U.S. Atlantic Surfclam and Ocean Quahog MSC Fishery Assessment Report

Public Certification Report

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December 8, 2016

Contents

Glossary of Acronyms

ABC	Acceptable Biological Catch
ACE	Annual Catch Entitlements
ASAP	Age Structured Assessment Program
B	Biomass
BMSY	Biomass calculated for Maximum Sustainable Yield
Bu	Bushels, one bushel of surfclams is equivalent to 17 pounds of meat; one bushel of ocean quahogs is equivalent to 12 pounds of meat
CAB	Conformity Assessment Body
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DFO	Fisheries and Oceans Canada
EEZ	Exclusive Economic Zone
ETP	Endangered, Threatened or Protected species
F	Fishing Mortality
FAO	Food and Agriculture Organization of the United Nations
FCM	Fisheries Certification Methodology
FG	Fixed Gear
FLIM	Limit Reference Point for Fishing Mortality
FREF	Fishing Mortality Reference Point
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
Kg	kilogram
Lb.	Pound, equivalent to roughly 2.2 kg
LL	Longline
LMOT	Large Mesh Otter Trawl
LOA	Length Over-All
LPUE	Landings per unit of fishing effort
M	Million (lbs.)
MAFMC	Mid-Atlantic Fishery Management Council
MG	Mobile Gear
MOU	Memorandum of Understanding
MSC	Marine Stewardship Council
MSE	Management Strategy Evaluation
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSP	Maximum Spawning Potential
mt	metric ton, 1000 kg or 2204.62 pounds
NAFO	Northwest Atlantic Fisheries Organization
NEMSFMP	Northeast Multispecies Fisheries Management Plan
NEFMC	New England Fishery Management Council
nm	nautical mile
NMFS	National Marine Fisheries Service

OFL	Over-Fishing Level
OTB	Otter Trawl, Bottom
OY	Optimum Yield
P1, P2, P3	MSC's Principles
PA	Precautionary Approach
PI	Performance Indicator
PRI	Point of Recruitment Impairment
RAP	Regional Advisory Process
RV	Research Vessel
SARC	Stock Assessment Review Committee
SAW	Stock Assessment Workshop
SCS	SCS Global Services
SFF	Sustainable Fisheries Framework
SSB	Spawning Stock Biomass
SSBMSY	Spawning Stock Biomass for Maximum Sustainable Yield
SSR	Special Science Response
t and mt	metric ton
TAC	Total Allowable Catch
TMGC	Trans-boundary Management Guidance Committee
TRAC	Trans-boundary Resources Assessment Committee
USR	Upper Stock Reference Point
VPA	Virtual Population Analysis
VMS	Vessel Monitoring System
WWF	World Wildlife Fund

1. Executive Summary

SCS Global Services (SCS) is an independent third party Conformity Assessment Body (CAB) that has undertaken the MSC assessment of surfclam and ocean quahog fisheries in federal waters of the Atlantic coast of the United States from Virginia to Massachusetts. The assessment used the MSC Principles and Criteria for sustainable fishing version 1.1 (1 May 2010) and complies with the MSC Fishery Certification Requirements (FCR) and the guidance to the Certification Requirements version 2.0 (released October 2014).

2 Units of Assessment: Defined as the species, vessels, and gear assessed	
UoA: Species & Stock (FCR V2.0 7.4.7.1)	1. Surfclams (*Spisula solidissima*)/ U.S. Atlantic Surfclam 2. Ocean quahogs (*Arctica islandica*)/ U.S. Atlantic Ocean Quahog
UoA: Gear Type (FCR V2.0 7.4.7.2)	Hydraulic clam dredge
UoA: Vessels (FCR V2.0 7.4.7.3)	Vessels with federal surfclam fishing permits fishing in federal waters and landing (1) surfclams/ (2) ocean quahog under an ITQ allocation
Further Information: Geographical Area	Federal waters (3 nm –200 nm) off the U.S. Atlantic off the U.S. Northeast
Further information: Management System	Mid-Atlantic Fishery Management Council with the National Marine Fisheries Service

Note: There is a MSC-certified Arctic surfclam fishery out of Banquereau and Grand Bank, Canada, but this is a different species (*Mactromeris polynyma*), and therefore is not considered an overlapping fishery and is not considered for harmonization purposes.

The surfclam and ocean quahog fisheries in the U.S. Exclusive Economic Zone fall under a single, U.S. federal jurisdiction and are managed by the National Marine Fisheries Service (NMFS) and the Mid-Atlantic Fishery Management Council (MAFMC). Individual states manage the surfclam and ocean quahog fisheries within 3 nautical miles of shore, which is not part of this assessment. The commercial fishery for the UoA is prosecuted with large vessels (20-40 m) using hydraulic dredges. There is also a small Maine fishery prosecuted with small vessels (35-45 ft) targeting small quahogs for the local fresh, half shell market and using dry dredges. This is not included in the UoA. The fishable ocean quahog stock in federal waters is increasingly found in northern regions (Long Island, Southern New England, and Georges Bank). The surfclam fishery today exists primarily in a small area of federal waters off of the New Jersey coast and on Georges Bank.

Since 1977 the U.S. Atlantic surfclam and ocean quahog fisheries have been managed under a single Fishery Management Plan (FMP). The Council decided to manage the fisheries through a joint management plan out of recognition that changes in allowable harvest levels of one species would likely transfer fishing effort to the other resource. An Individual Transferable Quota (ITQ) system was implemented in 1990 for the surfclam and ocean quahog fisheries; the first such system established for a U.S. Federal fishery (MAFMC 2014a). Prior to that, the surfclam fishery was managed through limited entry, quarterly quotas and fishing time restrictions (MAFMC 2014a). By the mid-1980s, effort limitations combined with overcapacity resulted in vessels operating only 6 hours every other week. Within two years of implementation of the ITQ program, the surfclam fleet size was reduced by 54%, and capacity utilization was increased by 150% (MAFMC 2014a). As a

result, market consolidation and vertical integration have increased over time. In general, landings for both surfclam and ocean quahog have been substantially less than the quota in the last decade.

Surfclam and ocean quahog quotas are generally denoted in bushels of whole shellfish. For stock assessment purposes bushels are converted to metric tons using 17 pounds of meat per bushel of Atlantic surfclams and 10 pounds of meat per bushel of ocean quahogs. 2204.62 pounds equals one metric ton, and a metric ton of surfclam meats is equivalent to 130 bushels of live surfclams. A metric ton of ocean quahog meats is equivalent to 220 bushels. Data in this report are generally presented in units provided in the original sources. Conversion information is provided here, in the glossary, and within select figure captions where relevant throughout the report.

Assessment Overview

The team selected to undertake the assessment includes two team members that collectively meet the requirements for MSC assessment teams. These are:

- Dr. Joseph DeAlteris, Team Leader and Principles 1 and 2 Expert
- Mr. Richard Allen, Principle 3 Expert

The client for this assessment contracted a thorough pre-assessment that was delivered by MRAG Americas on 10 December 2014. The client entered the full assessment process in December 2015. The client representatives provided the pre-assessment report and supporting documents to the assessment team. The assessment team requested additional information from the client, and, through the client representative, from fishery managers and scientists with responsibility for the surfclam and ocean quahog fisheries. Email exchanges provided most of the interaction between the client, the assessment team, and agency representatives prior to the site visit.

The assessment team met with fishery representatives, scientists and stakeholders in Falmouth, MA on March 31 and April 1, 2016 to review the information available at that time and to request additional information. Prior to, during, and subsequent to the site visit, documents were presented by fishery representatives and fisheries scientists to inform the assessment team.

Public versions of the report were posted on the MSC website at: https://www.msc.org/track-a-fishery/fisheries-in-the-program/in-assessment/north-west-atlantic/us-atlantic-surfclam-and-ocean-quahog. Different versions of the report and milestones in the MSC were completed as follows.

Fishery enters full assessment	December 22, 2015
Site visit	March 31-April 1, 2016 in Falmouth, Massachussetts
Peer reviewers confirmed	August 9, 2016
Public Comment Draft Report released	September 29, 2016
Final Report released	November 10, 2016

Summary of Findings

The assessment team has found that the fishery is consistent with the MSC Principles and Criteria for Sustainable Fishing. In this report we provide the rationales for all scores proposed, which support the assessment that the fishery is recommended for certification. A summary of scores is provided as follows:

Table 1. Final Principle Scores

Final Principle Scores		
Principle	**Surfclam Score**	**Ocean Quahog Score**
Principle 1 – Target Species	96.7	96.7
Principle 2 – Ecosystem	86.0	86.0
Principle 3 – Management System	95.6	95.6

Strengths:
The governance system and fisheries specific management systems are very strong, being federally managed under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) through the Mid-Atlantic Fishery Management Council (MAFMC) process. The surfclam and ocean quahog fishery has a long history of cooperation with the management system via fishing log books, dealer reports, and cooperative science projects. The scientific basis for stock assessments and the sustainable management of the target species is sound. The ITQ management system has been in place since 1990 and is considered very robust. All of the products landed by the fishery fall within the purview of the National Shellfish Sanitation Program, which provides an additional layer of traceability and accountability for the fishery. Resource abundance is large in comparison to annual harvests, resulting in low fishing mortality rates. The ocean quahog resource extends beyond the range of the fishing gear, providing a natural refuge for an unknown portion of the stock. The footprint of the fishery on an annual basis is relatively small, resulting in a low overall impact on habitat. The gear is well suited to efficiently targeting clams and quahogs of the desired size, with little other capture or mortality of unwanted species (retained species, bycatch, or ETP species).

Weaknesses:
Prior to 2015, the surfclam and ocean quahog fisheries were not required to carry on-board observers at the same frequency required of other fisheries in the region. As a result, there are relatively few data on catch composition. While the fishery is generally regarded as having very little bycatch, the data to support this conclusion are outdated. In 2015 the surfclam and ocean quahog fisheries came under the requirements of the Standardized Bycatch Reporting system, which will provide significantly more data on catch composition for the fisheries via an observer program. It is therefore understood that this deficiency in information is already being addressed. However, because the updated information was not available at the time of full assessment for review by the assessment team, there is a condition places on 2.1.3 and 2.2.3 for both surfclam and ocean quahog (see Appendix 1a Conditions).

The surfclam and ocean quahog fisheries are believed to have robust traceability and accountability and operate in general compliance with relevant regulations. However, the assessment team was not able to obtain fishery-specific enforcement records to verify this during the initial scoring period. Per suggestion from agency staff, the client group facilitated a formal request for these records via the Freedom of Information Act (FOIA), a process which took several months (as documented in Appendix 6). Records were reviewed by the assessment team in August 2016, but the records did not supply sufficient information to achieve a score of SG80 or higher on Performance Indicator (PI 3.2.3). Therefore, a condition on this PI remains in place, due to close at the Year 1 surveillance. See Appendix 6 for more detail regarding the FOIA request process and a summary of records released.

2. Authorship and Peer Reviewers

Audit Team

This assessment was conducted by Joseph DeAlteris Ph.D. and Richard Allen M.M.A., with administrative and quality oversight by SCS Global Services. The assessment was carried out using the MSC Fisheries Certification Requirements v2.0 (Effective April 1, 2015).

Dr. Joseph DeAlteris – Lead, Principles 1 & 2

Dr. DeAlteris retired from the University of Rhode Island (URI) in May of 2012, and was awarded Professor Emeritus status. In 30 years of service to URI he taught course work, conducted research, and developed outreach programs in fisheries conservation engineering, fish population dynamics and quantitative ecology, and shellfish aquaculture. He mentored more than 40 graduate students completing MS and PhD degrees. He served on numerous government committees including the National Research Council. He authored more than 35 publications in peer-reviewed journals, and also authored and co-authored numerous books, manuals, non-refereed articles, and technical reports in the fields of fisheries biology, stock assessment and fishing gear technology.

