and recovery of the North Atlantic Right Whale concluded that progress towards recovery has regressed since the last 5-year review (NMFS, 2017a).

There are numerous challenges facing the recovery of the Atlantic right whale. Interactions of right whales with fishing gear are mostly unobserved. Consequently, the detection of mortalities is largely opportunistic and estimates of mortalities are considered a minimum. In the majority of the cases, no gear is recovered or identifiable, making it impossible to assign mortalities to a specific fishery or fishing gear. Many times entangled animals are not found in the same location where they were initially entangled, because right whales also have a transboundary distribution across US and Canadian waters, further complicating assignation of mortality across Canadian and US fisheries.

Environmental conditions affect the distribution and habitat use of this population. However, there is a limited understanding on the effects of changing climate conditions on right whale distribution and changes in migratory patterns. These uncertainties make trends on whale abundance are difficult to interpret and could also have an effect on the number of human-cause mortalities as whales migrate outside of areas where mitigation measures have been implemented (NMFS, 2017a).

There are ongoing research and management initiatives aiming to address data gaps on: whale distributions, sufficiency of gear-marking requirements, information on impacts of non-lethal effects of entanglements, need for better coordination in surveys and gear-marking programs with Canada.

Due to the complexities reviewed here, the assessment team considers that it will take longer than the period of certification for the US gillnet fishery UoA to achieve a performance level of 80 for PIs 3.1.1 and 3.3.3, required to close the conditions. For this reason the milestones for these conditions are extended beyond this certification cycle to the end of the next certificate cycle (MSC CR V2.0 G7.24.2.2) Efforts have been made to also align the milestones for the annual surveillances with expected progress in management's recovery strategy for Atlantic right whales.

Table 42. Condition 2-1 (Trawl)

2.3.1 SIa	SG 80 The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species.
Score	75
Rationale	Summary for PI 2.3.1 SIa Small Cetaceans Scoring Element (Bottom Trawl) The 2010-2014 average annual mortality of long-finned pilot whales attributed to the northeast bottom trawl was 33.2 animals (CV=0.15). The PBR for long-finned pilot whales is of 35 whales; the total reported takes across all fisheries exceeded this at 38. Annual mortality and serious injury of a stock in a given fishery higher than 50% of the PBR merits a designation of Category I under the MMPA. As of the 2017 List of Fisheries (LOF), this fishery continues to be classified under Category II; and there is no evidence that additional management actions to reduce take are being developed or implemented. The assessment team acknowledges that there is significant uncertainty in the stock assessment informing the PBR and that the 2017 stock assessment report states survey results are impartial and likely underestimate overall abundance of this species. Nonetheless, the published stock assessment is expected to represent the best available information used for management. Due to the inconsistency between the estimated annual mortality to its PBR and the MMPA categorization of the trawl fishery does not meet the SG80.
Condition	**2-1** By the fourth surveillance the fishery shall provide evidence that (1) the effects of the bottom trawl UoA on long-finned pilot whales are known and are highly likely to be within limits of national requirements for protection of marine protected mammals (Marine Mammal Protection Act, MMPA); (2) it's is highly likely that the bottom trawl fishery meets MMPA requirements, there would be direct demonstration that requirements for protection and rebuilding are being achieved.
Milestones	**Year 1 Surveillance (2019).** The fishery shall provide evidence of supporting federal management agency actions to address the discrepancy between the long-finned pilot whale SAR and PBR and Northeast Bottom Trawl LOF classification such that bottom trawl fishery is meeting the MMPA requirements. **Year 2 Surveillance (2020)** The fishery shall present evidence of continued support of actions taken by the federal management agency towards meeting the national requirements for the protection of long-finned pilot whales by the trawl fishery. **Year 3 Surveillance (2021).** The fishery shall present evidence of continued support of actions taken by the federal management agency to further progress 1 towards meeting the national requirements for the protection of long-finned pilot whales by the trawl fishery. **Year 4 Surveillance (2022).** The fishery shall present evidence of meeting national requirements for the protection of long-finned pilot whales.

Client action plan	At the first annual audit, the clients will present evidence of supporting federal management agency actions to address the discrepancy between the long-finned pilot whale SAR and PBR and Northeast Bottom Trawl LOF classification such that bottom trawl fishery is meeting the MMPA requirements. At the second annual audit, the clients will present evidence of continued support of actions taken by the federal management agency towards meeting the national requirements for the protection of long-finned pilot whales by the trawl fishery. At the third annual audit, the clients will present evidence of continued support of actions taken by the federal management agency to further progress towards meeting the national requirements for the protection of long-finned pilot whales by the trawl fishery. At the fourth annual audit, the clients will present evidence of meeting national requirements for the protection of long-finned pilot whales.
Consultation on condition	

Table 43. Condition 2-2 and 2-3 (Gillnet)

2.3.1 SIa	SG 80: Direct effects are highly unlikely to create unacceptable impacts to ETP species.
Score	75
Rationale (PI 2.3.1)	Summary for PI 2.3.1 SIa Large Whales Scoring Element (Gillnet) Recent estimates indicate an abundance decline of the Western North Atlantic stock of right whale since 2011 (Pace et al. 2017). Between 2010 and 2014, the fishery-caused mean annual serious injury and mortality for this stock was estimated to be 4.65; significantly higher than the prescribed PBR of one. Confirmed fishery-caused mortality and injury events are considered a minimum; not all entangled whales are discovered or reported. Entanglement events for this species are unobserved; In the majority of the cases, no gear was documented or recovered, or the whale was carrying sections (line or rope) of unknown/undetermined gear type. Over 95% of mortality/serious injury events recorded between 2010 and 2014 did not have sufficient information to assign the event to a specific fishery/gear type. During this period no mortalities were attributed to the gillnet fishery. Nonetheless, there is evidence which indicates that Atlantic right whales may be susceptible to entanglement in gear employed by gillnet fisheries.

	Between 1975 and 1993 there are records of past entanglements events attributed to gillnets (Hayes et al. 2016). There also appears to be some spatial overlap between the areas where acoustic tracks have recorded right whales distribution and where fishing effort with US gillnets occurs. The MMPA cites annual mortality and serious injury to North Atlantic right whale from the Northeast sink gillnet >50%PBR as part of the basis for classifying this fishery as Category I. Consequently, this fishery is under the Atlantic Large Whale Take Reduction Plan (ALWTRP). The ALWTRP consists of regulatory measures to reduce incidental take of right whales including spatial and seasonal closures, gear modifications and gear marking requirements. At the November 2017 'Atlantic Large Whale Take Reduction Team Monitoring Webinar' the United States Coast Guard (USCG) reported on "… three cases involving violations of gillnet vessels in the Northeast and mid-Atlantic. These cases included failure to have an anchor, buoy lines with no markings, and failure to use weak links." Across all fisheries, there is an 87.4% compliance rate with gear regulations (NMFS 2017b). The SG80 requires a 'highly likely' probability (80th percentile). The interpretation of likelihood levels may be either qualitative (plausible argument, empirical observation of sustainability and qualitative risk) or quantitative (measured data relevant to the fishery, statistical analysis, quantitative risk assessment) (MSC v2.0 GSA 3.2.4). The overall compliance rate across all fisheries >80% suggests that the gillnet fishery is likely complying with the requirements to reduce take, meeting SG60. However, the limitations of verification of compliance, the high-risk states of Atlantic right whales, the limited information on entanglement events, and evidence of some non-compliance events, reduce the confidence that the gillnet fishery is highly likely to be complying with national requirements for protection and rebuilding (MSC CR v2.0 GSA3.2). The fishery does not meet SG80.
Condition 2-2	2-2. By end of the next certificate cycle[15] the fishery shall provide evidence that (1) the effects of the gillnet UoA on Atlantic right whales are known and are highly likely to be within limits of national requirements for protection of marine protected mammals (Marine Mammal Protection Act, MMPA); (2) it's is highly likely that the gillnet fishery meets MMPA requirements, there would be direct demonstration that requirements for protection and rebuilding are being achieved
PI 2.3.3	**PI 2.3.3 SI a. at SG80: Sufficient information is available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species.** **PI 2.3.3 SI c at SG80: Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species.**
Score	75

[15] The assessment team considers that it will take longer than the period of certification for the US gillnet fishery UoA to achieve a performance level of 80 for PIs 2.3.1 required to close the conditions. For this reason the condition is extended beyond this certification cycle to the end of the next certificate cycle (MSC CR V2.0 G7.24.2.2). The rationale behind this explanation is justified in Appendix 1.3 Conditions & Client Action Plan

Rationale (PI 2.3.3)	*Summary for PI 2.3.3 SIa Large Whales Scoring Element (Gillnet)* Atlantic right whales entanglement occurrences are rarely observed during fishing operations. Consequently, there are difficulties in attributing mortalities to specific fisheries. Recorded entanglement incidents are considered a minimum, since not all entangled whales are discovered or reported. Entangled animals are usually not found in the same location where it was initially entangled, making it at times impossible to identify the gear type and area where the entanglement occurred. In the majority of the cases, no gear was documented or recovered, or the whale was carrying sections (line or rope) of unknown/undetermined gear type. Though the majority of mortalities for right whales has no identified gear type, there is evidence that right whales are susceptibility to entanglement in gear employed by gillnet fisheries (See PI 2.3.1 SIa). Because available information is not sufficient to allow the gillnet fishery-related mortality and the impact of fishing to be quantitatively estimated for Atlantic right whales the SG80 is not met. *Summary for PI 2.3.3 SIc Large Whales Scoring Element (Gillnet)* The limited information on the specific fisheries/gear type on mortalities of Atlantic right whales (See SIa of this PI), impedes the development of reduction measures that effectively target the appropriate fishing areas/gear types/fisheries. Given the susceptibility of Atlantic right whales to gillnet fisheries, the available information is not considered sufficient to support a full strategy to manage the impacts of this fishery on this stock.
Condition 2-3	**2-3.** By the fourth annual surveillance the fishery shall provide evidence that (A) sufficient information is available to allow fishery related mortality to be quantitatively estimated for Atlantic right whales AND (B) information is sufficient to support a full strategy to manage impacts on Atlantic right whales.
Milestones	**Year 1 Surveillance (2019).** (*Condition 2-3 PI 2.3.3*) The fishery shall present evidence of efforts to efforts to continue complying with existing regulations to protect Atlantic right whales, including gear marking and weak links. Additionally, the fishery shall present evidence of supporting federal management agency actions to improve data collection aimed at enhancing information on Atlantic right whales mortality estimates and management measures. **Year 2 Surveillance (2020)** (*Condition 2-3 PI 2.3.3*). The fishery shall present evidence of continued compliance with existing regulations to protect Atlantic right whales (gear markings, weak links). Additionally, the fishery shall present evidence of continued support of federal management agency actions to improve data collection aimed at enhancing information on Atlantic right whales mortality estimates and management measures. **Year 3 Surveillance (2021).** (*Condition 2-3 PI 2.3.3*).The fishery shall present evidence of continued support of federal management agency actions to improve data collection aimed at enhancing information on Atlantic right whales mortality estimates and management measures.