Dr. DeAlteris has an international reputation as an expert in the field of stock assessment and fishing gear technology. He brings intimate knowledge of finfish and invertebrate fisheries and has considerable experience in MSC fishery evaluations. He has worked for several CABs. Dr. DeAlteris has worked the full assessment of the Louisiana blue crab and Atlantic red crab fisheries, the Echebaster Indian Ocean tuna fishery, the re-assessment of British Columbia halibut fishery, and annual audits of Dungeness crab, red crab, blue crab, Canadian haddock, Full Bay sea scallop and the shrimp fisheries. He has also conducted pre-assessments, and assessment peer reviews. He recently worked as an independent expert for the Global Seafood Sustainability Initiative (GSSI). He is a MSC certified assessment team leader under v.2.0.

Mr. Richard Allen – Principle 3

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.

Mr. Allen has relevant education, MSC version 2.0 team member training certificates, a depth of MSC assessment experience and proven competencies as described in Annex PC2 to serve as a team member. He has achieved the relevant qualifications for Principle 3 described in Table PC3, and offers substantial depth of experience in local fishery context and country.

Peer Reviewers

Peer reviewers were selected based on their qualifications in accordance with the MSC requirements (using CRV1.3 because the Peer Review College is not yet implemented). Both peer reviewers comply with Row 1 of Table CM2, and based on their CVs and in particular MSC assessment team experience in similar fisheries (including Northwest Atlantic sea scallop and surfclam fisheries), both comply with Row 5 of Table CM3 and 2 or more further requirements from items 1-4 in Table CM3.

Dr. Andy Brand

Dr Andy Brand worked for the University of Liverpool for 40 years on the academic staff of the Port Erin Marine Laboratory, Isle of Man, retiring in 2006 as Director of the Laboratory. During this time he developed large research programmes on the biology, ecology, aquaculture and fisheries of bivalve molluscs, especially scallops, and on the environmental impact of scallop dredging. He has had extensive fishery management and environmental assessment consultancy experience, including contracts with government departments and industry, and has been a member of ICES Working Groups on herring, scallops and ecosystem effects of fishing. In addition to work in the Irish Sea, he has advised on scallops and fisheries management in Alaska, Argentina, Australia, Bermuda, Chile, Ireland, France and the Philippines. He is now an Honorary Senior Fellow of the University of Liverpool and works as an independent shellfisheries consultant. He has recent experience as an Assessor, Auditor and Peer Reviewer for Marine Stewardship Council certifications of scallop, mussel, oyster, various clam and herring fisheries in Wales, Isle of Man, the Faroes, Ireland, Denmark, Holland, Spain, India, Japan, USA and Canada.

Dr. Rob Blyth-Skyrme

Rob started his professional career in finfish mariculture in 1996, before switching to a focus on the science, management and policy of wild fisheries. Following his PhD, which considered biological and socio-economic implications of an inshore shellfish fishery management system, he worked as the Senior Environment Officer and then Deputy Chief Fishery Officer at the Eastern Sea Fisheries Joint

Committee, the largest regional fisheries management organization in England. Rob then became Natural England's senior advisor to the UK Government on marine fisheries and environmental issues, leading a team dealing with fisheries policy, science and nationally significant fisheries casework. Since the end of 2008, he has run Ichthys Marine Ecological Consulting Ltd., a consultancy providing marine fisheries and environmental advice to a variety of governmental and industry clients.

Rob has undertaken all aspects of MSC work as a Lead Assessor, expert team member and peer reviewer, across varied fisheries including those for Alaska pollock, Pacific cod, Atlantic cod, Pacific salmon, albacore tuna, yellowtail flounder, Arctic surfclam, American lobster, pink shrimp, seabob. Japanese scallop, sea scallop and blue mussels. He is also a member of the MSC Peer Review College.

3. Description of the Fishery

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

UoA and Proposed Unit of Certification (UoC)

The Unit of Assessment comprises vessels with U.S. federal fishing permits fishing in U.S. federal waters (i.e., 3-200 nm) in the northeastern U.S. for surfclams and for ocean quahogs with hydraulic dredges.

The fishery is within scope of MSC certification:

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, 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 openness to certificate sharing, with an official statement to be posted to the MSC website (7.4.6-7.4.12).

Table 2. Final Unit of Assessment (UoA) and Unit of Certification (UoC) #1

Units of Assessment 1: Defined as the species, vessels, and gear assessed	
UoA: Species & Stock (FCR V2.0 7.4.7.1)	Surfclams (*Spisula solidissima*)/ U.S. Atlantic Surfclam
UoA: Gear Type (FCR V2.0 7.4.7.2)	Hydraulic clam dredge
UoA: Vessels (FCR V2.0 7.4.7.3)	Vessels with U.S. federal surfclam fishing permits fishing in U.S. federal waters and landing surfclams under an ITQ allocation
Further Information: Geographical Area	Federal waters (3 nm –200 nm) off the U.S. Atlantic off the U.S. Northeast
Further information: Management System	Mid-Atlantic Fishery Management Council (MAFMC) with the National Marine Fisheries Service (NMFS)
Unit of Certification: Defined as the vessels within the Unit of Assessment, allowed to use the MSC ecolabel and does not include Other Eligible fishers.	
Client Group	**Bumble Bee Foods** 280 10th Ave, San Diego, CA 92101 Mike Kraft, VP Sustainability, mike.kraft@bumblebee.com, 858-715-4091 **Sea Watch International, Ltd.** 8978 Glebe Park Drive Easton, MD 21601 Thomas T. Alspach, General Counsel, talspach@goeaston.net, 410-822-9100 **Atlantic Capes Fisheries, Inc.** 985 Ocean Drive, NJ 08204 Daniel Cohen, President, dcohen@atlanticcapes.com **Surfside Foods, LLC** 2838 High Street Port Norris, NJ 08349 Victor Broyan, CFO Peter LaMonica, plamonica@surfsidefoods.com **LaMonica Fine Foods** P.O. Box 309 Millville, NJ 08332 Michael A. Lavecchia, Vice President mlavecchia@lamonicafinefoods.com
Fishers in the UoC for the chosen stock	Vessels with U.S. federal surfclam permits fishing in U.S. federal waters and landing surfclams under an ITQ allocation to processors defined as part of the client group.
Other Eligible Fishers that may join the certificate for the chosen stock	All holders of U.S. Atlantic Surfclam ITQ landed at processors not in the client group

Table 3. Final Unit of Assessment (UoA) and Unit of Certification (UoC) #2

Units of Assessment 2: Defined as the species, vessels, and gear assessed	
UoA: Species & Stock (FCR V2.0 7.4.7.1)	Ocean quahogs (*Arctica islandica*)/ U.S. Atlantic Ocean Quahog
UoA: Gear Type (FCR V2.0 7.4.7.2)	Hydraulic clam dredge
UoA: Vessels (FCR V2.0 7.4.7.3)	Vessels with U.S. federal ocean quahog fishing permits fishing in U.S.federal waters and landing ocean quahog under an ITQ allocation
Further Information: Geographical Area	Federal waters (3m – 200nm) off the U.S. Atlantic off the U.S. Northeast
Further information: Management System	Mid-Atlantic Fishery Management Council (MAFMC) with the National Marine Fisheries Service (NMFS)
Unit of Certification: Defined as the vessels within the Unit of Assessment, allowed to use the MSC ecolabel and does not include Other Eligible fishers.	
Client Group	**Bumble Bee Foods** 280 10th Ave, San Diego, CA 92101 Mike Kraft, VP Sustainability, mike.kraft@bumblebee.com, 858-715-4091 **Sea Watch International, Ltd.** 8978 Glebe Park Drive Easton, MD 21601 Thomas T. Alspach, General Counsel, talspach@goeaston.net, 410-822-9100 **Atlantic Capes Fisheries, Inc.** 985 Ocean Drive, NJ 08204 Daniel Cohen, President, dcohen@atlanticcapes.com **Surfside Foods, LLC** 2838 High Street Port Norris, NJ 08349 Victor Broyan, CFO Peter LaMonica, plamonica@surfsidefoods.com **LaMoncia Fine Foods** P.O. Box 309 Millville, NJ 08332 Michael A. Lavecchia, Vice President mlavecchia@lamonicafinefoods.com
Vessels in the UoC for the chosen stock	Vessels with U.S. federal ocean quahog fishing permits, fishing in U.S. federal waters, and landing ocean quahogs under an ITQ allocation to processors defined as part of the client group.

Other Eligible Fishers that may join the certificate for the chosen stock	All holders of U.S. Atlantic Ocean quahog ITQ, landed at processors not in the client group

Final UoC(s)

The Units of Certification comprises vessels fishing in federal waters (3– 200 nm) in the northeastern U.S. for surfclams and ocean quahog, using hydraulic dredges for both species, and selling their catch to members of the client group. See Tables 2 and 3 for a detailed description.

All federally-permitted vessels fishing for surfclams and ocean quahogs using hydraulic dredges in U.S. federal waters are covered by the Unit of Certification if they sell their catch to the client group. A certificate sharing arrangement is not needed by producers to participate in the Unit of Certification. However, other processors interested in joining the Unit of Certification should contact the client to discuss certificate sharing options.

Total Allowable Catch (TAC) and Catch Data (taken from 2015 MAFMC Information documents for Surfclams and Ocean Quahogs)

Table 4. Surfclam

TAC	**Year**	**2016**	**Amount**	**3,400,000 bu[1]**
UoA share of TAC	**Year**	**100%**	**Amount**	**3,400,000 bu**
UoC share of total TAC	**Year**	**>95%**	**Amount**	**3,230,000 bu**
Total green weight catch by UoC	**Year (most recent)**	**2014**	**Amount**	**2,229,650* bu**
	Year (second most recent)	**2013**	**Amount**	**2,285,700 *bu**

Table 5. Ocean Quahog

TAC	**Year**	**2016**	**Amount**	**5,333,000 bu**
UoA share of TAC	**Year**	**98%**	**Amount**	**5,233,000** bu**
UoC share of total TAC	**Year**	**>95%**	**Amount**	**4,971,350*** bu**
Total green weight catch by UoC	**Year (most recent)**	**2014**	**Amount**	**2,974,450 ****bu**
	Year (second most recent)	**2013**	**Amount**	**3,082,750**** bu**

***UoC catch calculated based on estimate that the UoC took 95% of the total U.S. EEZ surfclam catch in 2013 and 2014.**
****UoA share of TAC, is the total TAC minus 100,000 bushels allocated to the State of Maine for the Maine Mahogany Quahog fishery.**

[1] Note: Surfclam and ocean quahog quotas are generally denoted in bushels of whole shellfish. For stock assessment purposes bushels are converted to metric tons using 17 pounds of meat per bushel of Atlantic surfclams and 10 pounds of meat per bushel of ocean quahogs. 2204.62 pounds equals one metric ton, A metric ton of surfclam meats is equivalent to 130 bushels of live surfclams. A metric ton of ocean quahog meats is equivalent to 220 bushels.

*****UoC share of TAC is the total TAC minus 100,000 bushels allocated to the State of Maine. 95% of this value is then estimated to be taken by the UoC.**
******UoC catch calculated based on estimate that the UoC took 95% of the total U.S. EEZ non-Maine ocean quahog catch in 2013 and 2014.**

Scope of Assessment in Relation to Enhanced Fisheries

There is no evidence of enhancement in this fishery.

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

Surfclam (*Spisula solidissima*) and ocean quahogs (*Arctica islandica*) are not introduced species, they are native to the region.

3.2 Overview of the Fishery

Historical Overview of Fleet Capacity and Management

The surfclam fishery expanded rapidly during the 1940s and 50s with the introduction of the hydraulic clam dredge and the discovery of dense beds of clams off the New Jersey coast (Yancey and Welch 1968). During the 1960s the boats became larger and shifted from being primarily owned and operated by individuals to being nearly all company-owned and operated (Yancey and Welch 1968). Under the effort control regime that was in place in the 1970s and 80s, the number of vessels participating in the surfclam fishery decreased from 162 in 1979, to a low of 113 in 1983, before rising to 133 in 1987 (Christel 2004). The surfclam fleet became overcapitalized and required strict limits on fishing time during the 1980s, following a resource die-off caused by hypoxic water conditions (Weinberg, Murawski, and Serchuk 1997).

The ocean quahog fishery began in Rhode Island around 1943 to supply a war food program. After World War II, ocean quahog meats were used as inexpensive substitutes for hard and soft-shell clam meats, but were considered an inferior product because the meat was darker and had a strong flavor. Ocean quahogs also competed with the more desirable surfclam. The ocean quahog catch reached 1.5 million pounds of meats in 1946 and subsequently declined. By 1975 demand was increasing again and six vessels landed 1.3 million pounds of meats, all in Rhode Island. (MAFMC 1977)

In 1976 the fishery expanded to New Jersey and resulted in a five-fold increase in total ocean quahog landings, from a total of 1.255 million pounds in 1975 to 5.545 million pounds in 1976, with New Jersey responsible for 4 million pounds and Rhode Island the remainder. Harvesting and processing of ocean quahogs increased during the late 1970s as the result of declining availability and increasing cost of surfclams and to technological advances that overcame the flavor and meat color problems associated with ocean quahogs. (MAFMC 1977)

The MAFMC developed the original Surfclam and Ocean Quahog Fishery Management Plan in 1977, recognizing that surfclam populations were declining. The Council recognized that significant cutbacks in the allowable harvest levels of surfclams would likely transfer significant fishing effort to

the ocean quahog resource. For that reason, the Council decided to include both species in a join management plan. The initial Surfclam and Ocean Quahog FMP included quarterly quotas and limited the fleet to four days per week fishing for surfclams. The National Marine Fisheries Service Regional Administrator was given the authority to reduce or increase the allowable fishing days per week depending on the rate at which the quarterly surflcam quota was being landed. An annual quota of 3 million bushels of ocean quahogs was established, with authority given to the Regional Administrator to limit the number of fishing days per week if the pace of harvest indicated that the ocean quahog quota would be exceeded before the end of the year (MAFMC 1977).

Throughout the 1980s, allowable fishing time for surfclams was continually reduced, with boats eventually allowed to fish only a few days per calendar quarter. This situation was considered intolerable and the Council eventually replaced the effort controls with an individual transferable quota (ITQ) system that was adopted by the Council in 1988 and approved by NOAA in 1990. (MAFMC 1988)

The allocation formula is explained below under “Access Rights” and had the effect of separating quota ownership from boat ownership. Boat owners were able to eliminate excess boats and consolidate quota onto fewer boats. Consolidation of allocation ownership and the rationalization of the fleet were both anticipated and accepted in the development of the ITQ program in Amendment 8 to the Surfclam and Ocean Quahog FMP (Christel 2004). The number of boats fishing surfclams declined by 50% within a few years under the ITQ program (Weinberg, Murawski, and Serchuk 1997).

Both ocean quahogs and surfclam were included in the ITQ program. Over the years from 1990 to the present, the surfclam and ocean quahog fisheries have experienced an evolution in fleet ownership, quota ownership, and vertical integration. In 1990, the fleet included a mix of company-owned boats and individual owner-operators. After the ITQ program went into effect, some individuals sold their boats and kept their quota to lease out. Other individuals expanded their fleets. Some vertically integrated companies acquired additional boats and quota, but some eventually sold off their boats and quota. Boat ownership is relatively concentrated at present, but most of the larger fleets are owned by families that have been in the fishery for generations. Some boat-owning families have also bought processing plants (D.H. Wallace, personal communication).

Quota ownership for both surfclams and ocean quahogs is public information and can be found at: http://www.greateratlantic.fisheries.noaa.gov/sustainable/species/clam/index.html. Forty entities are listed as owners of ocean quahog quota and 67 entities are listed as surfclam quota owners. An entity can be an individual, a corporation, partnership, or trust that has legal standing in the eyes of the law. In some cases, the same or related individuals control multiple quota owner entities. Lenders may be listed as quota owners because it may be necessary for them to be listed as the quota owner in order to secure loans to the operating owner (Christel 2004). For the 2016 initial quota allocations, 35 of the 40 ocean quahog quota-owning entities own less than 5% each of the total ocean quahog quota, although that figure may be misleading because multiple entities may be owned by the same or related individuals. Twenty three of the ocean quahog quota-owning entities

own less than 1% each of the total ocean quahog quota. Sixty two of the 67 surfclam quota-owning entities hold less than 5% each of the overall surfclam quota and 46 own less than 1% each. The largest single-entity ocean quahog ownership share is 22%, without considering any possible relationships between entities. For surfclams, the largest share held by a single entity is 13%, not considering any possible inter-related entities. A 2002 analysis of surfclam and ocean quahog quota ownership by the Government Accounting Office (GAO) concluded that "one entity controlled quota in 12 different names, accounting for 27% of the 2002 total surfclam quota allocated." When one person controls multiple quota-holding entities, the effect is additional concentration of ownership compared to outward appearances. The same report concluded that, for ocean quahogs, "one entity controlled quota held in two different names, representing 22 percent of the 2002 total ocean quahog quota allocated." (Christel 2004)

Christel (2004) concluded that "the current concentration of allocation ownership may not differ substantially from the concentration of fishing time among vessel owners in the fishing time-based system under the surfclam moratorium that existed prior to the implementation of the ITQ system," but the passage of time frustrated such an assessment. The ITQ system, when initially implemented, simply vested vessel owners with a portion of the overall quota based largely on reported landings. It maintained a relative *status quo* in the fisheries. For that reason, the MAFMC declined to impose limitations on the amount of allocation that could be held by one entity and instead relied on the operation of the Sherman and Clayton Antitrust laws to prevent the acquisition of an amount of allocation that could allow for the "fixing" the price of surfclams or ocean quahogs (Christel 2004).

Since 2004, when NOAA Fisheries committed to implementing the recommendations of the Government Accounting Office (GAO) IFQ report, the subject of "excessive shares" in the surfclam and ocean quahog fisheries has been further analyzed by the MAFMC, including a contracted report by the consulting firm "CompassLexecon," with expertise in anti-trust law and economics (Mitchell, Peterson and Willig 2011). The initiation of an excessive shares amendment to the FMP was included in the Council's 2015 Strategic Plan Proposed Deliverables (MAFMC 2015c).

The surfclam fishery today exists primarily in a small area of federal waters off of the New Jersey coast and on Georges Bank. At times there have also been relatively small surfclam fisheries in the state waters of New Jersey, New York, and Massachusetts. Atlantic surfclams in these different jurisdictions are not biologically distinguishable, but due to habitat differences that affect growing conditions they may produce different meat yields per bushel of clams. Clam beds with higher meat yields are favored by processing plants and thus by fishermen. Commercial concentrations have been found and harvested off New Jersey, the Delmarva Peninsula, and on Georges Bank (MAFMC 2012, 2014b; Figure 8). Other than Massachusetts state waters, these areas have management regimes that include annual quotas and harvest limits for individual vessels. Surfclam fisheries in New Jersey, New York, and Massachusetts state waters are managed by state authorities, while surfclams in the EEZ are managed at the federal level under the Surfclam and Ocean Quahog Fishery Management Plan (FMP). Some vessels are licensed to participate in both the federal and state fisheries but very little fishing is done in state waters. Vessels are not allowed to fish in both state and federal waters on the same trip. Federally permitted vessels must carry a vessel monitoring

system (VMS) that can verify their fishing area. This assessment only addresses the federal waters fishery inside the EEZ, but outside the 3 miles allocated to state fisheries. This EEZ fishery is managed by the NMFS and MAFMC.

Fishing ports from Maine to Virginia are involved in harvesting and processing of Atlantic surfclams and ocean quahogs. Ports in New Jersey and Massachusetts handle the most volume and value, particularly Atlantic City and Point Pleasant, New Jersey, and New Bedford, Massachusetts. Some landings are also made in Ocean City, Maryland (MAFMC 2015). Maine mahogany quahogs are landed in eastern Maine, but the Maine Mahogany Quahog fishery operates under an allocation to the state of Maine that is deducted from the overall federal ocean quahog quota. The 'Maine mahogany quahog' is not a separate species, but are distinguishable by their smaller size and are harvested via a separate and distinct fishery targeting small quahogs for the local fresh, half shell market and using dry dredges, and is not included in the assessment. The processing sector of the fishery operates for both surfclams and ocean quahogs as some of the facilities purchase and/or process both species. In 2013, there were 7 companies purchasing both species from the commercial fisheries outside of Maine (MAFMC 2014b).

Surfclams on Georges Bank were not fished from 1990 to 2008 due to the risk of paralytic shellfish poisoning (PSP). During 2009-2011 some fishing was allowed on Georges Bank under an exempted fishing permit and landings per unit effort LPUE in that area were substantially higher (5-7 times higher) than in other traditional fishing grounds. In 2013 NMFS allowed increased access to Georges Bank for more boats. The Greater Atlantic Regional Fisheries Office reopened a portion of Georges Bank to the harvest of surfclams and ocean quahogs beginning January 1, 2013 (77 FR 75057, December 19, 2012) under its authority in 50 CFR 648.76. Harvesting vessels have to adhere to the recently adopted testing protocol that is part of the National Shellfish Sanitation Program. It is anticipated that allowing clam vessels to fish in the reopened area would significantly reduce the fishing pressure in the southern portion of the surfclam range while providing an economic benefit to the industry because of the higher LPUE from Georges Bank (MAFMC 2014b). Ocean quahogs are harvested over a larger spatial area. The fishing year for surfclams and ocean quahogs is 12 months, beginning January 1 of each year (MAFMC 2003). Harvesting surfclams and ocean quahogs in federal waters requires heavy equipment. There are no recreational fisheries or traditional users for either Atlantic surfclams or ocean quahogs (MAFMC 2012) in federal waters.

Management of the fisheries at the federal level is governed by the Surfclam and Ocean Quahog Fishery Management Plan (FMP), first implemented in 1977 (MAFMC 1977). The management unit of the FMP is all Atlantic surfclams (*Spisula solidissima*) and ocean quahogs (*Arctica islandica*) in the Atlantic EEZ. The ocean quahogs managed under this federal FMP include a small-scale fishery in eastern Maine that harvests small ocean quahogs (Maine Mahogany Quahog) in federal waters designated in the FMP as the Maine Mahogany Quahog Zone. The fishery operates under an allocation of ocean quahogs that is made to the state of Maine and is deducted from the overall ocean quahog quota. The Maine Mahogany Quahog fishery is not a part of this assessment.

The total number of vessels participating in fisheries for surfclams and quahogs in federal waters is shown in Table 6 (Jessica Coakley, personal communication).

Table 6. Federal Surfclam and Ocean Quahog fleet profile, 2003 through 2014 (Compiled by Jessica Coakley, MAFMC, from NMFS data, 2016).

Vessel-type	Harvested Species	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Non-Maine Vessels	Both surfclams & quahogs	11	14	12	9	9	8	8	12	12	13	7	7
	Only surfclams	23	21	24	20	24	24	28	22	24	29	33	31
	Only quahogs	16	15	12	9	8	10	7	9	7	6	9	9
	Total	50	50	48	38	41	42	43	43	43	48	49	47

The total number of non-Maine vessels fell from 56 in 1996 to 43 in 2010, but has increased since then, averaging 45 vessels over the period from 2003 through 2014. The number of non-Maine vessels harvesting only surfclams was between 20 and 25 vessels until 2011 (with the exception of 2009) but increased from 24 in 2011 to 33 in 2013. The number of non-Maine vessels harvesting both surfclams and ocean quahogs has fluctuated around an average of 10 vessels per year.