	Year 4 Surveillance (2022). (*Condition 2-3 PI 2.3.3*) The fishery shall present evidence that there is sufficient information collected to allow fishery related mortality to be quantitatively estimated for Atlantic right whales and to support a full strategy to manage impacts. **Next Surveillance Cycle** (*Condition 2-2 PI 2.3.1*) By the end of the next certificate cycle the client will provide evidence that direct effects of the gillnet UoA are highly unlikely to create unacceptable impacts to Atlantic right whales. Only when the final milestone is complete will the team be able to provide a revised score of 80
Client action plan	At the first annual audit, the clients will present evidence of efforts to improve compliance with existing regulations to protect Atlantic right whales, including gear marking and weak links. Additionally, the fishery shall present evidence of supporting federal management agency actions to improve data collection aimed at enhancing information on Atlantic right whales mortality estimates and management measures. At the second annual audit, the clients will present evidence of improved compliance with existing regulations to protect Atlantic right whales (gear markings, weak links). Additionally, the fishery shall present evidence of continued support of federal management agency actions to improve data collection aimed at enhancing information on Atlantic right whales mortality estimates and management measures. At the third annual audit, the clients will present evidence of continued support of federal management agency actions to improve data collection aimed at enhancing information on Atlantic right whales mortality estimates and management measures. At the fourth annual audit, the clients will present evidence that there is sufficient information collected to allow fishery related mortality to be quantitatively estimated for Atlantic right whales and to support a full strategy to manage impacts.
Consultation on condition	

8.3 Appendix 2 Peer Review Reports

8.3.1 Peer Review 1.

Overall Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**No**	**Conformity Assessment Body Response**
Justification: See the detailed comments on particular PIs. Rationales as currently written do not provide appropriate justifications for assigned scores for many performance indicators in P1 and P2. Scores may be correct but require reference to additional evidence to support them.		Responses included for each PI in tables below

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?	**Yes**	**Conformity Assessment Body Response**
Justification: Conditions are expressed appropriately but Conditions 2-1 and 2-2 are based on scores that are inconsistent between scoring issues a and b for PI 2.3.1. After these inconsistencies are resolved, one or both of these conditions may not be required.		Inconsistencies have been resolved, see response for PI 2.3.1 in table below

General Comments on the Assessment Report (optional)

There are a lot of abbreviations used in the report that are not listed in the Glossary including the following identified in the first 45 pages: ACL, ASAP, ASMFC, BREP, BRP, CoP, CV, ESA, FMP, FREBUILD, Fthreshold, MA, MMPA, MRIP, MSA, NE, NEFOP, NEFSC, NMFS, NOAA, OPR, RBF, SARC, SAW, SBRM, SD, SE, SDCSMB, SSBmax, SSC, TRAC, USFWS, VTR.

Abbreviations have now been included in Glossary

Also, some abbreviations are repeatedly defined in the text, raising the question of whether they warrant abbreviation

Abbreviations that are repeated more than 3 teams are included or those that for which familiarity helps understanding.

Also, OFL is described in the report as meaning the Overfishing Level but other documents concerning this fishery refer to OFL as meaning the Overfishing Limit. Given the importance of defining limit reference points in the FCR, if this shift is intentional it should be explained (and note later questions about what constitutes the limit reference point).

OFL, "Level" is used in MAFMC and MSA Docs. But OFL also functions as a Limit under MSC criteria.

Page 16: "The principal commercial fishing gears used to catch dogfish are sink/drift/sink/float gillnets, bottom longlines and trawls" Duplicate use of sink?

Section fixed

The reference list is incomplete, so I could not check whether the information in key references has been accurately cited or used. For example, the difference between reported observed and calculated mortality is large so it would be worth a brief explanation of how longevity was calculated to help understand why it is regarded as excessive.

Reference list has been updated.
Age, growth etc. are reviewed in detail in Sec. 3.3 "Age and Growth". The data show that SD mature at 12 yrs., may live to 60 and have very low fecundity as pointed out in several places in the background. These values are defining for K-selected species.

Page 26: "The SARC panel may accept or reject an assessment". It would be helpful to state the panel's opinion on the most recent SD assessment.

Noted in text

P2 Species classifications (Table 11): What information was used to determine which species were vulnerable? Most skates are classified as vulnerable but little skate (on its own) is not. What makes tilefish and cusk vulnerable? Also, as cusk is designated as vulnerable, should it not also be a main species not a minor species?

Species categorized as "Less Resilient" in Table 11 was assessed using the productivity pat of the MSC Productivity Susceptibility Analysis (PSA). Species that score equivalent to low or medium productivity were categorized as "Less Resilient" (MSC CR v2.0 SA3.4.2.2). Correction has been made to designate little skate as vulnerable and cusk as a main species. The volumes for species have been corrected, cusk is below 2% threshold thus it would not be designated as 'main'.

Page 36: Acadian redfish. Is this three species? Is it the same as the "Northwest Atlantic redfish" or one of the three species in this complex? When referred to simply as 'redfish' what taxonomic group is being referenced?

Acadian redfish (*Sebastes mentella*), clarification included in background

Page 51: ETP species
"If the estimated total annual mortality and serious injury for that stock is less >10% of the PBR, each fishery is classified into one of three categories:" Clarification needed.

Clarification now included in background

Are there no records of any seabird species being incidentally killed by any of these gear types? They would be potentially vulnerable to all three gear types and I would have expected to see seabirds among the groups of ETP species. The NEFSC website indicates that seabirds have been caught by fishing gear in this area (https://www.nefsc.noaa.gov/ecosys/ecosystem-ecology/seabirds.html).

Seabird interactions have now been included and scored

Table 14. There are two cells which seem to be incorrectly filled: for Minke whales the mortality and injury total is greater than half the PBR but there is 'N' in the 7th column; and for Fin whales the total exceeds the PBR but there is 'N' in the 8th column.

The first column refers to Total Annual Mortality, including non-fishery related mortality (i.e. vessel strikes) the second column included fisheries Mortality and Significant Injury. For fisheries classification only the fisheries-related mortality are considered.

PI 1.1.1

For scoring issue b, the actual target reference point is not specified in the rationale.

The rationale states that the reference points are based on the biomass of particular size classes and describes the data used to determine the 'biomass target' but the actual biomass target is not provided.

Change made in text of rationale

The background describes the biological reference points within the section on stock assessment and these should be repeated in the rationales (Biomass target = SSBmax = 159,288 mt). There is also a fishing mortality reference point that is used to define when overfishing is occurring and this seems to be the primary reference point that is used to determine the ABC. The relationship between the two is not clearly spelt out in the rationale or the background.

Already provided in 1.1.1a, now also added to b

Rabo and Sosebee 2010 (NEFSC 10-06 Biological Reference Points for Spiny Dogfish) gives "The revised target reference point, expressed in terms of average weight (kg) per tow of female spiny dogfish greater than 80 cm, is estimated as 30.343 kg/tow."

Figure 5 in the background shows that the smoothed index of abundance does not reach 30 kg/tow. If 31 kg/tow remains as the target, and status is judged on the values derived from the Kalman smoothing function, the stock could not be said to be fluctuating around the target.

The fishery was not recovered until 2010 and so was rebuilding until then. Since then the stock has been "Fluctuating around the target"

If the target is converted to a biomass (after scaling the catch rates by swept area estimates) then the stock status should also be given in the same units of biomass. At the moment there is no consistency or clarity in how stock status or reference points are described in the assessment report.

The table under PI 1.1.1 gives the target reference point as being a "Quota" of 18,307 mt. But a quota is a means of implementing a catch limit (which should be determined from a measure of stock status) and is not the act As noted in the textual target for the stock.

Agreed have used SSB max instead.

Similarly, stock status relative to the reference point is given as the latest landings figures, which does not provide any information about stock status. If the target is SSBmax (159.288 mt) then the latest estimate of biomass in mt or as a proportion of the target should be given in the table. If a kg/tow value is considered to be the target then the catch rate from the latest survey should be given in the table.

Change made in report

The OFL is also listed as the limit reference point in this table but it seems to function more as a target as a limit, as the ABC seems to be derived directly from it.

Information in other documents (e.g. Description and Foundation of the Mid-Atlantic Fishery Management Council's Acceptable Biological Catch Control Rule September 13, 2016, Figures 1 and 4) suggests that the limit reference point is actually at 10% of the target. That is the point at which the acceptable probability of overfishing goes to zero and the fishery presumably would be closed.

OFL is a limit to be avoided. ABC is set as some fraction of OFL. When ABC is reached the fishery is closed to avoid reaching OFL as noted in the text

PI	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	No	No	N/A	See separate document	
1.1.2	No	No		Scoring issue a: The rationale here is similarly vague about the actual reference points. The basis for the OFL is not mentioned and no arguments are presented as to why it should be considered appropriate for the stock. Scoring issue b: The rationale provided describes aspects of the stock assessment process but does not explicitly refer to the the limit reference point or how it avoids risks to reproductive capacity. Scoring issue c: The rationale provided does not provide evidence in support of the proposed score. This is of particular concern given the lack of clarity about the target reference point mentioned above. Some of the background documents provide clear statements about what sources of uncertainty are and are not addressed in the setting of the ABCs and these should be referenced in the rationale.	SIa. Section inserted from MAFMC SSC Control Rule Doc. SIb. Clarification added SIc. Clarification added on ABC and control rule
1.1.3				N/A	
1.2.1	No	No		Scoring issue a: The harvest strategy is not well described in the rationale or in background. It would be helpful to at least include the spiny dogfish flow chart from the Omnibus amendment that shows the process and also more description from the SSC's 2016 report "Description and	SIa. More information added. Comment added on FMP Amendments SIb. Additional informational on

				Foundation of the Mid-Atlantic Fishery Management Council's Acceptable Biological Catch Control Rule" about the treatment of uncertainty. Note that this flowchart is itseld not clear as to how it uses the results of the monitoring survey and stock assessment, which are key parts of a harvest strategy as defined by the MSC system, so additional description of these should also be added. I agree with the score but the rationale is currently not sufficiently supportive. Scoring issue b: How this strategy has been evaluated is not explained in the rationale or the background. It has been in place and has allowed the stock to rebuild which provides evidence sufficient to reach SG 80 but to reach SG 100 would normally require some form of analytical testing of performance under a range of scenarios (e.g. by MSE). If this has been done then the reference to the results should be provided. Scoring issue d: I agree with the score but the rationale does not adequately support it. The evidence for review and improvement of the harvest strategy would seem to come from the periodic amendments to the FMP, not from the annual adjustments to the ABC which would occur whether or not the harvest strategy itself was amended. Scoring issue e: The rationale would be strengthened by additional information about the results of the compliance activities. Have any shark finning events been recorded? Do inspections detect other infringements?	reference point and evalutaion of stock status has been included. SId. Additional information has been included about amendments to the Spiny Dogfish FMP. SIe. Additional context about measures to ensure shark fining is not taking place have been included.
1.2.2	No	No		Scoring issue a: The rationale does not adequately support the score. It focusses on the recording of catches and compliance with the catch limits whereas this	SI a. Context tying survey results to OFL added

				scoring issue is intended to evaluate the process (the harvest control rule) that converts the information about stock status into those limits. There is one sentence which touches on the key issue: “The quota is established annually based upon the estimated size of the dogfish population and sustainable harvest rates”. This needs to be expanded to provide a better explanation of the harvest control rule that makes this link and uses the population estimate of stock status relative to the reference points to derive the OFL, ABC and ACL. Scoring issue b: The rationale does not adequately support the proposed score. Some of the background documents contain explicit statements about which sources of uncertainty are addressed by the current assessment approach and which are not. These should be cited as evidence rather than just stating that ‘it is difficult to define “a wide range of uncertainties” ‘. Reference to Attachment-B-SSC_Report_21-22_Sept+2010.pdf could be useful in this regard. The in press publication Wiedenmann and Jensen 2017 (CJFAS Uncertainty in stock assessment estimates for New England groundfish and its impact on achieving target harvest rates) may also contain relevant information.	SIb. Added reference.
1.2.3	No	No		Scoring issue b: This scoring issue does not require all possible sources of information to be monitored with a high degree of certainty, just those that are needed to support the HCR. A focus on these sources of data may allow the SG 100 level to be met after due consideration of the uncertainties identified under 1.2.2b mentioned above.	Believe uncertainty with B estimates justify current Score at 80.
1.2.4	No	No		Scoring issue a: The rationale could also make reference to spiny dogfish’s unusual reproductive strategy being explicitly recognised in its designation as ‘atypical’ and therefore requiring a more conservative harvest control rule with lower probabilities of overfishing. Scoring issue b: The rationale should make more direct reference to how the stock status is evaluated relative to the reference points e.g.	SIa. Sentence refering to design of HCR. SI b. SSB data added SIc. Details of how stock assessment takes account