Fishing Practices

The length of hydraulic dredge boats working in federal waters ranges from 60-feet to 165-feet. The larger boats are primarily ocean quahog boats. Surfclam boats are typically 80-110-feet in length. Crew size ranges from 3 to 6 on both types of vessels.

Figure 1. Modern surfclam and ocean quahog dredge vessel. (R. B. Allen photo)

Surfclams and ocean quahog are extracted from the sediment using hydraulic dredges dragged slowly across the seabed generally in water depths less than 60m, being limited by their ability to maintain sufficient water pressure in the length of hose required to feed the nozzles on the dredge with high-pressure water necessary to allow the dredge to move through the sediment. Surfclams and ocean quahogs are buried in the sediment. The hydraulic dredge is like a large sled with a row of nozzles across the front. Water is pumped from the vessel to the nozzles through a long hose (see Figure 3). The nozzles shoot water into the sediment, softening and liquifying the sediment so that the blade of the dredge, extending down about six inches, can travel through the sediment and separate the clams from the sediment and direct the clams into the rear part of the dredge, generally a cage made of steel rods or a chain bag on older boats and dredges. Surfclams are found from the surf zone to depths of about 50 m and ocean quahogs from about 8 m out to the extent of their range, which is beyond the depth capability of the survey vessels and gear. (http://www.greateratlantic.fisheries.noaa.gov/sustainable/species/clam/index.html). Ropes (1988) reported that ocean quahogs are common in depths of 35 to 75 m. Murawski and Serchuk (1979) reported that larger quahogs were found in the 20.1-40.0 m survey depth strata, with progressively fewer large quahogs in deeper water.

Hydraulic dredges have been used in the surfclam fishery for over fifty years and in the ocean quahog fishery since its inception in the early 1970s (MAFMC 2003). A typical dredge is 12 feet wide and 22 feet long. Large vessels greater than 95 feet in length tow dredges up to 15 feet wide. The dredges are highly efficient, catching 80-95% of clams of suitable size in their path (Wallace & Hoff 2005, Meyer et al 1981, Thorarinsdottir et al 2010). The 56th Stock Assessment Workshop

Assessment Report considers commercial gear to have “relatively well understood selectivity” (NEFSC 2013; Figure 2). This size-selectivity is considered one manner in which the resource is protected from the effects of fishing for surfclams in particular as they reproduce at small sizes and are sexually mature for several years before becoming available to the fishing gear (NEFSC 2013a). As for surfclam, the dredges are designed to select large ocean quahogs with the highest meat weight and to minimize the capture of small ocean quahogs, along with other unwanted invertebrates, fish and trash (Murawski and Serchuk, 1989a; Thorarinsdottir, G. G. et al. 2010).

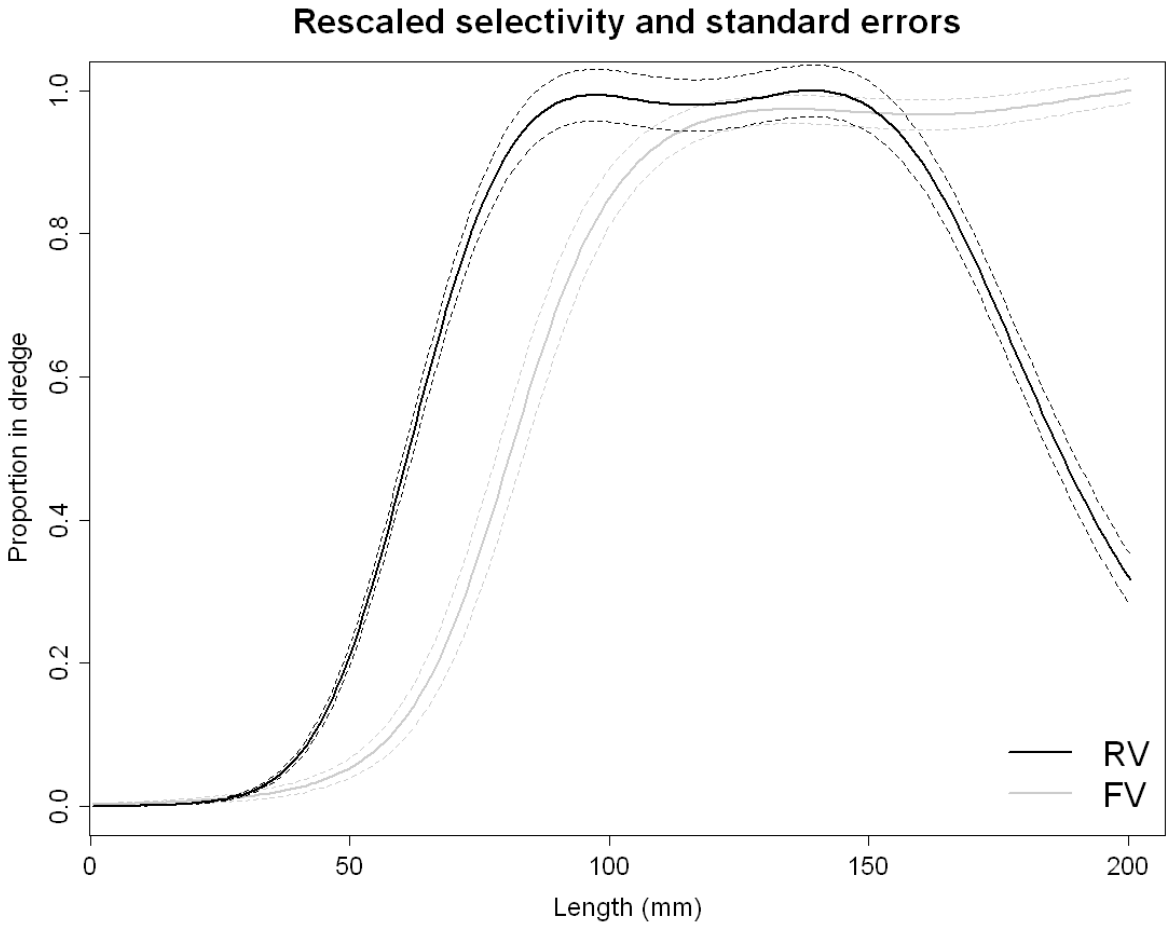


Figure 2. Rescaled selectivity fits for both survey and commercial dredges for surfclam with +/- 2 standard errors. FV= Fishing Vessel and RV= Research Vessel. The dredges used by research vessels versus fishing vessels have meaningfully different selectivity for larger clams, resulting in a ‘dome shaped’ selectivity curve for research vessels, and a logistic curve for fishing vessels (Source: Figure A54 in NEFSC 2013)

The Fishery Management Plan (FMP) (§ 648.72) provides for a minimum size for the surfclam fishery of 4.75in (~120mm), but this has been suspended annually in recent years. There is no federal minimum size for ocean quahogs. There is therefore no ‘undersized’ or ‘sublegal’ clams in the fishery, and there is no discarding at sea (NEFSC 2013, Chute et al. 2013). In practice, clam dredges are optimized to harvest clams of marketable size, as dictated by processors. Murawski and Serchuk (1989a) describe a discard mortality of 50% for surfclams and 10% for ocean quahogs; however, so long as there is no minimum size and no discarding in the fishery, discard mortality is not relevant. NEFSC stock assessment reports estimate incidental mortality of non-landed surfclams and ocean

quahogs in the path of clam dredge, including all sizes, at 5% and 12% respectively (NEFSC 2013, Chute et al 2013).

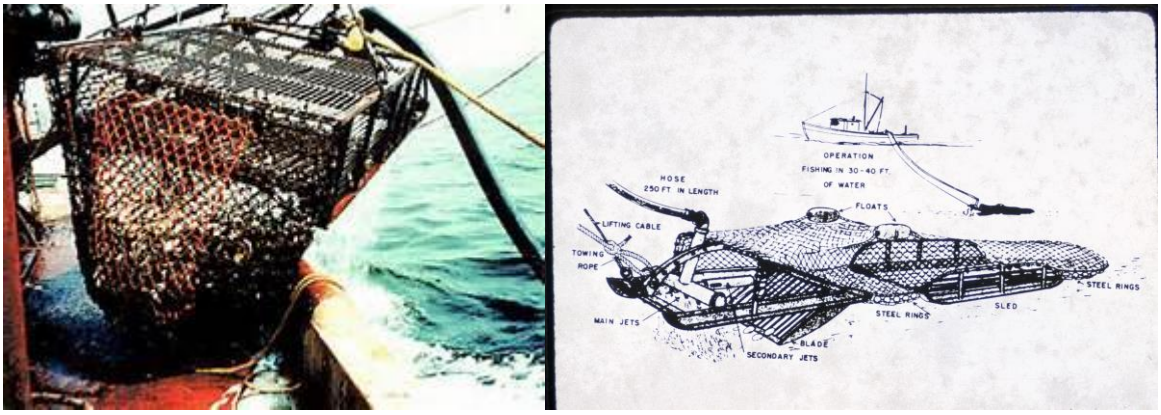


Figure 3. Hydraulic clam dredge with chain bag. (Source: FAO)

3.3 Principle One: Target Species Background

3.3A Surfclam

Taxonomic Classification

Class: Bivalvia

Order: Veneroida

Family: Mactridae

Genus: *Spisula*

Species: *solidissima*

Biology

(Text adapted from Cargnelli, L., S. Griesbach, D. Packer, and E. Weissberger. 1999. Essential Fish Habitat Source Document: Atlantic Surfclam, Spisula solidissima, Life History and Habitat Characteristics. NOAA Tech. Memo. NMFS-NE-142.)

Introduction

The Atlantic surfclam, *Spisula solidissima* (Figure 4) is a bivalve mollusk that inhabits sandy continental shelf habitats from the southern Gulf of St. Lawrence in Canada to Cape Hatteras, North Carolina, USA (Merrill and Ropes 1969). Atlantic surfclams are managed under the Mid-Atlantic Fishery Management Council Atlantic Surfclam and Ocean Quahog Fishery Management Plan (MAFMC 1997).

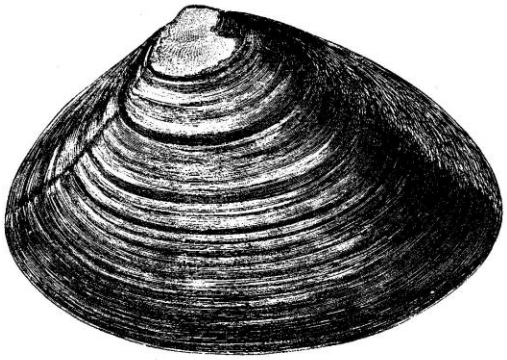


Figure 4. The Atlantic surfclam, *Spisula solidissima* (from Goode 1884).

Life History

Unfertilized Atlantic surfclam eggs are 56 µm in diameter, unpigmented, and relatively free of yolk (Allen 1951, 1953), characteristics that are generally associated with planktotrophic eggs. Fertilization occurs in

the water column above the beds of spawning clams (Ropes 1980). In the laboratory, the optimal concentration of gametes for fertilization is 0.8-4 x 10^6 sperm/ml and 5-30 x 10^3 eggs/ml (Clotteau and Dubé 1993). No information on fecundity in *S. solidissima* is available (Fay *et al.* 1983), however, fecundity of the southern subspecies *S. solidissima similis* ranges from 0.14-13 million eggs in individuals 26-50 mm shell height (Walker *et al.* 1996).

Fertilized eggs develop into pyramid-shaped, planktonic trochophore larvae approximately 9 h after fertilization at 21.7°C (Ropes 1980) and 40 h at 14°C (Loosanoff and Davis 1963). Veliger larvae, the first larval stage to possess a bivalved shell, appear in 72 h at 14°C and 28 h at 22°C (Loosanoff and Davis 1963). The pediveliger stage, a transitional "swimming-crawling" larval stage with development of a foot for burrowing (Fay *et al.* 1983), occurs 18 d after fertilization at 21.7°C (Ropes 1980). Metamorphosis to juveniles, which consists of complete absorption of the velum and settlement to the substrate, occurs anywhere from 19 to 35 d after fertilization depending on temperature (Fay *et al.* 1983). Size at metamorphosis is 230-250 µm shell length; however Ropes (1980) noted that larvae metamorphosed at 303 µm.

The size and age of sexual maturity is variable. Off New Jersey, Atlantic surfclams may reach maturity as early as 3 months after settlement and at lengths of less than 50 mm (Chintala and Grassle 1995; Chintala 1997). At the other extreme, clams from Prince Edward Island, Canada, may not reach maturity until 4 yrs of age and 80-95 mm shell length (Sephton 1987; Sephton and Bryan 1990). In Virginia, the minimum length at maturity is 45 mm; size rather than age is more important in determining sexual maturity (Ropes 1979). Because of the wide variability in age at maturity, juveniles and adults will be discussed together in this report.

Atlantic surfclams may reach a maximum size of 226 mm (Ropes 1980) and a maximum age of 31 yrs (Jones *et al.* 1978). Growth appears to be similar among different localities during the first 3-5 yrs of life (Ambrose *et al.* 1980; Sephton and Bryan 1990). However, after the first 5 yrs, clams offshore grow faster and attain a larger maximum size than clams inshore (Jones *et al.* 1978; Ambrose *et al.* 1980; Jones 1980; Wagner 1984). High clam density may negatively affect growth rate and maximum size (Fogarty and Murawski 1986; Cerrato and Keith 1992); density effects on growth have been detected at relatively low densities (> 50 clams per 352 m^2) (Weinberg 1998b). Growth lines in the shells of Atlantic surfclams are deposited at times of spawning and high temperature, but there is a question as to whether lines are annual (Jones *et al.* 1978; Jones 1980; Wagner 1984; Walker and Heffernan 1994). Growth is not uniform over the year; temperature significantly affects Atlantic surfclam growth, physiology, and behavior (Ambrose *et al.* 1980; Davis *et al.* 1997).

Geographical Distribution

Atlantic surfclams are distributed in western North Atlantic continental shelf waters from the southern Gulf of St. Lawrence, Canada to Cape Hatteras, North Carolina, USA (Merrill and Ropes 1969; Weinberg 1998a; Figure 5 and Figure 6). In United States waters, major concentrations of Atlantic surfclams are found on Georges Bank, south of Cape Cod, off Long Island, southern New Jersey, and the Delmarva

Peninsula (Merrill and Ropes 1969; Ropes 1978). Although Atlantic surfclams can inhabit waters from the surf zone to a depth of 128 m, most are found at depths of less than 73 m (Figure 5 and Figure 6). (Ropes 1978). Along Long Island and New Jersey, the highest concentrations occur at < 18 m, whereas off the Delmarva Peninsula, the greatest concentrations occur from 18 to 36 m (Ropes 1978).

The terms pre-recruit and recruit are used here to describe Atlantic surfclam distribution. They refer to the exploited and unexploited portions of the stock. For stock assessment purposes, surfclams less than 12 cm have generally considered pre-recruits and surfclams 12 cm and larger have been considered to be fully-recruited to the fishery, with knife-edged selectivity. However, a new stock assessment model used in the 2013 stock assessment estimates a dome-shaped selectivity curve with selectivity near one at sizes 16+ cm on Georges Bank and 16-17+ cm in the south (NEFSC 2013).

The NMFS Northeast Fisheries Science Center (NEFSC) clam surveys [see Reid *et al*. (1999) for survey methods] collected Atlantic surfclams from Georges Bank to just north of Cape Hatteras (Figure 5 and Figure 6). Pre-recruits and recruits had similar distributions, although recruits were not collected quite as far to the south. The greatest number of catches of pre-recruits and recruits were made from the Hudson Canyon to Cape Hatteras inshore of the 60 m contour. The Gulf of Maine was not surveyed, although Atlantic surfclams are found there in areas containing suitable substrate (sand).

Reproduction

Atlantic surfclams spawn from late spring into early fall. In New Jersey, spawning occurs from late June to early August (Ropes 1968a), although spawning may begin as early as late May or early June closer inshore (Tarnowski 1982; J.P. Grassle, Rutgers University, New Brunswick, NJ, unpublished data). Spawning begins and ends earlier in the south; in Virginia, it may begin in May and end in July (Ropes 1979). The southern subspecies *Spisula solidissima similis* spawns in the spring to early summer (Kanti *et al.* 1993).

Spawning is not associated with a particular temperature or abrupt temperature changes (Ropes 1968a), but usually occurs when temperatures are greater than 15^{o}C. There may be a second, minor spawning in October, caused by breakdown of the thermocline; in extremely cold years, this second spawning may not occur (Ropes 1968a). Little is known about the effects of other environmental factors, such as salinity and dissolved oxygen, on Atlantic surfclam spawning.

Food Habits

Atlantic surfclams are planktivorous siphon feeders. Leidy (1878) noted the presence of many genera and species of diatoms in Atlantic surfclam guts. Ciliates were also a common component of the diet in the field. Riisgård (1988) showed that Atlantic surfclams retained particles as small as 4 µm in diameter. High concentrations of suspended clay particles may decrease the amount of algae ingested and digested (Robinson *et al.* 1984).

Millions of microscopic plants (phytoplankton) thrive in nearly every drop of coastal seawater. In the presence of sunlight and sufficient nutrients to grow, these plants photosynthesize and multiply, creating a “bloom.” While most of the thousands of species of algae are harmless, this species is one of a few dozen that create potent toxins. The swimming, photosynthetic cells of *Alexandriumfundyense* are responsible for blooms in the northeast U.S. A closely related species called *Alexandrium tamarense* also occurs in these waters but *A. fundyense* is more abundant and thusits name is used to simplify discussions. The motile cells of *A. fundyense* originate from the germination of dormant cysts that accumulate in bottom sediments and allow the species to survive cold winter temperatures and unfavorable growing conditions. The cysts can also be resuspended by tides and storms. (WHOI 2016)

The toxins produced by *A. fundyense* accumulate in filter-feeding shellfish such as clams, mussels and oysters making them unsafe for people and animals to eat. There is no risk to people who consume the flesh of fish, lobsters, and shrimp or who swim in the ocean. If eaten in sufficient quantity, these contaminated shellfish can result in illness or even death from a poisoning syndrome called paralytic shellfish poisoning, or PSP. Portions of Georges Bank have been closed for surfclam harvest due to PSP.

Predation

Atlantic surfclams have many predators, including the naticid snails *Euspira heros* and *Neverita duplicata* (Franz 1977; Dietl and Alexander 1997), the sea star *Asterias forbesi* (Meyer *et al.* 1981), lady crabs (*Ovalipes ocellatus*), Jonah crabs (*Cancer borealis*) (Stehlik 1993), and horseshoe crabs (*Limulus polyphemus*) (Botton and Haskin 1984). Fish predators include haddock (*Melanogrammus aeglefinus*) and Atlantic cod (*Gadus morhua*) (Ropes 1980). The sevenspine bay shrimp, (*Crangon septemspinosa*) preys on recently settled clams (Viscido 1994). In the New York Bight, crabs accounted for 48.3-100% of Atlantic surfclam mortality while naticid moon snails accounted for 2.1% of mortality (MacKenzie *et al.* 1985).

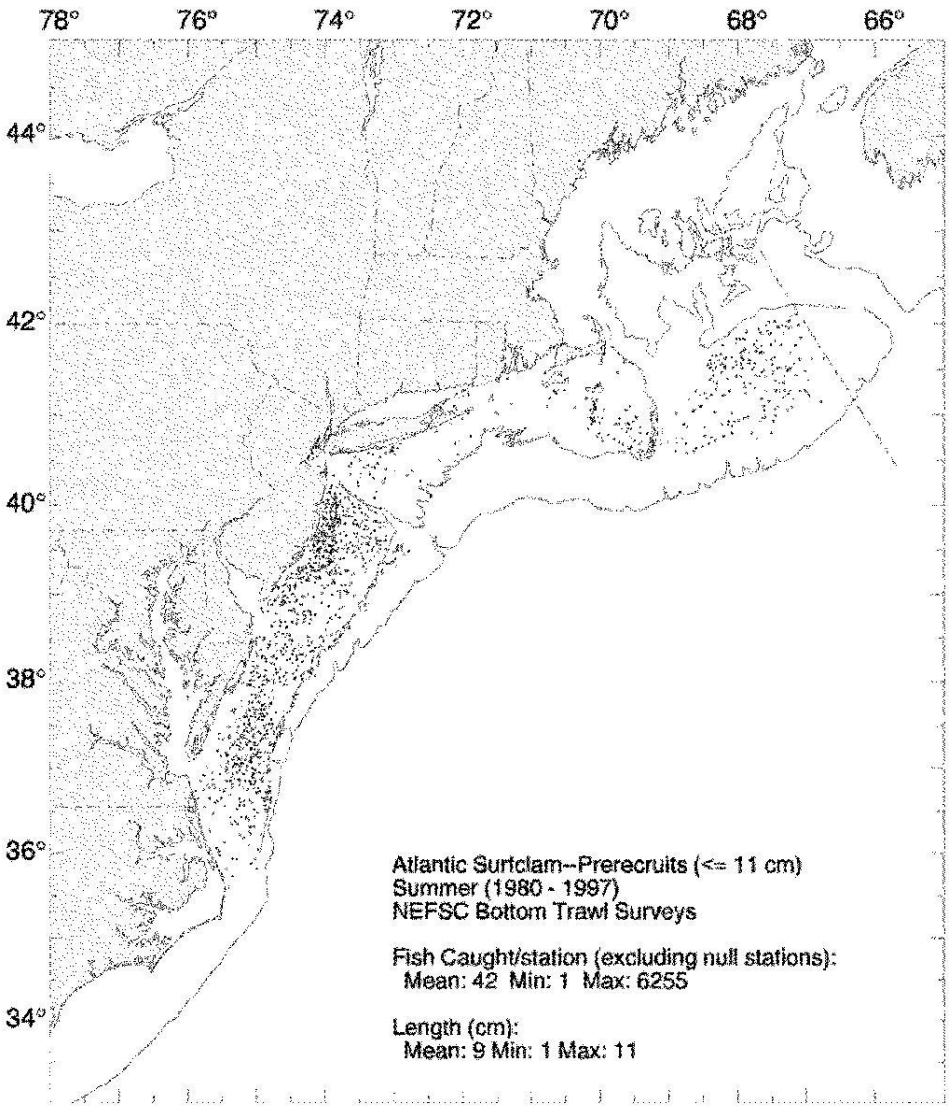


Figure 5. Distribution of Atlantic surfclam pre-recruits (≤11 cm) collected during NEFSC summer clam surveys from 1980-1997 [see Reid *et al.* (1999) for details]. Black dots represent stations where Atlantic surfclams were taken. The line, furthest offshore gives the demarcation of continental shelf.