				current biomass vs SSBmax or survey catch rate vs target kg/tow. The current rationale does adequately address the scoring issue. Scoring issue c: The rationale does not adequately support the proposed score. To reach SG 100 would require evidence of how stock assessments provide a probabilistic esitmate of current stock status relative to the reference points. No such evidence is provided in the rationale which describes the process but does not indicate whether the outputs meet this requirement. Scoring issue d: The evidence in the rationale does not support the score. Evidence of testing and of how alternative approaches have been considered should be cited. Describing the process of assessment and review is not sufficient to meet the SG 100 requirements.	uncertainty in aprobalistic way is now included. Sid. Evidence from SAW doc added.
2.1.1	Yes	No		Scoring issue a: All the main retained species are listed as not overfished and not subject to overfishing but the basis for these assessments is not always recorded in the background. For some there are full stock assessments, for others the status is based on average catch rates in surveys, but for some there is no source provided to support statements about stock status. And for those species whose status is based on on “a rate of change in the three year moving average from NEFSC Groundfish Survey biomass” it is unclear what reference points are used to determine status or how these are determined. Nor are the actual survey results provided. The rationale under scoring issue d claims that all have biologically based reference points but examples are not given in the background to support the claim. More information on stock status is needed to support the stated classifications. They are all described as being “under the same stringent management system as for P1 species” but they don’t seem to have the same level of assessments and therefore would not have the same	SIa. Full documentation for assessments and establishment of BRPS is given in Section 3.4.2 Management of Retained Species and 3.4.2 Status of Main Retained Species. Additional information on reference points for each main species has been included in the background to support the rationale for scoring this PI.

				confidence about stock status. The situation for Atlantic cod warrants more information as it could affect their treatment under this and other PIs. They have been moved from a main to a minor species based on a reduced catch but it is not clear whether that is the result of increased discarding, declining stocks, increased catch of other species, or reduced mortality resulting from better management. A more detailed justification for their classification as no longer being a main retained species is needed that considers these aspects and in particular the discarded as well as retained catch. This is particularly important given that both affected stocks are classified as overfished and subject to overfishing. The 4th surveillance audit report also describes catches of over 6,000 mt by the gillnets and 3,800 mt by trawl in 2016 (and much higher levels in previous years) but also reports spawning biomass levels of only 1,966 mt for the GB stock in 2014 and only 2,500 mt for the GOM stock in 2013. At face value these data don't seem consistent with the contention that these UoAs are not hindering recovery.	Atlantic cod was re-categorized from 'main' to 'minor' species on account of the reduction of catch from the UoA. This species is evaluated now as a 'minor' retained species. Information on Atlantic cod is included under Section 3/4/4 Status of Minor Retained Species. Species categorized as 'minor' automatically achieve SG80, and are only required to meet requirements at the 100 SG levels. This PI did not achieve SG100.
2.1.2	No	No		Scoring issue a: There is no description in the rationale of the actual management measures that apply so it is not clear that the fishery even reaches the SG 60 level. More detail is needed than a repeat of the statement about being under the same stringent management system and a description of data collection systems. Scoring issues b, c and d: As previously noted, the evidence to support statements about stock status of the main retained species is not contained in the background and is also needed here to be able to judge the effectiveness of management measures. Scoring issue e: The issue of shark finning is already covered under P1 and should not also be evaluated under P2.	SI. Additional context explaining how Federal Fishery Management plans meet the criteria for SG80 has been included SIc, c and d. the evidence to support the statements about stock status of the main retained species Sharks are a target species but also there are species of sharsk

					that are minor retained categories
2.1.3	Yes	No		Scoring issues a and b: The status of all main retained species is claimed to be known so if SG 100 is not met, is this only because the impacts on some minor species are not known? Scoring issue d: Unclear what is meant by "(e.g. due to changes in the outcome indicator score or the operation of the fishery or the effectiveness of the strategy)". And the subsequent words are repeated.	SI a and b. Information has been included in the rationale SI d. Wording has been fixed
2.2.1	Yes	Yes			
2.2.2	Yes	No		A description of the actual measures is needed to show what is in place, why it is expected to work, how they are being implemented, and whether they are effective.	More information has been included in this PI to explain the management measures for bycatch species.
2.2.3	Yes	No		Scoring issue b: The statement "there are no available stock assessments or status information for all of these species" is ambiguous. Is it meant to say that there are not stock assessments for all species or that there are no stock assessments for any species? If there is no status information for any species then PIs 2.2.1 and 2.2.2 should be re-scored!	There are not stock assessments for all species or that there
2.3.1	No	No		Scoring issue a: Large whales for gillnets - the mortality of Fin whales shown in Table 14 (3.8) exceeds the PBR (2.5). Text does not reflect this. Small cetaceans in trawl fishery - text references gill nets not trawls. Sea turtles for gillnets - there is no comment on which SG levels are met. Scoring issue b: Following CB3.11.3.1, because there are requirements for protection,	Scoring Issue a The total estimated mortality of fin whales of 3.8 surpasses the PBR of 2.5. However, of these mortalities only 1.8 are attributed to fisheries, the remaining moretalities are assgined to vessel strikes. The fishery-related estimated mortality>50%PBR; accordingly the Northeast Sink Gillnet fishery,

				the term 'unacceptable impacts' in this scoring issue must be interpreted only in terms of whether these requirements for protection are met. Therefore scores for issues a and b should be the same as the mortalities described are all from direct impacts. Rationales should therefore also align. At present there are different scores for large whales for gill nets (80 for a, 60 for b), small cetaceans for trawl (60 for a, 80 for b), and turtles for longline (80 for a, 100 for b). These differences in scores should be resolved and the need for the conditions then re-assessed.	which interacting with fin whales is designated under Category I and the Atlantic Large Whale Take Reduction Team (ALWTRT) includes of fin whales, meeting SG80. The text has been modified in the rationale. The confusion for harbor propoise under small cetaceans for the gillnet and trawl fishery has been corrected. Comment on SG met for sea turtles in the gillnet fishery has been included. Scoring Issue b Following CB3.11.3.1 and explantion has been included and the scores for both SI a and SIb are now aligned and conditions have been modified accordingly.
2.3.2	Yes	No		Scoring issue a: If the requirements for protection include compliance with the MMPA, the use of the PBR system and the adoption of Take Reduction Plans, then it is not clear how following this framework is a strategy "which is designed to achieve above national and international requirements for the protection of ETP species" as is required to reach the SG 100 level. The strategy sets a high bar, which is being achieved, but the case has not been made that any of the UoAs are reaching a higher level of protection. The PBRs on there own were clearly stated as not constituting the	Scoring Issue a The score in SIa has been modified from SG100 to SG80. Scoring Issue c: The language in this SI has been modified to match the intent of the SG 100.

				requirements for protection. Therefore, keeping mortalities less than PBR cannot be used as an argument for exceeding requirements for protection and reaching the SG 100 level. Scoring issue c: This is about implementation, not outcomes. Therefore if there is clear evidence that TRTs have been developed and implemented where needed, then UoAs could be scored as meeting SG 100. Whether the strategies are meeting their goals is evaluated under scoring issue d.	
2.3.3	Yes	Yes		Scoring issue a: More information on the actual levels of observer coverage would be useful. There are only general statements about it being low and it is unclear what level is considered low. Is it 1%, 10%, or some other figure? This is relevant to judging whether information is sufficient, particilularly for assessing rarer events like interactions with ETP species.	Informaiton about estimated observer coverage has been included.
2.4.1	Yes	Yes			
2.4.2	Yes	Yes			
2.4.3	Yes	Yes			
2.5.1	Yes	Yes			
2.5.2	Yes	Yes			
2.5.3	Yes	Yes			

3.1.1	Yes	Yes			
3.1.2	Yes	Yes			
3.1.3	Yes	Yes			
3.1.4	Yes	Yes			
3.2.1	Yes	Yes			
3.2.2	Yes	Yes			
3.2.3	Yes	Yes			
3.2.4	Yes	Yes			
3.2.5	Yes	No		The fishery is scored as meeting one of two scoring issues at the SG 100 level which would warrant a score of 90 not 85.	Score corrected.

Any Other Comments

Comments	Conformity Assessment Body Response
The last full stock assessment was apparently conducted in 2010. The annual fishery-independent surveys provide the key indicator of stock status between assessment updates and these results are a key input to the assessment. The results of the 2017 survey are now available and provide a very low recent estimate of abundance for spiny dogfish. “The female SSB estimate for 2017 of 24.4 kt is the lowest in the time series.” These results may not have been available to the assessment team when it conducted the majority of its evaluation but it should be taken into account now. A survey result that was close to previous estimates would not be important to include but there are potentially major implications for scores against Principle 1 PIs from this very low result.	Information about the assessment update published in 2011 with catch data of 2010 and results from the 2011 trawl survey have been now included in the rationales of the report.

8.3.2 Peer Review 2.

Overall Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes/No** **Yes**	**Conformity Assessment Body Response**
Justification: The assessment team has appropriately evaluated the US spiny dogfish fishery. For PI 1, there is ample information on this fishery regarding the stock status, fishing pressure, reference points, harvest strategy and control rules to make an informed assessment of the fisheries for SD. In a few PIs (1.1.1, 1.2.2, 1.2.4), I requested more information or detail to justify the scoring (see bolded text under Justification in the Performance Indicator Review). For PI 2, generally the information used was extensive to evaluate retained, bycatch species, and ETP species. However in some cases, I think that additional review of the scores listed is needed as they don't always correspond to the justification text provide. For PI 2.3.1, for the 1st SI for fishes, the provided information does not adequately explain why the scores of SG80 for gillnet and trawl were assigned or the SG100 for longline. 2.3.1, For fishes, the provided information does not adequately explain why the scores of SG80 for gillnet and trawl were assigned or the SG100 for longline. The statement "The data available on UoA interactions, the findings of the 2013 Biological Opinion, and estimated high post capture survival rates provide sufficient confidence to achieve the SG80. Due to uncertainty in post capture survival and relatively low observer coverage, SG100 cannot be met" is not specific to any UoA. For the 2nd SI: for large whales and small cetaceans the scoring justification for gillnets and longlines is fine, but no justification is provided for the trawl UoA score of SG80. For turtles, justifications are fine for the gillnet and trawl UoAs, but no specific justification for the SG100 score for the longline UoA is provided. For fishes, the certifiers state "the gillnet, bottom trawl and bottom longline UoAs meet SG80 for the fish scoring element", but no specific justification for the SG100 score for the longline UoA is provided. This should be added. 2.3.3, For the SG60 gillnet UoA, the certifiers note that "the majority of mortalities for right whales has no identified gear type." With that information, it is difficult to understand how they arrived at the SG60 score only for gillnet. I think that it would be helpful to explain that there is a higher rate of entanglement *assumed* (because from the numbers in the report it's hard to determine this) for gillnets For PIs 2.5.2 & 2.5.3 I noted potential typos in the scoring versus the text. For PI3, the team has effectively accessed the information available on the management system structure, goals, incentives and monitoring and enforcement protocol to justify the high marks for the spiny dogfish fishery.		PI 2.3.I now scores have been separated by scoring elements and by UoA to clearly indicate how the team arrived at each score. The scoring rationale for PI 2.3.1 SIa. For fish has now been expanded PI 2.3.3. Additional information has been included to indicate why a SG60 was given to gillnet for the large whale scoring elements. PI 2.5.2 and 2.5.3 scoring types have been corrected.