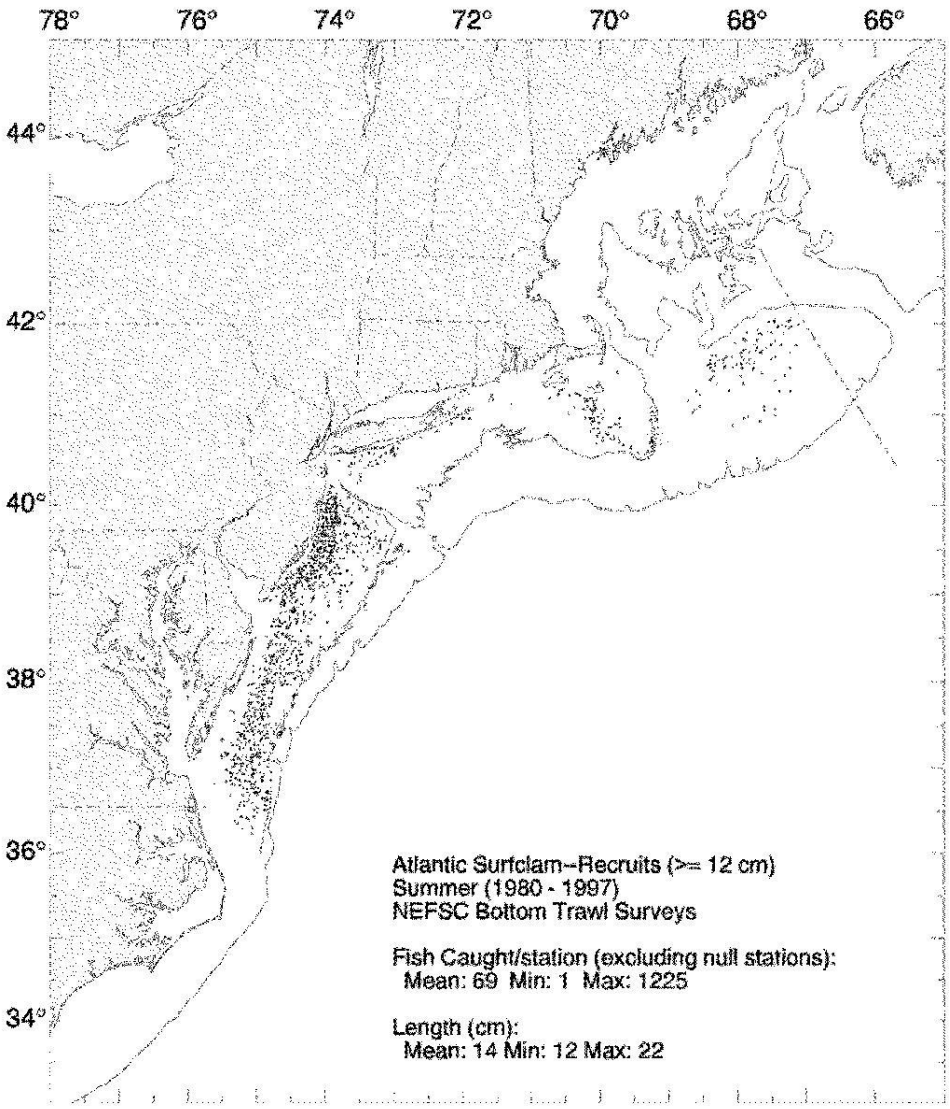


Figure 6. Distribution of Atlantic surfclam recruits (≥ 12 cm) collected during NEFSC summer clam surveys from 1980-1997 [see Reid *et al.* (1999) for details]. Black dots represent stations where Atlantic surfclams were taken.

Habitat Characteristics

(Information on the habitat characteristics of the Atlantic surfclam focuses primarily on Atlantic surfclam beds in U.S. waters; most of the information is from the Middle Atlantic Bight.)

Fertilization of Atlantic surfclam eggs is optimal at 6-24°C, 20-35 ppt salinity, and a pH of 7.8-10 (Allen 1953; Castagna and Chanley 1973; Clotteau and Dubé 1993). Eggs and sperm can withstand salinities as low as seawater diluted to 40% for 2-3 h (Schechter 1956).

Few studies have examined Atlantic surfclam larvae in the field. In New England, Mann (1985) reported high larval concentrations (up to 823 larvae/m^3) associated with 14-18°C water masses and relatively low chlorophyll *a* concentrations. In New Jersey, Tarnowski (1982) noted high concentrations of Atlantic surfclam larvae in the spring and fall. Spring larvae were derived from inshore clams, while fall larvae were from offshore clams. Dispersal by currents occurs during the larval stage (Fay *et al.* 1983) and larval settlement may coincide with the relaxation of upwelling events (Ma 1997). Franz (1976) hypothesized that a convergence of tidal and longshore currents trap Atlantic surfclam larvae off western Long Island, although this theory is based on juvenile and adult distributions rather than larval samples. Spawning in nature occurs at temperatures > 15°C and is typically heaviest when temperatures are at their highest (Jones 1981b; Sephton 1987).

The greatest concentrations of Atlantic surfclams are usually found in well-sorted, medium sand (Dames and Moore 1993), but they may also occur in fine sand (MacKenzie *et al.* 1985) and silty-fine sand (Meyer *et al.* 1981). Ambrose *et al.* (1980) noted a positive correlation between growth rate and mean sediment grain size when other variables were controlled, although Goldberg and Walker (1990) found that substrate type did not affect the growth rate of clams in the laboratory and field, although clams did not burrow in mud.

Growth is not uniform over the year. Ambrose *et al.* (1980) noted that growth of Atlantic surfclams in the Middle Atlantic Bight was positively correlated with temperature and negatively correlated with variation in temperature. Davis *et al.* (1997) found that growth in the coastal Gulf of Maine was higher at warmer temperatures and at higher chlorophyll *a* concentrations. Stable oxygen isotopes revealed that shell growth in New Jersey waters reflects seawater temperature; growth is most rapid in spring and early summer, slow in late-summer and fall, and extremely slow or non-existent in winter (Jones *et al.* 1983). In Delaware waters, Atlantic surfclam production is highest in August and September when temperatures are high (Howe *et al.* 1988).

Although Atlantic surfclams are found only at salinities higher than 28 ppt in the field, they are capable of surviving salinities as low as 12.5 ppt for 2 d (Castagna and Chanley 1973). This suggests that something other than salinity is controlling the distribution of Atlantic surfclams. In the laboratory, Atlantic surfclam heart rate increased as salinity dropped from 30 ppt to 20 ppt (deFur and Mangum 1979).

Atlantic surfclams are susceptible to low levels of dissolved oxygen (DO). Severe hypoxic events (DO < 3 ppm) in New Jersey have killed Atlantic surfclams several times (Ogren and Chess 1969; Garlo *et al*. 1979; Ropes *et al.* 1979). Weinberg and Helser (1996) showed spatial and temporal changes in growth rate and maximum size and hypothesized these changes may be related to low dissolved oxygen levels. Positive effects of hypoxia include the decimation of Atlantic surfclam predators, allowing successful recruitment of recently-settled clams (Garlo 1982).

There has been little work on the effects of currents on Atlantic surfclams, particularly on feeding and bedload transport of small clams (small clams along with sediment being moved along the seabed by bottom currents). The dynamic environments in which Atlantic surfclams live may substantially affect flux of food and population distribution. For example, oceanic storms can displace adults a considerable distance from their burrows (Fay *et al.* 1983).

Fishery Fleet Profile and Landings

(Text adapted from Mid-Atlantic Fishery Management Council Atlantic Surfclam Information Document - April 2014)

The commercial fishery for surfclam in federal waters is prosecuted with large vessels (20-40 m) and hydraulic dredges. Surfclam landings and commercial quotas are given below in Table 7 and Table 8. The distribution of the fishery has changed over time, as shown in Figure 7 and Figure 8.

Landings peaked during 1973-1974 at about 33,000mt and then fell dramatically during the late 1970s and early 1980s. EEZ or federal fishery landings stabilized between 1985 and 2011, fluctuating between 18 and 25,000mt (NEFSC 2013), in the region of 2.5 to 3 million bushels (Table 7). Note that surfclam landings are reported in volume units of bushels. Since 2004, surfclam quota has been set at at 3.4 million bushels, the upper limit permissible under the FMP. This quota is much lower than allowed under the ABC which is four times higher than the upper limit of the quota under the FMP. Surfclam harvests have been much lower than permitted under the FMP.

The total number of vessels participating in the surfclam fishery has been relatively stable from 2003 through 2013, ranging from 29 vessels in 2006 to 47 vessels in 2014 (Table 6). The average ex-vessel price of surfclams reported by processors increased about 2% from $12.44 in 2012 to $12.63 per bushel in 2013. The total ex-vessel value of the 2013 federal harvest was approximately $31.0 million or a 7% increase from the prior year. A myriad of factors have contributed to difficulties in the clam industry. Major users of clam meats have reduced their purchases from industry and stopped advertising products like clam chowder in the media. Industry members reported that imported meat from Canada and Vietnam contributed to an oversupply of clam meats in the marketplace. The costs to vessels harvesting clams has increased due to the rising costs of fuel and insurance. Trips harvesting surfclams have increased in length as catch rates have declined, as the stock abundance has declined from virgin levels to the biomass at MSY.

As indicated above, surfclams on Georges Bank were not fished from 1990 to 2008 due to the risk of PSP. There was light fishing on Georges Bank in years 2009-2011 under an exempted fishing permit and LPUE in that area was substantially higher (5-7 times higher) than in other traditional fishing grounds. The Greater Atlantic Regional Fisheries Office reopened a portion of Georges Bank to the harvest of surfclams and ocean quahogs beginning January 1, 2013 (77 FR 75057, December 19, 2012) under its authority in 50 CFR 648.76. Harvesting vessels have to adhere to the recently adopted testing protocol under the National Shellfish Sanitation Program. It is anticipated that allowing clam vessels to fish in the reopened area would significantly reduce the fishing pressure in the southern portion of the surfclam range while providing an economic benefit to the industry because of the higher LPUE from Georges Bank (Figure 9).

Table 7. Federal Surfclam Quotas and Landings: 1998 - 2016.

Year	Landings [a] ('000 bu)	Quota ('000 bu)	% Harvested
1998	2,365	2,565	92%
1999	2,539	2,565	99%
2000	2,565	2,565	100%
2001	2,855	2,850	100%
2002	3,113	3,135	99%
2003	3,241	3,250	100%
2004	3,138	3,400	92%
2005	2,744	3,400	81%
2006	3,057	3,400	90%
2007	3,231	3,400	95%
2008	2,919	3,400	86%
2009	2,602	3,400	77%
2010	2,332	3,400	69%
2011[b]	2,443	3,400	72%
2012[b]	2,341	3,400	69%
2013[b]	2,390	3,400	70%
2014[c]	359 [d]	3,400	NA
2015[c]	NA	3,400	NA
2016[c]	NA	3,400	NA

[a] One surfclam bushel is approximately a meat weight of 17 lb and 7.7kg [b] A metric ton of surfclam meats is equivalent to 130 bushels of live surfclams.The Scientific and Statistical Committee (SSC) recommended an overfishing limit (OFL) for 2010, 2011, 2012, and 2013 of 129,300 mt, 114,00 mt, 102,300 mt, and 93,400 mt, respectively, and an acceptable biological catch (ABC) of 96,600 mt (2011-2013). [c] For 2014-2016, the SSC recommended an OFL of 81,150 mt (2014), 75,178 mt (2015), 71,512 mt (2016), respectively, and an acceptable biological catch (ABC) of 60,313 mt, 51,804 mt, 48,197 mt, respectively. [d] Incomplete landings year. NA = Not yet available. Source: NMFS Clam Vessel Logbook Reports.