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?	**Yes/No** **Yes**	**Conformity Assessment Body Response**
Justification: The conditions specified would allow the PIs 2.3.1 and 2.3.3 to achieve SG80 within 4 years. For Condition 2-1, the 4 year plan, (1) review the level of direct impact of the trawl fishery on long-finned pilot and determine whether the information basis is sufficient to draw confident and robust conclusions to implement measures to reduce take, (2) undertake additional monitoring, review or research conducted to inform the development of management measures to reduce take of pilot-fin whales by the trawl fishery, (3) evaluate, propose and undertake consultation on management measures to reduce take of pilot-fin whales, and (4) implementation of management measures to meet requirements to reduce take long-finned pilot whales, will be enough to provide evidence that: • The effects of the bottom trawl UoA on long-finned pilot whales are known and are highly likely to be within limits of national and international requirements for protection of ETP species AND that direct effects of this UoA are highly unlikely to create unacceptable impacts to long-finned pilot whales**.** For Condition 2-3, the 4 year plan, (1) identify main information gaps on mortality of Atlantic right whales by the gillnet fishery, (2) present evidence of implementation of data collection actions and (3) continued success or modification of these programs, and (4) evidence of additional mitigation efforts, will be enough to provide evidence that: • The information is sufficient to measure trends and support a full strategy to manage impacts on Atlantic right whales. While no specific milestones are provided for Condition 2-2, the plan for Condition 2-3, should also address Condition 2-2 and provide the necessary information to determine that: • The direct effects of the gillnet UoA are highly unlikely to create unacceptable impacts to Atlantic right whales**.** **However, a plan similar to that proposed for assessing the effects of the bottom trawl on long-finned whales (Condition 2-1) may be an appropriate supplement. Consider adding milestones specific to Condition 2-2.**		Milestones have now been included in Condition 2-2

Performance Indicator Review

PI	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	Yes	No, see 2nd SI.	NA	For PI 1.1.1: **The stock is at a level, which maintains high productivity and has a low probability of recruitment overfishing**, there are 2 SIs. For the 1st SI, there is a high degree of certainty that the stock is above the point where recruitment would be impaired. An SG100 is justified because the total removals in 2010 corresponded to an F estimate that was well below Fmsy. Also, in the assessment update, the NEFSC estimated a 100% probability that overfishing was not occurring (F2010 < Fthreshold). With respect to biomass, the 2011 SSB estimate was about 6% above SSBmax and in the assessment update, the NEFSC estimated a 100% probability that the stock is not overfished. **For the 2nd SI, the certifiers need to demonstrate that there is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years. While they have cited the 2010 assessment report stats for the 1st SI, they have not provided any information on the length of time that spiny dogfish has been above or at the target ref point (e.g., info from past assessments prior to 2010? Is this only based on the assessment in 2010 and the survey data through 2015?). While 2010-2015 may qualify as 'recent, there is not enough information in the justification to understand whether this is the case. Overall, this SI is asking about trend, and more information**	SIa. Peer Reviewer agrees with rationale and scoring, no response required. SIb. The Stock was severely overfished and was managed under a rebuilding program until 2010 when it was deemed recovered by NMFS. Since this the Biomass estimates have been fluctuating around the target. See fig 5 above. Additional information has been added to SIb to support the rationale.

				should be added to the certifiers' justification in order to clearly assess the SG100 qualification.	
1.1.2	Yes	Yes	NA	For PI 1.1.2: **Limit and target reference points are appropriate for the stock**, there are 3 relevant SIs. For the 1st SI, as noted in PI 1.1.1, the ACL is the target RP and is the primary management tool, and the OFL is the limit RP, which are both estimated with uncertainty. It is clearly stipulated under the MSFCMA that the ACL must be set less than or equal to the ABC (to account for management uncertainty), which must be set less than or equal to the OFL. National Standard 1 of the MSFCMRA requires that the ABC prevent overfishing (i.e., when the fishing mortality rate exceeds that which produces the maximum sustainable yield, or FMSY), while still attempting to achieve optimum yield for the fishery. To prevent overfishing, the ABC must have a probability of overfishing <50%. Scientific uncertainty must also be considered in the ABC. Importantly, the ABCs constrain the council's ACL, which may not exceed the ABC. Therefore, SG80 (the highest for this SI) is met. For the 2nd SI, it can be said that the limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of precautionary issues because the stock assessment is based on mature female stock biomass. Therefore, SG100 is met. For the 3rd SI, the certifiers note that the target reference point is such that the stock is maintained at a level consistent with BMSY or some measure or surrogate with similar intent or outcome. However, the target and reference points do not take into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty. Since the assessment of spiny dogfish is a single species assessment, the SG80 score is justified.	Peer Reviewer agrees with rationale and scoring, no response required.
1.1.3	NA	NA	NA	NA	
1.2.1	Yes	Yes	NA	For PI 1.2.1: **There is a robust and precautionary harvest strategy in place**, there are 5 SIs. For the 1st SI, SG100 is justified as the harvest strategy is responsive to the state of the stock and designed to achieve stock management	SIa. Peer Reviewer agrees with rationale and scoring, no response required.

				objectives reflected in the target and limit reference points. This is exemplified by the joint FMP of the MAFMC and the NEFMC and the setting of the ACL<ABC<OFL precautionary approach. There is also a monitoring protocol and data collection approach that is used to assess when the quota is met in order to close the fishery. The OFL has never been approached. For the 2nd SI, the performance of the harvest strategy is fully evaluated annually and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels (e.g., the OFL has never been approached). Therefore, SG100 is met. For the 3rd SI, SG60 (the only measure) is met as fishery dependent data are recorded by observers, and dockside landings are quantified to assure the quota is not exceeded. For the 4th SI, SG100 is met (the only measure) as the harvest strategy is reviewed and adjusted annually. Additionally, since the stock was declared recovered in 2010 the quota harvest strategy has resulted in landings that are on target or below target every year. For the 5th SI, there is a high degree of certainty that shark finning is not taking place as it is allowed in this fishery and observers are on board to monitor compliance with the 2000 Shark Finning Prohibition Act.	
1.2.2	Yes	No (see the 1st SI)	NA	For PI 1.2.2: **There are well-defined and effective harvest control rules in place**, there are 3 SIs. For the 1st SI, while I agree that "well defined harvest control rules are in place that are consistent with the harvest strategy" **the justification provided by the certifiers doesn't explain whether there are measures in place to "ensure that the exploitation rate is reduced as limit reference points are approached".** They do note that when the annual quota is fully harvested, the dogfish fishery will be closed for the remainder of the fishing year and that commercial	The protocol is precautionary to prevent reaching the OFL. The ABC is set below the OFL. The fishery is closed when the ABC (expressed as a quota) is reached. Thus there do not need to be measures to reduce catch

				landings are not permitted following a closure announcement. However, there's not mention of whether there are any protocols in place to slow or reduce the exploitation rate. In order to qualify for SG80 (the highest SG), this information should be provided. For the 2nd SI, the certifiers note that the MSFCMA requires that FMPs set the ABC well below the OFL to account for assessment uncertainty. Then it requires the average % overage over the previous years to be subtracted from the ABC to yield an annual catch target (ACT) to account for management uncertainty. This confirms the SG80 score. The certifiers state that assigning SG100 is not warranted due to the inability of the HCR to account for "all" sources of uncertainty, but it seems like certain *types* of HCRs might be able to do this better than others. For example, ramped HCRs based on the relationship between biomass and effort have been found to be more responsive than a step HCR. Obviously this is not applicable here, but **perhaps the certifiers can explain more about the responsiveness of the HCR for spiny dogfish in providing their response.**	as the ABC is approached. As noted there never has been an overage, and the quota has not been met in recent years See additions to PI 1.2.2 SI a regarding closing the fishery when quota is reached. Point is quota is set well below the overfishing level.
1.2.2	Yes	No (see the 1st SI)	NA	For the 3rd SI, given that since the stock was declared recovered in 2010, the quota harvest strategy has resulted in landings that are on target or below target every year and the fact that the overfishing limit has never been approached, this SI has been met at SG100.	See changes to SIa, (Ref to Fig 5)
1.2.3	Yes	Yes	NA	For PI 1.2.3: **Relevant information is collected to support the harvest strategy**, there are 3 SIs. For the 1st SI, there is information in the stock assessments and from the NMFS Observer and Vessel Trip reporting, and Port Sampling programs as well as other external reports to justify SG100. For the 2nd SI, to meet SG80, it's necessary that stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule. This seems justified and I agree with this precautionary scoring based on the fact that not all sources of uncertainty can be assessed/corrected for.	SIa. Peer Reviewer agrees with rationale and scoring, no response required.

				For the 3rd SI, data are collected and analyzed on US domestic commercial landings and discards as well as Canadian commercial landings and US recreational landings representing good information on total removals and justifying SG80.	
1.2.4	Partially—See 3rd SI	Partially—See 3rd SI	NA	For PI 1.2.4: **There is an adequate assessment of the stock status**, there are 5 SIs. For the 1st SI, the assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery. Given the fact that fishing mortality on spawning females in the past led to the collapse of the fishery, it is key that the reference points for spiny dogfish are based on the female SSB and the rate of fishing mortality applied to the fully vulnerable stock. For the 2nd SI, the assessment estimates stock status relative to reference points so this SG60 (the only SG) is met. For the 3rd SI, I agree with the SG100 score, **but the justification of the certifiers should note details on the statistical and probabilistic nature of the reference points.** For the 4th SI, assessments are peer-reviewed, vetted, and may be accepted or rejected. Therefore, SG100 is met.	SIc. Section added on biomass estimates and incorporation of sampling variability of surveys.
2.1.1	Yes	Yes	NA	For 2.1.1: **The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species**, there are 4 SIs. For the 1st SI, the main retained species are highly likely to be within biologically based limits, but not all minor species are within biologically based limits, so SG80 is warranted for all UoAs. For the 2nd SI, target reference points are not defined for retained species (although they are for all main retained species, so the SG 100 is not met. **Also, a minor point: can you note here which ones? I**	Peer Reviewer agrees with rationale and scoring, no response required.

				know that this was assessed as 'all or none' but would be helpful to know. The 3rd SI is NA as none of the main retained species for all three UoA are outside the limits. For the 4th SI, the certifier notes that Minor Species not managed under an FMP are represented in the annual catches by 2000 individuals or less from a small area and are not likely to be posing a risk of serious or irreversible harm or preventing recovery of these species.	
2.1.2	Yes	Yes	NA	For PI 2.1.2: **There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species**, there are 5 SIs. For the 1st SI, the management of all main species (regardless of UoA or gear) falls under the same stringent management system as for the P1 species. Therefore SG80 is met, but because not all minor species are under an FMP, SG100 is not met. For the 2nd SI, SG 80 is justified as many of these stocks have been rebuilt, and none of the main species is overfished nor is overfishing occurring. Therefore SG80 is met, but because not all minor species are under an FMP, SG100 is not met. For the 3rd SI, there is clear evidence that the strategy is being implemented successfully sd under management many of these stocks have been rebuilt, and none of the main species is overfished nor is overfishing occurring. SG100 is justified. For the 4th SI, there is some evidence that the strategy is achieving its overall objective, as many of these stocks have been rebuilt, and none of the main species is overfished nor is overfishing occurring. This justifies the SG100 (the only SG). For the 5th SI, there is a high degree of certainty that shark finning is not taking place—this is justified as the same laws, monitoring and	Peer Reviewer agrees with rationale and scoring, no response required.