Table 8. Federal Surfclam Landings by Area: 2009-2013. Source: Dan Hennan Pers. Comm. (NEFSC 2014). Individual harvesting areas identified in the tables below can be identified in Figures 6, 7 and 9.

a) mt meats

Year	Southern VA	Delmarva	NJ	LI	Southern New England	Georges Bank	Other	Total
2009	0	1,977	14,825	1,798	1,444	11	9	20,064
2010	0	1,556	11,064	1,181	2,870	1,311	2	17,984
2011	0	1,445	12,036	409	2,552	2,387	10	18,839
2012	0	3,763	6,171	305	4,119	3,560	94	18,012
2013	0	3,585	5,329	231	4,862	4,369	57	18,433

b) bushels ('000)

Year	Southern VA	Delmarva	NJ	LI	Southern New England	Georges Bank	Other	Total
2009	0	256	1,923	233	187	1	1	2,602
2010	0	202	1,435	153	372	170	0	2,332
2011	0	187	1,561	53	331	310	1	2,443
2012	0	488	800	40	534	462	12	2,336
2013	0	465	691	30	631	567	7	2,390

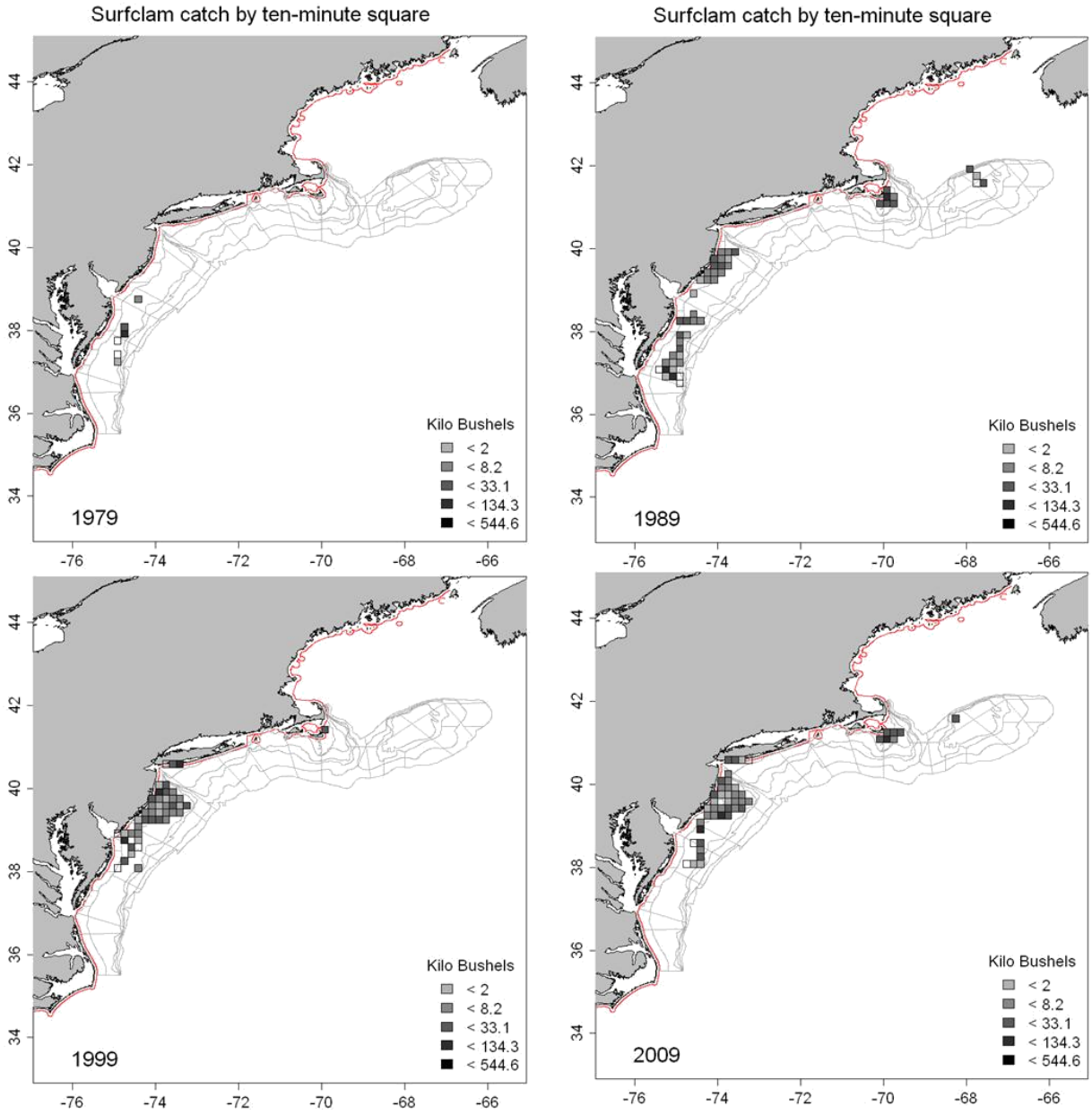


Figure 7. Early increase in effort, and changes in the distribution and intensity of the fishery through time. Gives Surfclam landings by ten-minute square (TMSQ), the finest scale location for landings reported in logbooks, for 1979, 1989, 1999, and 2009 (1 kilobushel = 1000 bu y-1). Source: Stock Assessment Summary (NEFSC 2013).

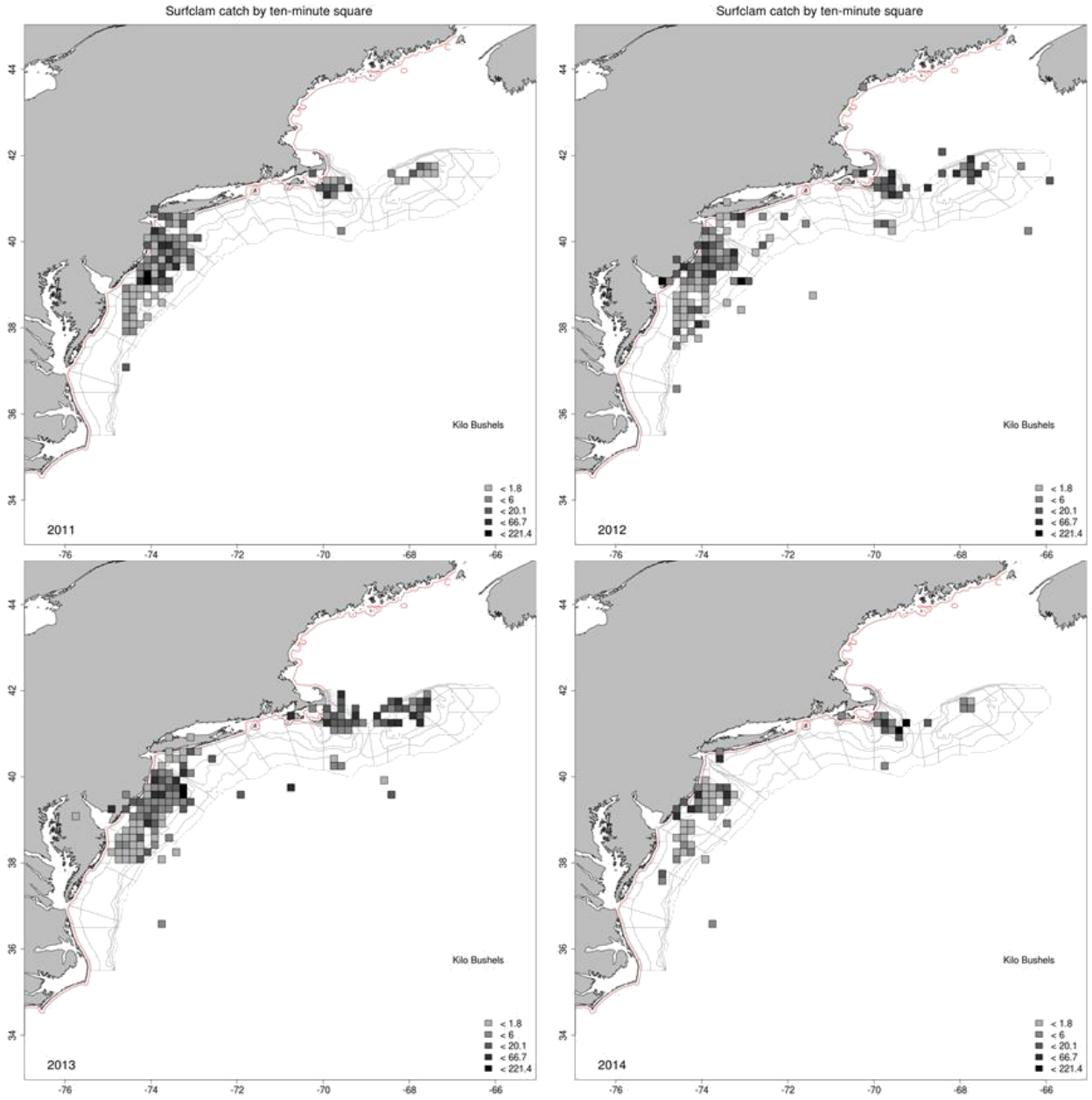


Figure 8. More recent changes in fishing intensity and distribution through time, given as surfclam landings by ten-minute square (TMSQ), the finest scale location for landings reported in logbooks, for 2011-2013, and preliminary 2014 (1 kilobushel = 1000 bu y-1). Source: Dan Hennan Pers. Comm. (NEFSC 2014).

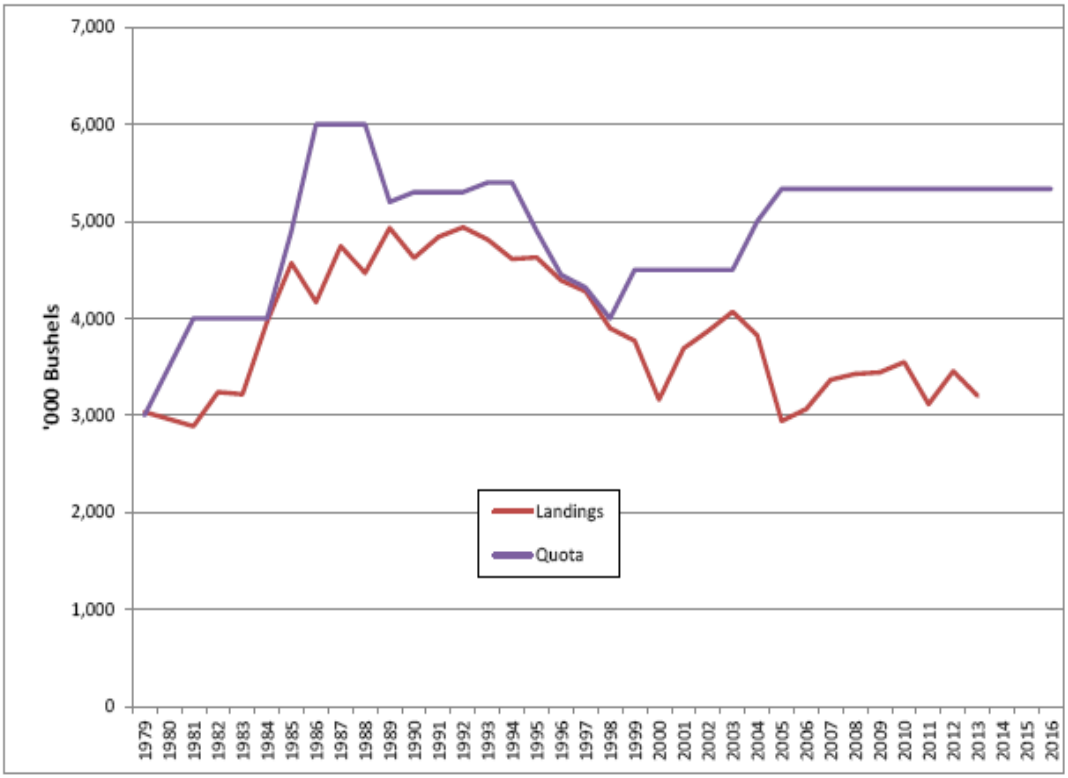


Figure 9. Federal Surfclam Quotas and Landings: 1979 – 2013 (MAFMC 2012, 2014b).Georges Bank first closed for PSP in 1990.