				enforcement for the P1 species apply to the P2 species. Therefore, the SG100 is justified.	
2.1.3	Yes	Yes	NA	For PI 2.1.3: **Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species**, there are 4 SIs. For the 1st SI, for all retained species the information on catch is accurate and verifiable according to the certifier. However, the consequences of catches of those species not managed under an FMP is not verified. A score of SG80 is warranted. For the 2nd SI, the information available is sufficient to estimate outcome status with respect to biologically based limits, but not with a high degree of certainty for all retained species—especially those not managed under an FMP. For the 3rd SI, the available information is adequate to support a partial strategy to manage main retained species, but not for all retained species—especially those not managed under an FMP. For the 4th SI, sufficient data continue to be collected to detect any increase in risk level, but nor for all retained species—especially those not managed under an FMP.	Peer Reviewer agrees with rationale and scoring, no response required.
2.2.1	Yes	Yes	NA	For PI 2.2.1: **The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups**, there are 3 SIs. For the 1st SI, there are no main bycatch species and it isn't certain that **all** minor bycatch species are within biologically based limits, so the SG80 score is justified. The 2nd SI is NA as there are no main bycatch species. For the 3rd SI, the Northeast Fisheries Observer Program, the ESA designations, gear modifications to reduce bycatch and collaborative	Peer Reviewer agrees with rationale and scoring, no response required.

				research initiatives with fisheries such as the Bycatch Reduction Engineering Program (BREP) are all evidence that there are numerous measures and practices in place expected to result in the fishery not causing the bycatch species to be outside biologically based limits or hindering recovery. Therefore, SG60, the only SG, is met.	
2.2.2	Yes	Yes	NA	For PI 2.2.2: **There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations**, there are 4 SIs. For the 1st SI, the 3 UoAs operate as part of federal fisheries that have observer monitoring of bycatch and management protocols for federally managed species or other measures for non-federally managed species, I agree this is a cohesive strategy, meeting SG100. For the 2nd SI, the SG80 is met on the basis of the stock status of the main species. For the 3rd SI, since the observer program is in place and the percentage of minor bycatch species across all UoA is less than 1% of catch this suggests that the FMPs for those species that contribute to a large share of the catch are working. SG80 is met. For the 4th SI, the U.S. National Bycatch Report notes details on the operation of the observer program, and the inclusion of management measures for those species with high bycatch and/or vulnerable status, which demonstrates that the strategy is achieving is achieving its overall objective.	Peer Reviewer agrees with rationale and scoring, no response required.
2.2.3	Yes	No (see SI 4)	NA	For PI 2.2.3: **Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch**, there are 4 SIs. For the 1st and 2nd SIs, the observer program provides accurate and verifiable information on the catch of all bycatch species. However, as there is no status information for many of the bycatch species and no way to *quantitatively* estimate the status, the SG100 is not met, but SG80 is justified.	Sid. The team agrees with the peer reviewer, score for this indicator has been changed from SG100 to SG80.

				For the 3rd SI, there is adequate information collected from observers for federally managed species, but not for all bycatch species, therefore SG80 is warranted. For the 4th SI, the certifier notes that coverage and consistency of the observer program provides sufficient information to assess mortalities of all bycatch species so that SG100 is met, **but I question if this is truly the case for ALL bycatch species based on what was noted for the 3rd SI, that adequate information collected from observers for federally managed species, but not for all bycatch species—should this be an SG80 (although this is noted as NA)??**	
2.3.1	No (see 1st and 2nd SIs).	No (see 1st and 2nd SIs).	Yes	For PI 2.3.1: **The fishery meets national and international requirements for the protection of ETP species. The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species**, there are 3 SIs. For the 1st SI, the certifiers note that the PBR defined in the MMPA and the ITS for ESA species are not quantitative limits, but that since the MSC doesn't strictly define 'limits', they define 'within limits' to be in compliance with requirements to reduce take and that this is satisfied when there are requirements to reduce take in place for species above the PBR or ITS. • For large whales, only right whales have rates of mean annual serious injury and mortality above the PBR. However, the ALWTRP has requirements in place to reduce take. The effect of each of the UoAs is known and within acceptable limits or has requirements in place to reduce take. The gillnet and trawl UoA is scored at SG80 due to uncertainty around minke whales, humpback and right whales. • For small cetaceans, as there are no documented potential interactions for the bottom longline UoA with small cetaceans, SG100 is justified. For the gillnet UoA, only certain species of bottlenose dolphins may be above the PBR, but there is a Bottlenose Dolphin Take Reduction Plan in place so SG80 is justified. For the trawl UoA, long-finned pilot whale mortality is above the PBR and there is significant uncertainty in the assessment. Additionally, no requirements	No response required in this section, see responses to comments for PI 2.3.1 in the following sections

				are being implemented or developed to reduce take of bottom trawl fisheries so this UoA gets SG60.	
2.3.1 (cont.)	No (see 1st and 2nd SIs).	No (see 1st and 2nd SIs).	Yes	• The pinniped justification for scoring is fine, but the Trawl SG should read "SG80" not "SG60". • For turtles the justification seems fine for the trawl and gillnets is fine, but the scoring for the trawl UoA should read "SG80" not "SG60". Since bottom longline is not considered to be an important source of interaction and mortality for sea turtles, meeting SG80 is considered and uncertainty in data on interactions and the level of ongoing interactions prevents the UoA from meeting the SG100 criteria. The longline UoA should read "SG80" not "SG100". • **For fishes, the provided information does not adequately explain why the scores of SG80 for gillnet and trawl were assigned or the SG100 for longline. The statement "The data available on UoA interactions, the findings of the 2013 Biological Opinion, and estimated high post capture survival rates provide sufficient confidence to achieve the SG80. Due to uncertainty in post capture survival and relatively low observer coverage, SG100 cannot be met" is not specific to any UoA.**	The typo has been corrected, for SIa in the 'Pinnipeds' element, the Trawl UoA now reads SG80.
2.3.1 (cont.)	No (see 1st and 2nd SIs).	No (see 1st and 2nd SIs).	Yes	For the 2nd SI: • For large whales, the scoring justification for gillnets and longlines is fine, **but no justification is provided for the trawl UoA score of SG80.** • For small cetaceans, the scoring justification for gillnets and trawls is fine, **but no justification is provided for the longline UoA score of SG80.** • For pinnipeds, all scoring is justified. • For turtles, justifications are fine for the gillnet and trawl UoAs, **but no specific justification for the SG100 score for the longline UoA is provided. Is the rationale that overall estimated mortalities are available for gillnet and trawl fisheries and not for the longline? Should be made explicit.**	SIb. The scoring justifications have now been organized by scoring element and UoA to ensure justification is provided for each UoA.

				• For fishes, the certifiers state "the gillnet, bottom trawl and bottom longline UoAs meet SG80 for the fish scoring element", but **no specific justification for the SG100 score for the longline UoA is provided. Please add.** For the 3rd SI, indirect impacts (trophic interactions and habitat disturbance) have been considered for ETP species via stock assessments, designation of critical habitat under the ESA, and various studies of the trophic ecology of the NES LME and role of forage species justifying the SG80 score.	
2.3.2	Yes	Yes	NA	For PI 2.3.2: **The fishery has in place precautionary management strategies designed to:** **Meet national and international requirements;** **Ensure the fishery does not pose a risk of serious harm to ETP species;** **Ensure the fishery does not hinder recovery of ETP species; and** **Minimise mortality of ETP species.** There are 4 SIs. For the 1st SI, there is a comprehensive strategy in place for managing the fishery's impact on ETP species, including measures to minimize mortality, which is designed to achieve above national and international requirements for the protection of ETP species: • Marine mammals: MMPA; stock assessments and PBRs • Sea turtles and fish: the ESA and a 2013 BiOp that includes an incidental take statement that includes an expected number of interactions and required 'reasonable and prudent measures' to be undertaken by the fisheries to minimize impacts on sea turtles and Atlantic sturgeon Therefore the SG100 is met for all UoAs. For the 2nd SI, the MMPA and ESA strategies are mainly based on information directly about the fishery and the marine mammal species involved. Also the use of the observer program and abundance surveys (mammals) or nesting surveys (turtles) provide quantitative data which support a high confidence that the strategy works. Therefore SG100 is met for all UoAs	Peer Reviewer agrees with rationale and scoring, no response required.

2.3.2 (cont.)	Yes	Yes	NA	For the 3rd SI, for mammals there is no clear evidence that all TRTs have meet their goals it is considered that the strategy is not being implemented successfully for gillnets or trawls. For turtles and fish, the use of TEDs is considered to be a sign of success, but uncertainty in the status of loggerheads, low observer coverage, the ongoing interactions of the fleet with sea turtles, and the fact that the incidental take statement is not gear specific means SG80 is warranted. For the 4th SI, the MMPA has not been successful at reducing the take of all marine mammals under the PBR or the long-term goal is to reduce bycatch to levels approaching a zero mortality. Also, since the annual incidental take for loggerheads by trawls has been exceeded, the ESA is not considered to be achieving its objective for sea turtles. Therefore neither the MMPA or the ESA meet SG100 (the only SG).	Peer Reviewer agrees with rationale and scoring, no response required.
2.3.3	Yes (but see 1st SI)	No (see 1st SI)	Yes	**Relevant information is collected to support the management of fishery impacts on ETP species, including:** **Information for the development of the management strategy;** **Information to assess the effectiveness of the management strategy; and** **Information to determine the outcome status of ETP species.** There are 3 SIs that evaluate large whales, small whales, pinnipeds, sea turtles, and fishes. For the 1st SI, the certifier notes that the mortality and impact of each UOA on these groups is determined primarily from the observer data, where coverage is low, but which can be used to estimate total impacts. The longline scores for each of the species groups is SG80, for trawl is SG100 except for large whales (SG80), and for gillnets is SG100 except for large whales (SG60). While justification is provided for the gillnet SG60 score for large whales, insufficient explanation is provided for how the other scores were achieved specifically. **For the SG60 gillnet UoA, the certifiers note that "the majority of mortalities for right whales has no identified gear type." With that information, it is difficult to understand how they arrived at the SG60 score only for gillnet. I think that it would be helpful to explain that there is a higher rate of entanglement *assumed* (because from the numbers in**	Additional explanation has been included to SI a to address that entanglements are biased low and to justify why only the gillnet UoA is scored at SG60 for the marine mammal scoring element.

				the report it's hard to determine this) for gillnets and then something like the following: "Since 2010 no entanglement event has been attributed to gillnet fisheries in the US. However, due to the high risk and susceptibility of right whale entanglement in gear employed by gillnet fisheries, the low PBR number, and the numerous records prior to 2010 of interactions with gillnet fisheries in the US. For these reasons it is not possible to assert that it's highly unlikely that the gillnet fishery in the US is not creating unacceptable impacts to the right whale population."	
2.3.3 (cont.)	Yes (but see 1st SI)	No (see 1st SI)	Yes	For the 2nd SI, the scoring seems justified as there are data collected from the observer program, stranding reports and surveys on abundance of ETP species are sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species, but it is the uncertainty in estimating population status for all ETPs and in quantifying mortalities from specific gears that prevents an SG100. For the 3rd SI, **similar to the 1st SI, it would be helpful to provide more specifics on why the gillnet gear is more harmful to right whales (when it has been stated that it's not been possible to this point to attribute specific entanglement mortalities to a particular gear).** Overall though, I agree "that current information is not sufficient to support a full strategy to manage impacts on right whales from gillnet fisheries."	Additional information has been provided and a reference to SIa of the same PI.
2.4.1	Yes	Yes	NA	For PI 2.4.1: **The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function**, there is 1 SI. SG80 requires that the fishery be highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. With respect to the trawl UoA, based on the fact that the area where the trawl operates is ~20% of the total area and that there are closed areas to protect essential fish habitat, and because the adverse effects of otter trawls has significantly decreased over the last two decades, SG80 is met for this fishery. This	Peer Reviewer agrees with rationale and scoring, no response required.

				justification seems solid for this UoA even though recovery times may be >5 years in affected areas. With respect to the longline and gillnet UoAs, recovery values for biological and structural features are mostly under 2 years, but there is a lack of specific information on the interaction of these gear types with habitat features, so SG80 is justified.	
2.4.2	Yes	Yes	NA	For PI 2.4.2: **There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types**, there are 4 SIs. For the 1st SI, there is a partial strategy in place for managing impacts on habitat, primarily founded in Essential Fish Habitat (EFH) requirements in the MSFCMA. However, since the EFH designations and considerations do not extend beyond federally managed species, and non-federally managed (i.e. state or ASFMC managed) fisheries are not required apply the EFH-driven habitat management strategy, it cannot be said that there is a strategy in place for all MSC UoAs and non-MSC UoAs. SG80 is warranted. For the 2nd SI, there are studies on recovery of habitats in areas closed to bottom gears that provide some objective basis for confidence that the partial strategy will work, meeting the SG80. For the 3rd SI, lines of evidence for implementation success are the closure areas, gear restrictions, and implantation of the reviews of EFH impacts conducted via the FMPs, and the current development of the Omnibus Essential Fish Habitat Amendment 2. Across the UoAs these are felt to justify SG80. *Clear* evidence is hard to demonstrate and so this precautionary determination is warranted. For the 4th SI, the certifiers note that there aren't any measurable thresholds for achieving the requirements to minimize adverse effects, so it's not possible to determine whether the strategy is achieving its objective. SG100 cannot be met.	Peer Reviewer agrees with rationale and scoring, no response required.

2.4.3	Yes	Yes	NA	For PI 2.4.3: **Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types**, there are 3 SIs For the 1st SI, the certifiers note that there is a Habitat Protection Index calculated for top habitats identified as vulnerable to adverse fishing impacts based on an estimate of EFH protected in the given alternative over the total amount of EFH designated. Because "Priority areas were selected on the basis of the amount of EFH designations covered in an area relative to fishing effort in the same area", it can be said that the nature, distribution and vulnerability of all main habitat types in the fishery are known at a level of detail relevant to the scale and intensity of the fishery, but perhaps not that the distribution of habitat types is known over their range. Therefore, the SG80 is warranted. For the 2nd SI, in terms of impacts, the SASI modeling does not differentiate between the gear specifically for different trawl and gillnet configurations. But, information available from observational and experimental studies of bottom trawls identifies the impacts of the UoA on its main habitats of interaction. The spatial extent of interaction and timing and location of use of fishing gear is generally available from VMS and VTR data, so SG80 is warranted. For the 3rd SI, the information noted for the 1st and 2nd SIs is sufficient to detect any increase in risk to habitat. However, the fact that fine-scale temporal changes have not been measured warrants the SG80 score.	Peer Reviewer agrees with rationale and scoring, no response required.
2.5.1	Yes	Yes	NA	For PI 2.5.1: **The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function**, there is 1 SI. The certifiers find that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. This finding is based on the fact that spiny dogfish is not a key species for ecosystem functioning. However, the top down effects of fishing are believed to have a significant effect on the ecological community, and the	Peer Reviewer agrees with rationale and scoring, no response required.

				ecosystem is also undergoing significant changes due to the changing ocean climate. Because there is no readily available evidence that the UoAs are highly unlike to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm, SG100 is not met and the SG80 is warranted.	
2.5.2	Yes	Yes, but see 1st SI (typo?)	NA	For PI 2.5.2: **There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function**, there are 4 SIs. For the 1st SI, the certifiers provide evidence of the Ecosystem Approach, which is under development by the Councils and additionally note that there are existing strategies targeted at the ecosystem components reflected in Principles 1 and 2 that together work to maintain ecosystem structure and function. For this reason it can be claimed that a partial strategy is in place, and they note that this is the case for each of the UoAs. **However they claim that SG100 is met, which I don't feel is justified. I think that this may just be a typo though?** For the 2nd SI, the partial strategy takes into account available information from the fishery from stock assessments, SBRM reports and EFH designations. Because the ecosystem strategy operates at a federal level and influences all the FMPs that are included in the three UoAs involved in this fishery, it is considered that this partial strategy is expected to restrain impacts of the fishery on the ecosystem, meeting SG80. For the reasons stated for the 1st SI (that the Ecosystem Approach is still under development, SG100 is not met. For the 3rd SI, ongoing monitoring linked with management mechanisms provides an objective basis for confidence that the partial strategy will work. However, as noted above much of this management focuses on particular components of the ecosystem rather than the overarching ecosystem structure and function. There is not yet a cohesive ecosystem-based management plan has not been operationalized or tested, so SG80 is warranted.	SIa. The typo has been corrected.

2.5.2	Yes	Yes, but see 1st SI (typo?)	NA	For the 4th SI, there is some evidence that the partial strategy is being implemented successfully and PIs 2.1.2, 2.2.2, 2.3.2, and 2.4.2 are examples of management measures implemented to meet objectives for each of these ecosystem components. SG80 is warranted but not SG100.	Peer Reviewer agrees with rationale and scoring, no response required. In MSC CR v1.3 there is no scoring guidepost for SIa at SG100.
2.5.3	Yes	Partially, see 3rd, 4th, and 5th SIs. Typos in 2nd SI	NA	For PI 2.5.3: **There is adequate knowledge of the impacts of the fishery on the ecosystem**, there are 5 SIs. For the 1st SI, the certifiers note the availablility of the Ecosystem Status Report and supporting information provided for PIs 2.1.3, 2.2.3, and 2.4.3. SG80, the highest SG is met. For the 2nd SI, the most important evidence for scoring this SG is the fact that the management system considers fishery impacts on 'valued ecosystem components' with each management action, and particular impacts by the fishery may be investigated in detail when considering alternative management actions (such as closures or gear modifications. One external study on the food web was also cited as an 'investigation'. However, I agree that the claim for the detailed investigation of all main interactions is not met. **Note: the guidepost descriptions for SG80 and SG100 are mixed up.** For the 3rd SI, the certifiers assign a score of SG80 because they feel that "the main functions of the Components (i.e., target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known." However, it is not clear that *all* retained or bycatch species would be covered by this as not all minor species are federally managed. **Could you clarify if this should be the case here and if non-federally managed species meet the SG requirements? I agree that all main species evaluated under Retained and Bycatch considerations are federally managed, and are thus subject to their own FMPs, regular stock assessment, and EFH designations.**	Typo for SIb SG100 has been fixed. Sic. For non-federally managed bycatch species catch/discard information is collected, allowing to monitor should the contribution of catch/discards of these minor bycatch species becomes sufficiently important to be directly managed. This information has been included in the justification.
2.5.3 (cont.)				For the 4th SI, the certifiers find that SG100 is met, however SG100 requires that information be adequate for all elements of **all** components, including **minor elements**. Secondary minor elements	SId. Information on catch/discards of minor bycatch species is

				include several species that are not subject to federal or state management, and for which there are no stock assessments available. **For this reason, it seems more reasonable that SG80 is met, but not SG100.** For the 5th SI, I agree that in the NE region, there's sufficient information available and collected to detect any increase in risk level and that there may be information to support the development of a strategy. **However I would note that since such a strategy doesn't exist, it's difficult to judge whether it's sufficient. A score of SG80 might be more conservative?**	collected, which allows the main consequences for the ecosystem to be *inferred,* meeting SG100.
3.1.1	Yes	Yes	NA	For PI 3.1.1: **The management system exists within an appropriate legal and/or customary framework which ensures that it:** **Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and** **Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and** **Incorporates an appropriate dispute resolution framework.** There are 4 SIs for this PI and each of them can be justified using the guidelines and mandates of the MSFCMA. The score of 100 on this PI is warranted by the high marks for each of the SIs.	Peer Reviewer agrees with rationale and scoring, no response required.
3.1.2	Yes	Yes	NA	For PI 3.1.2: **The management system has effective consultation processes that are open to interested and affected parties. The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties**, there are 3 SIs. For the 1st SI, the certifier notes that the roles and responsibilities of the respective Councils, their committees and staff, and the regional NMFS science centers are clear and understood by all relevant parties. They provide as justification the key roles and functions for spiny dogfish of the National Marine Fisheries Service ("NMFS") (NOAA), Northeast Fisheries Science Center (NEFSC/Woods Hole), Mid-Atlantic Fishery Management Council ("MAFMC"), Scientific and Statistical Committee ("SSC") of the MAFMC, and the Spiny Dogfish Committee of the MAFMC. Therefore, SG100 is met.	Peer Reviewer agrees with rationale and scoring, no response required.

				For the 2nd SI, the certifier notes that the Council process is fully public and there are regular opportunities for public involvement. Public notification procedures are specified by law and all meetings must be open to the public and that final rules include responses to public comments, explaining how input was used. Therefore, SG100 is met. For the 3rd SI, as per all US managed fisheries, the consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement. In addition to publically announcing all meetings, interested parties can attend council meetings in person or by way of conference calls and webinars and members of council advisory panels have their meeting expenses paid by the councils. Therefore, SG100 is met.	
3.1.3	Yes	Yes	NA	For PI 3.1.3: **The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach**, there is 1 SI. To meet SG100, clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within and required by management policy. The spiny dogfish fishery is managed under an FMP that includes catch limits and accountability measures that are intended to insure that overfishing can't reduce a stock below the level that will produce MSY on a continuing basis as mandated by the MSFCMA.	Peer Reviewer agrees with rationale and scoring, no response required.
3.1.4	Yes	Yes	NA	For PI 3.1.4: **The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing**, there is 1 SI. The certifiers assign a score of 100, indicating that the management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure they do not contribute to unsustainable fishing	Peer Reviewer agrees with rationale and scoring, no response required.

				practices. As noted by the certifiers, the statutory management planning by the Council gives certainty about the rules and goals of management in accordance with principles of sustainability, meeting the SG60 and SG80 scoring issues. The justification for the SG100 is that the Planning Development Team (PDT) of the Council conducts a regular review of the management plan to determine if objectives are being met. Action is taken through amendments to the Spiny Dogfish Fishery Management Plan and incentives for sustainable fishing are explicitly considered through Accountability Measures including reductions in quotas in subsequent years if the Annual Catch Limit is exceeded, meeting the requirements of the SG100 scoring issue.	
3.2.1	Yes	Yes	NA	For PI 3.2.1: **The fishery-specific management system has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2**, there is 1 SI. To meet this at a score of 100, the fishery must have well-defined and measurable short and long-term objectives, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery-specific management system. The certifiers cite the objectives of the 1999 MAFMC & NEFMC Spiny Dogfish Fishery Management Plans and the 2002 ASMFC Interstate Fishery Management Plan for Dogfish which are clear and specific to the sustainable management of this fishery.	Peer Reviewer agrees with rationale and scoring, no response required.
3.2.2	Yes	Yes	NA	For PI 3.2.2: **The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery**, there are 5 SIs. For the 1st SI, there are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives through the MSFCMA. Therefore SG 80 (the highest SG possible) is met. For the 2nd SI, the MAFMC, the NEFMC, and the NEFSC, use decision-making processes that respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent,	Peer Reviewer agrees with rationale and scoring, no response required.

				timely and adaptive manner and take account of the wider implications of decisions: SG 100 is met and justified. For the 3rd SI, the MAFMC formally incorporated the precautionary approach into the spiny dogfish FMP through Amendment 2. SG 80, the only SG is met. For the 4th SI, as noted by the certifier, accountability and transparency of the management system is required by multiple laws and Executive Orders. As a managed fishery in the US, spiny dogfish management complies with this requirement and SG 100 is met. For the 5th SI, the certifiers have noted that spiny dogfish has NOT been subject to legal battles and that there is a plan in place to proactively avoid legal disputes. Therefore, SG 100 is met.	
3.2.3	Yes	Yes	NA	For PI 3.2.3.: **Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with**, there are 4 SIs. For the 1st SI, the certifiers note that the current MCS plan of the NMFS and USCS has demonstrated an ability to enforce relevant management measures, strategies and/or rules. However, the client could not find or access existing documents that demonstrated the ability of the monitoring, control and surveillance system to enforce relevant management measures, strategies, and/or rules, therefore, a score of 100 was not justified. For the 2nd SI, the certifier noted that there is an explicit and statutory sanction framework that is applied for violations of fishery regulations, and they did interview federal enforcement and prosecution officials to determine that sanctions to deal with noncompliance exist, are consistently applied and are thought to be effective. However, they did not feel that they could be said to meet the requirement of being “demonstrably effective”. While these sanctions may be quite stringent, a more conservative score of 80 is felt justifiable.	Peer Reviewer agrees with rationale and scoring, no response required.

				For the 3rd SI, the certifiers note that "Anecdotal information and the expert opinion of law enforcement officers indicate that fishers comply with the management system under assessment and provide information of importance to the effective management of the fishery." Given that there is a mix of anecdotal evidence and expert opinion, this score is justified. For the 4th SI, the certifiers claim: "on the basis of information available for the assessment, there is no evidence of systematic non-compliance." Given the other information about the fishery and the management system, this score is felt to be warranted.	
3.2.4	Yes	Yes	NA	For PI 3.2.4: **The fishery has a research plan that addresses the information needs of management**, there are 2 SIs. For the 1st SI, a comprehensive research plan mandated by the MSFCMA provides the management system with a coherent and strategic approach to research across P1, P2, and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2, meeting SG 100. For the 2nd SI, research results are disseminated to all interested parties in a timely fashion and are widely and publicly available through presentations at Council and Commission meetings, stock assessment workshops, and web sites, meeting SG 100. These criteria are clearly met for the spiny dogfish fishery	Peer Reviewer agrees with rationale and scoring, no response required.
3.2.5	Yes	Yes	NA	For PI 3.2.5: **There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives**, there are 2 SIs. For the 1st SI, the spiny dogfish fishery does have in place mechanisms to evaluate *all parts of the management system*, allowing for a score of 100 on this SG. This is evidenced by the review of the MAFMC and the SSC of the MAFMC, the Spiny Dogfish Advisory Panel, and the periodic reviews of the NEFSC. In my opinion the management system in place is sufficient to provide a full evaluation of the spiny dogfish fishery.	Peer Reviewer agrees with rationale and scoring, no response required.

				For the 2nd SI, the certifiers applied a score of 80, which requires that "the fishery-specific management system is subject to regular internal and occasional external review." Given that there is no regular external review, a score of 100 is not justified, but since there a number of external groups (e.g., the ETP Take Reduction Teams, the Department of Commerce Inspector General and occasionally the NRC), as the certifiers note, the management system is subject to a high degree of oversight, with regular internal and occasional external review. Therefore, a score of 80 is justified.	

8.4 Appendix 3 Stakeholder submissions

No stakeholder submissions were received prior to the publication of the PCDR

8.5 Appendix 4 Surveillance Frequency

SCS has determined the fishery is eligible for a reduced Level 4 surveillance with 2 on-site surveillance audits 2 off-site surveillance audits. A detailed rationale for the rationale behind each surveillance activity and the number of auditors is outlined in Table 44.

Though this is a complex fishery with three Units of Assessment (UoA) the management system and client have a very high capacity and infrastructure to provide information that can be easily verified remotely:

- The clients and key stakeholders possess the infrastructure and mechanisms to engage with the team via email, phone and remote conference platforms.
- The information required to demonstrate progress against conditions evaluate progress against the conditions includes: fishery science reports, government reports and regulations and meeting notes. This documented evidence is generally made publically available through the official NOAA website. Any reports or information not found online can be easily requested electronically.
- There are no milestones that require investigation of physical aspects of the fishery
- There is a high level of transparency in management; assessment reports are made public on a timely manner. There are a number of evaluation processes of the management system itself, which are also publically available, enhancing the transparency and facilitation verification.

This is the second certification period for this fishery, and all conditions are associated only with one Principle, SCS concludes a reduced team of 1 auditor may be used (MSC CR v.2 7.23.4.2)

There is no proposed change in timing of the surveillance from the requirement to undertake the surveillance audits up to 6 months earlier or later from the anniversary date.

Table 44. Surveillance level rationale

Year	Surveillance activity	Number of auditors	Rationale
1	*Off-site surveillance audit*	1 auditor	Information needed to verify progress towards conditions 2.3.1 and 2.3.3 (meeting minutes, government documents and other relevant reports) are produced electronically, are usually publically available and can easily be verified remotely by the auditor. Additionally, there are ample opportunities and mechanisms to engage remotely with clients and key stakeholders such as skype, email and phone. Furthermore, by Year 1 the fishery is not expected to show significant progress towards closing the conditions.
2	On-site surveillance audit	1 auditor	Information needed to verify progress towards conditions on 2.3.1 and 2.3.3 can be provided remotely in year 2. However, SCS determines that on-site surveillance would be more beneficial in Year 2 as it provides an opportunity to gain a more comprehensive perspective and to cover small details that may not be perfectly captured via written records/remote communications, and maintain rapport with key stakeholders and clients.
3	*Off-site surveillance audit*	1 auditor	Information needed to verify progress on year 3 towards conditions 2.3.1 and 2.3.3 (meeting minutes, government documents and other relevant reports) are produced electronically, are usually publically available and can easily be verified remotely by the auditor. Additionally, there are ample opportunities and mechanisms to engage remotely with clients and key stakeholders such as skype, email and phone.
4	On-site surveillance audit	1 auditor	Information needed to verify progress towards conditions on 2.3.1 and 2.3.3 can be provided remotely in year 4. However, because It is assumed that this site visit will be combined with the site visit for the re-assessment an on-site surveillance will be conducted.

Table 45. Fishery Surveillance Program

Surveillance Level	Year 1	Year 2	Year 3	Year 4
Level 2	Off-site surveillance audit	On-site surveillance audit	Off-site surveillance audit	On-site surveillance audit & re-certification site visit

8.6 Appendix 5 Objections Process

(REQUIRED FOR THE PCR IN ASSESSMENTS WHERE AN OBJECTION WAS RAISED AND ACCEPTED BY AN INDEPENDENT ADJUDICATOR)

8.7 Appendix 6 Additional Documentation

Tables for Catch Documentation where obtained from the Northeast Fisheries Observer Program

8.7.1 Catch Summary

Table 46. Catch Summary average for Gill net UoA from 2012-2015

Common Name	Catch 2016	% Catch 2012-16	MSC Class.
Dogfish, Spiny	1,193,277	49%	P1
Skate, Winter (Big)	363,457	25%	Main-Retained
Monkfish (Goosefish)	65,208	4%	Main-Retained
Pollock	6,331	6%	Main-Retained
Cod, Atlantic	6,017	4%	Minor-Retained
Skate, Nk	18,994	1%	Minor-Retained
Bass, Striped	2,272	0%	Minor-Retained
Bluefish	10,251	1%	Minor-Retained
Bonito, Atlantic	3	0%	Minor-Retained
Butterfish	137	0%	Minor-Retained
Crab, Horseshoe	1,214	0%	Minor-Retained
Crab, Jonah	1,617	0%	Minor-Retained
Crab, Northern Stone	168	0%	Minor-Retained
Crab, Rock	200	0%	Minor-Retained
Crab, Snow	5	0%	Minor-Retained
Crab, Spider, Nk	963	0%	Minor-Retained
Croaker, Atlantic	136	0%	Minor-Retained
Cusk	29	0%	Minor-Retained
Dogfish, Nk	36	0%	Minor-Retained
Dogfish, Smooth	4,828	0%	Minor-Retained
Drum, Red	30	0%	Minor-Retained
Fish, Nk	475	0%	Minor-Retained
Flounder, American Plaice	340	0%	Minor-Retained
Flounder, Fourspot	122	0%	Minor-Retained
Flounder, Nk	17	0%	Minor-Retained
Flounder (Windowpane	164	0%	Minor-Retained
Flounder, Summer (Fluke)	1,418	0%	Minor-Retained
Flounder, Winter (Blackback)	3,183	0%	Minor-Retained
Flounder, Witch (Grey Sole)	31	0%	Minor-Retained
Flounder, Yellowtail	3,267	0%	Minor-Retained
Haddock	467	0%	Minor-Retained
Hake, Red (Ling)	88	0%	Minor-Retained
Hake, Red/White Mix	15	0%	Minor-Retained
Hake, Silver (Whiting)	1,438	0%	Minor-Retained
Hake, White	1,685	1%	Minor-Retained
Halibut, Atlantic	252	0%	Minor-Retained
Harvestfish	3	0%	Minor-Retained
Herring, Atlantic	1	0%	Minor-Retained
Herring, Nk	1	0%	Minor-Retained
Houndfish	5	0%	Minor-Retained
Kingfish, Southern	622	0%	Minor-Retained
Lobster, American	12,746	2%	Minor-Retained
Mackerel, Atlantic	86	0%	Minor-Retained
Mackerel, Chub		0%	Minor-Retained
Mackerel, Spanish	812	0%	Minor-Retained

Menhaden, Atlantic	2,526	0%	Minor-Retained
Pompano, Florida	2	0%	Minor-Retained
Raven, Sea	1,292	0%	Minor-Retained
Ray, Bullnose	4	0%	Minor-Retained
Redfish, Nk (Ocean Perch)	44	0%	Minor-Retained
Scallop, Nk		0%	Minor-Retained
Scallop, Sea	66	0%	Minor-Retained
Scup	89	0%	Minor-Retained
Sea Bass, Black	99	0%	Minor-Retained
Sea Robin, Northern	7	0%	Minor-Retained
Sea Robin, Striped	374	0%	Minor-Retained
Shad, American	214	0%	Minor-Retained
Shark, Hammerhead, Scalloped	80	0%	Minor-Retained
Shark, Nk	200	0%	Minor-Retained
Shark, Porbeagle	301	0%	Minor-Retained
Shark, Sandbar	79	0%	Minor-Retained
Shark, Thresher	1,081	0%	Minor-Retained
Skate, Barndoor	5,910	1%	Minor-Retained
Skate, Clearnose	576	0%	Minor-Retained
Skate, Little	11,670	1%	Minor-Retained
Skate, Little/Winter, Nk	930	0%	Minor-Retained
Skate, Rosette	7	0%	Minor-Retained
Skate, Smooth	89	0%	Minor-Retained
Skate, Thorny	1,206	0%	Minor-Retained
Spot	2	0%	Minor-Retained
Tuna, Little (False Albacore)	112	0%	Minor-Retained
Weakfish	185	0%	Minor-Retained
Whelk, Channeled	18	0%	Minor-Retained
Whelk, Knobbed	43	0%	Minor-Retained
Whelk, Nk, Conch	1	0%	Minor-Retained
Whelk, True Unc	3	0%	Minor-Retained
Wolffish, Atlantic	101	0%	Minor-Retained
Sturgeon, Atlantic	1,698	0%	ETP
Anemone, Nk	1	0%	Minor-Bycatch
Clapper, Clam	3	0%	Minor-Bycatch
Cobia	2	0%	Minor-Bycatch
Crab, Cancer, Nk	379	0%	Minor-Bycatch
Crab, Blue	3	0%	Minor-Bycatch
Crab, Lady	1	0%	Minor-Bycatch
Crab, Spider, Portly	55	0%	Minor-Bycatch
Crab, True, Nk	93	0%	Minor-Retained
Cunner (Yellow Perch)	9	0%	Minor-Bycatch
Drum, Black	156	0%	Minor-Bycatch
Hagfish, Atlantic	4	0%	Minor-Bycatch
Hogchocker	1	0%	Minor-Bycatch
Invertebrate, Nk	6	0%	Minor-Bycatch
Jellyfish, Nk	31	0%	Minor-Bycatch
Lumpfish	5	0%	Minor-Bycatch
Mussel, Nk	38	0%	Minor-Bycatch
Puffer, Nk (Burrfish)	9	0%	Minor-Bycatch
Ray, Torpedo	41	0%	Minor-Bycatch
Remora, Nk	1	0%	Minor-Bycatch
Sculpin, Longhorn	54	0%	Minor-Bycatch
Sea Cucumber, Nk	1	0%	Minor-Bycatch
Shad, Hickory	1	0%	Minor-Bycatch
Shark, Atl Angel	321	0%	Minor-Bycatch

Shark, Carcharhinid,Nk	30	0%	Minor-Bycatch
Shark, Sand Tiger	141	0%	Minor-Bycatch
Shark, Spinner	40	0%	Minor-Bycatch
Snail, Nk	2	0%	Minor-Bycatch
Sponge, Nk	35	0%	Minor-Bycatch
Starfish, Brittle,Nk	2	0%	Minor-Bycatch
Starfish, Seastar,Nk	79	0%	Minor-Bycatch
Stargazer, Nk	4	0%	Minor-Bycatch
Stargazer, Northern	70	0%	Minor-Bycatch
Sturgeon, Nk	76	0%	Minor-Bycatch
Tautog (Blackfish)	7	0%	Minor-Bycatch
Triggerfish, Nk	4	0%	Minor-Bycatch
	1,734,066		

Table 47. Catch composition of UoA bottom trawl

Common Name	Catch 2016	% Catch 2012-16	MSC Class.
Dogfish, Spiny	118,408	15%	P1
Skate, Little	76,870	11%	Main Retained
Scup	44,286	6%	Main Retained
Skate, Nk	54,705	6%	Main Retained
Skate, Winter (Big)	40,897	5%	Main Retained
Hake, Silver (Whiting)	20,621	6%	Main Retained
Redfish, Nk (Ocean Perch)	9,447	5%	Main Retained
Herring, Atlantic	63,298	2%	Minor Retained
Squid, Atl Long-Fin	54,400	3%	Minor Retained
Monkfish (Goosefish)	25,190	4%	Minor Retained
Crab, Horseshoe	17,185	1%	Bycatch Minor
Butterfish	15,450	2%	Minor Retained
Hake, Red (Ling)	14,832	4%	Minor Retained
Flounder, Summer (Fluke)	11,772	3%	Minor Retained
Flounder, Winter (Blackback)	11,734	2%	Minor Retained
Flounder, American Plaice	5,543	1%	Minor Retained
Hake, White	4,853	1%	Minor Retained
Sea Bass, Black	4,683	1%	Minor Retained
Skate, Little/Winter, Nk	4,315	1%	Minor Retained
Cod, Atlantic	3,802	2%	Minor Retained
Dogfish, Smooth	3,503	1%	Minor Retained
Crab, Jonah	3,278	1%	Minor Retained
Flounder, Witch (Grey Sole)	3,047	1%	Minor Retained
Alewife	336	0%	Minor Retained
Bass, Striped	719	0%	Minor Retained
Bluefish	893	0%	Minor Retained
Crab, Northern Stone	24	0%	Minor Retained
Crab, Rock	784	0%	Minor Retained
Cusk	17	0%	Minor Retained
Eel, Conger	11	0%	Minor Retained
Fish, Nk	12	0%	Minor Retained
Flounder, Fourspot	2,211	1%	Minor Retained
Flounder, Gulfstream	18	0%	Minor Retained
Flounder, Nk	20	0%	Minor Retained

Flounder, (Windowpane)	2,911	1%	Minor Retained
Flounder, Yellowtail	2,407	2%	Minor Retained
Haddock	2,854	1%	Minor Retained
Hake, Nk	309	1%	Minor Retained
Hake, Spotted	2,234	0%	Minor Retained
Halibut, Atlantic	20	0%	Minor Retained
Halibut, Greenland	1	0%	Minor Retained
Herring, Blueback	40	0%	Minor Retained
Lobster, American	1,864	1%	Minor Retained
Mackerel, Atlantic	274	0%	Minor Retained
Mackerel, Chub	68	0%	Minor Retained
Menhaden, Atlantic	192	0%	Minor Retained
Pollock	2,096	3%	Minor Retained
Puffer, Northern	2	0%	Minor Retained
Raven, Sea	34	0%	Minor Retained
Scallop, Nk	1	0%	Minor Retained
Scallop, Sea	1,919	0%	Minor Retained
Sculpin, Longhorn	255	0%	Minor Retained
Sea Robin, Northern	1,831	0%	Minor Retained
Sea Robin, Striped	1,712	0%	Minor Retained
Skate, Barndoor	1,012	1%	Minor Retained
Skate, Rosette	31	0%	Minor Retained
Skate, Thorny	2,277	1%	Minor Retained
Squid, Nk	2,615	0%	Minor Retained
Squid, Short-Fin	1,539	0%	Minor Retained
Tautog (Blackfish)	10	0%	Minor Retained
Triggerfish, Nk (Leatherjacket)	4	0%	Minor Retained
Tuna, Nk	2	0%	Minor Retained
Whelk, Channeled (Smooth)	98	0%	Minor Retained
Whelk, Knobbed	59	0%	Minor Retained
Whelk, Nk, Conch	10	0%	Minor Retained
Beardfish	2	0%	Bycatch Minor
Crab, Blue	161	0%	Bycatch Minor
Crab, Deepsea,Red	2	0%	Bycatch Minor
Crab, Hermit, Nk	15	0%	Bycatch Minor
Crab, Lady	115	0%	Bycatch Minor
Crab, Spider, Nk	194	0%	Bycatch Minor
Crab, Spider, Portly	371	0%	Bycatch Minor
Dogfish, Chain	26	0%	Bycatch Minor
Dory, Buckler (John)	10	0%	Bycatch Minor
Eel, Sand Lance, Nk	5	0%	Bycatch Minor
Hogchocker	2	0%	Bycatch Minor
Jellyfish, Nk	506	0%	Bycatch Minor
Kingfish, Northern	11	0%	Bycatch Minor
Kingfish, Southern	46	0%	Bycatch Minor
Lumpfish	17	0%	Bycatch Minor
Ocean Pout	1,553	0%	Bycatch Minor
Puffer, Nk (Burrfish)	7	0%	Bycatch Minor
Ray, Torpedo	400	0%	Bycatch Minor
Runner, Blue	4	0%	Bycatch Minor
Shad, American	282	0%	Bycatch Minor

Shark, Atl Angel	6	0%	Bycatch Minor
Shark, Sand Tiger	18	0%	Bycatch Minor
Skate, Clearnose	1,663	0%	Bycatch Minor
Skate, Smooth	565	0%	Bycatch Minor
Sponge, Nk	65	0%	Bycatch Minor
Starfish, Seastar,Nk	1,342	0%	Bycatch Minor
Stargazer, Northern	14	0%	Bycatch Minor
Stingray, Roughtail	400	0%	Bycatch Minor
Sturgeon, Atlantic	230	0%	Bycatch Minor
Weakfish (Squeteague Sea Trout)	1,098	0%	Bycatch Minor
Wolffish, Atlantic	31	0%	Bycatch Minor
Wrymouth	55	0%	Bycatch Minor
Grand Total	65,5061		

Table 48. Catch Composition for UoA bottom longline

Common Name	Catch 2012-2016	% Catch 2012-16	MSC Class.
DOGFISH, SPINY	128418	48%	P1
TILEFISH, GOLDEN	86424	33%	Main Retained
DOGFISH, NK	3408	1%	Main Retained
EEL, CONGER	2848	1%	Main Retained
COD, ATLANTIC	3286	1%	Main Retained
HADDOCK	2670	1%	Main Retained
CUSK	1129	0.4%	Main Retained
SHARK, MAKO, SHORTFIN	650	0%	Minor Retained
POLLOCK	355	0%	Minor Retained
HAKE, WHITE	304	0%	Minor Retained
HAKE, SPOTTED	421	0%	Minor Retained
TUNA, YELLOWFIN	172	0%	Minor Retained
SEA BASS, BLACK	88	0%	Minor Retained
SKATE, WINTER (BIG)	2650	1%	Minor Retained
MONKFISH (GOOSEFISH)	146	0%	Minor Retained
HAKE, RED (LING)	90	0%	Minor Retained
REDFISH, NK (OCEAN PERCH)	45	0%	Minor Retained
WRECKFISH	15	0%	Minor Retained
DOLPHINFISH (MAHI MAHI)	17	0%	Minor Retained
EEL, AMERICAN	10	0%	Minor Retained
TILEFISH, BLUELINE	5	0%	Minor Retained
HAKE, SILVER (WHITING)	9	0%	Minor Retained

WHITING, BLACK (HAKE, OFFSHORE)	2	0%	Minor Retained
ANEMONE, NK	0	0%	Minor Retained
BONE, NK	1	0%	Minor Retained
CRAB, JONAH	102	0%	Minor Retained
DEBRIS, FISHING GEAR	125	0%	Minor Retained
DOGFISH, CHAIN	226	0%	Minor Retained
DOGFISH, SMOOTH	5735	2%	Minor Retained
FISH, NK	0	0%	Minor Retained
FLOUNDER, FOURSPOT	1	0%	Minor Retained
HAKE, NK	2	0%	Minor Retained
INVERTEBRATE, NK	0	0%	Minor Retained
LOBSTER, AMERICAN	3	0%	Minor Retained
OCEAN POUT	1	0%	Minor Retained
RAVEN, SEA	9	0%	Minor Retained
RAY, TORPEDO	19	0%	Minor Retained
SCALLOP, SEA	1	0%	Minor Retained
SCULPIN, LONGHORN	35	0%	Minor Retained
SHARK, BIGNOSE	122	0%	Minor Retained
SHARK, CARCHARHINID,NK	275	0%	Minor Retained
SHARK, HAMMERHEAD, SCALLOPED	1000	0%	Minor Retained
SHARK, HAMMERHEAD, SMOOTH	225	0%	Minor Retained
SHARK, HAMMERHEAD,NK	150	0%	Minor Retained
SHARK, NK	550	0%	Minor Retained
SHARK, PORBEAGLE (MACKEREL SHARK)	25	0%	Minor Retained
SHARK, SANDBAR (BROWN SHARK)	1152	0%	Minor Retained
SHARK, TIGER	2075	1%	Minor Retained
SHELL, SCALLOP	3	0%	Minor Retained
SHRIMP, MANTIS	0	0%	Minor Retained
SKATE, BARNDOOR	19719	7%	Minor Retained
SKATE, LITTLE	323	0%	Minor Retained
SKATE, LITTLE/WINTER, NK	74	0%	Minor Retained

SKATE, SMOOTH	7	0%	Minor Retained
SKATE, THORNY	693	0%	Minor Retained
TUNA, NK	0	0%	Minor Retained
TUNA, SKIPJACK	4	0%	Minor Retained
WOLFFISH, ATLANTIC	46	0%	Minor Retained
Grand Total	265,865	100%	