Stock Assessment

(text adapted from Northeast Fisheries Science Center. 2013. 56th Northeast Regional Stock Assessment Workshop (56th SAW) Assessment Summary Report. U.S. Dept Commerce, Northeast Fish Sci Cent Ref Doc. 13-04; 42 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at http://nefsc.noaa.gov/publications/) (A benchmark stock assessment was underway during this assessment, but the results were not available to the review team prior to the completion of this report.)

The surf clam resource on the east coast of the U.S. is well studied and understood. Stock assessment models have continually improved with more detailed data, improved scientific surveys, better analytical approaches, and more treatment of uncertainty. In addition, the sampling gear efficiency is high and well understood. Continuing research has led to a better understanding of the selectivity of the sampling gear and in the fishery. Surfclams are now found in habitats not previously well sampled or they were not previously found.

The Atlantic surfclam stock assessment was peer reviewed and approved for use by management at Stock Assessment Workshop 56 (SAW 56, 2013). A statistical catch at age and length model called Stock Synthesis 3 was used and incorporates age and length structure. Reports on "Stock Status," including annual assessment and reference point update reports, SAW reports, and Stock Assessment Review Committee (SARC) panelist reports are available online at the NEFSC website: http://www.nefsc.noaa.gov

As noted previously, the surfclams settle, grow and mature at different rates depending on local conditions, therefore being a highly localized fishery, stock conditions are often described for regions rather than for the whole stock area (NEFSC 2013). The surfclam EEZ resource is summarized by six regions and two stock assessment areas. From north to south, the regions are: Georges Bank (GBK), Southern New England (SNE), Long Island (LI), New Jersey (NJ), Delmarva (DMV) and southern Virginia (SVA) (Figure 10) and the two stock assessment areas are northern (GBK) and southern (remaining regions). Stock assessment results from the two areas were combined by the NEFSC stock assessment staff to evaluate the status of the stock for the entire EEZ resource. The resource is defined as a single stock, although there are differences between regions in biological characteristics and fishing activity.

There has been a declining trend in catch per unit effort in the fishery (Figure 11). There was a doubling of effort in the ten years prior to 2011 while catches remained stable; effort shifted into LI and SNE from NJ. LPUE values by region in the few years leading up to 2011 were at or among the lowest since the ITQ began in 1990 except on GBK, where LPUE in the experimental fishery (see below) was about five times higher than elsewhere. Increased fishing time as a result of sparser clam beds has led to higher fuel costs. The surfclam fishery has been unable to locate large, dense beds of surfclams to replace those that were a mainstay for the fleet for many years (e.g., the eastern Nantucket Island beds that were discovered in 2004 are no longer producing high catches). In 2011, the industry depended on a single degree square off of New Jersey that supplied 47% of the federal harvest (MAFMC 2012).

The 56th SAW in 2013 conducted a stock assessment on the 2011 Atlantic surfclam resource in the U.S. EEZ. Surfclams and fisheries in state waters were not included in this assessment. The 2013 assessment used a statistical catch-at-age and length replacing the biomass dynamic model used previously. The new model incorporated age and length structure. Age composition data from the 1982 to 2011 NEFSC clam surveys, and commercial length composition from port samples (when available) were utilized in the assessment for the first time. Stock assessment results from the northern and southern areas were combined to evaluate the status of the stock for the entire EEZ. The SARC could not decide whether to recommend changing from the current single stock definition. The SARC noted that this should not prevent conducting stock assessments by subareas, nor should it preclude area-based management, if appropriate.

The 2013 stock assessment found that the biomass of the entire stock increased from 1330 thousand mt meats (2932 million lbs) and peaked at 2500 thousand mt meats (5512 million lbs) between 1982 and 1988 (Figure 12). During 1989-2011, biomass declined at a rate of about 3.5% per year. Stock biomass during 2011 was 1060 thousand mt meats (2337 million lbs) with a 95% confidence interval 802-1401 thousand mt, which was slightly less than the previous low of 1100 thousand mt (2425 million lbs) during 2010.

To assess stock status, the assessment used a proxy for FMSY: F = M where M was assumed to be 0.15 y^{-1}. The proxy for B_{MSY} was one-half of the estimated biomass (ages 6+ in the south and ages 7+ in the north) during 1999. The 1999 biomass and related biomass biological reference points, as well as MSY, were re-estimated in this assessment. The previous and revised reference point values are shown in Table 9.

Table 9. Previous and revised reference points (NEFSC 2013)

Reference Point	Last assessment (1999 YR)	Revised (2013 YR)
F_{MSY}	M=0.15 y^{-1}	Same
B_{1999}	1086 thousand mt meats	1944 thousand mt meats
$B_{MSY\ proxy} = ½B_{1999}$ **(target)**	543 thousand mt meats	972 thousand mt meats
$B_{Threshold} = ½\ B_{MSY\ proxy}$	272 thousand mt meats	486 thousand mt meats
MSY	NA	98 thousand mt meats

The Atlantic surfclam resource in the U.S. EEZ was not overfished and overfishing was not occurring in 2011 (NEFSC 2013). Estimated biomass of the entire resource during 2011 (approximate 120+ mm shell length, SL) was 1,060 thousand mt (2,337 million lbs), with a 95% confidence interval of 802 - 1,401 thousand mt meats (NEFSC 2013). The 95% confidence interval overlaps the B_{Target} = ½ B_{1999} = 972 thousand mt meats (2,142 million lbs) but is entirely above $B_{Threshold}$ = ½ B_{Target} = 486 thousand mt meats (1,071 million lbs; Figure 12). Estimated annual fishing mortality during 2011 for the entire resource was F = 0.027 (95% confidence interval 0.016 - 0.045), which is entirely below the overfishing threshold F_{MSY} proxy = M = 0.15 (Figure 13).

As noted previuosly, the entire surfclam population estimate is based on the integration of the northern and southern portions of the population. Estimated biomass of the northern area on Georges Bank during 2011 (ages 7+, approximately 120+ mm shell length, SL) was 357 thousand mt of meats (787 million lbs) with a 95% confidence interval 252 - 506 mt. Surfclams on Georges Bank were not fished from 1990 to 2008 due to the risk of paralytic shellfish poisoning (PSP). There was light fishing in years 2009-2011 under an exempted fishing permit. Fishing mortality on Georges Bank was close to zero (F_{2011} = 0.009; 95% confidence interval 0.006 - 0.013) during 2011. Estimated biomass of the southern area during 2011 (ages 6+, approximately 120+ mm shell length, SL) was 703 thousand mt (1,549 million lbs), with a 95% confidence interval of 481 - 1,028 thousand mt meats. Estimated fishing mortality during 2011 for the southern area was F = 0.037 (95% confidence interval 0.025 - 0.056). Recruitment (age 0) has been below average for the whole stock since 1999.

The FMP defines the biomass that existed in 1999 as a virgin biomass proxy, with a target biomass of B_{MSY} equal to ½ B_{1999}. For the 2013 stock assessment, the new stock assessment model estimated virgin biomass in the southern area as being almost identical to the biomass in 1999 as estimated in the previous stock assessment. That value was 1086 thousand mt of meats. The estimate of the combined Georges Bank and southern region biomass at that time was 1100 thousand mt of meats, approximately equal to the virgin biomass proxy estimated by the previous stock assessment. However, the 2013 stock assessment revised the B_{1999} biomass estimate upward to 1944 thousand mt meats, resulting in a new target of 972 thousand mt of meats, or somewhat less than the estimated total stock biomass (NEFSC 2013).

At the 1 April 2016 MSC onsite meeting, NMFS staff related that based on the ongoing 2016 assessment, using data through 2015, the surfclam stock is considered to be at "near virgin biomass levels" and is considered "lightly fished" (pers. comm, Dan Hennan). This conclusion is apparently based on information not evident in the 2013 stock assessment, which shows the total stock biomass as being somewhat greater than the target biomass, which is one-half the virgin biomass proxy (B_{1999}). Until the 2016 stock assessment is available, the biomass relative to the B_{1999} versus target biomass cannot be stated definitively, but based on the personal communication it appears that biomass estimates have increased under the 2016 assessment relative to the 2013 assessment.

Multiple explanations are possible to explain how the surfclam resource could be “near virgin biomass levels” after many years of fishing. The virgin biomass proxy is B_{1999}, at which time the resource had been fished for at least 50 years. At the time of the 2013 stock assessment, data for the Georges Bank portion of the surfclam stock was limited and no separate estimate of abundance on Georges Bank was available. The fishery is limited not by quota, but by market demand. Fishermen fish where it makes the most economic sense to fish, relative to costs. The need to achieve profitable catch rates causes the fishery to move away from areas where a substantial density of clams remains. Since 2013, the largest boats have focused their fishing on Georges Bank, where the resource is considered virgin, removing fishing pressure from the southern regions. Many areas with appreciable densities of clams simply are not fished because the catch rates would not be economical. These economics-based refuges allow clams to grow to large sizes. This phenomenon was illustrated by selectivity experiments that showed a

dome-shaped selectivity curve for the commercial fishery in the southern region (NEFSC 2013). The largest clams do not show up in the commercial fishery because they are found in areas where catch rates are not sufficient to support the commercial fishery. This distorts any fishery dependent CPUE as an indication of total stock abundance. The fishery is concentrated in relatively small areas with high catch rates but much of the stock is spread out over a large area with somewhat lower densities. Overall, the fishery exploits a relatively small part of the resource. In essence, the surfclam resource was initially fished down from the virgin biomass in the most profitable areas, as expected. The combination of continuing surplus production in the fished areas and a large portion of the resource being unfished explain the continuing high biomass.

In addition, size selectivity of the fishery is an important factor in this assessment and tends to buffer the resource from the effects of fishing to some degree (NEFSC 2013a). The fishery does not begin to select clams until they reach relatively large sizes. Surfclams are reproductive at very small sizes and thus are sexually mature for several years before becoming available to the fishery (Cagnelli et al. 1999, cited in NEFSC 2013).

Uncertainties

Uncertainties are discussed in detail throughout NEFSC stock assessment reports. Uncertainty in the 2013 surfclam assessment can be found in NEFSC 2013 under the heading "Uncertainty." The below summarize key uncertainties identified in the 2013 stock assessment (NEFSC 2013).

Uncertainty about survey capture efficiency increased uncertainty about biomass levels substantially. However, conclusions about stock status are considered robust to this uncertainty. Estimates of biomass in both the northern and southern areas were uncertain in terms of absolute biomass (scale) but estimated trends in biomass were relatively certain.

The Subcommittee concluded that B_{1999} was preferable to a formal virgin biomass estimate from an assessment model as the basis for biomass reference points because the stability of estimated trends substantially reduces uncertainty in the ratio $B_{Current}/B_{Threshold}$ when $B_{Threshold} = B_{1999}/4$ and because of uncertainty about ongoing environmental trends. The group concluded that ratio of $B_{Current}$ over an estimate of B_{MSY} was thought unlikely to be robust particularly due to uncertainties about B_{MSY} in the face of environmental change. (NEFSC 2013)

Fishing mortality estimates for surfclams are uncertain because they compare the scale of catch against the absolute but uncertain scale of biomass. There is also uncertainty about natural mortality in surfclams, which likely varies temporally and spatially. Reductions in biomass of surfclam in inshore southern regions are probably due, in part, to changes in environmental conditions and increasing natural mortality. On the other hand, the occurrence of old clams (> 35 y) in survey catches implies that the natural mortality rate may be lower than assumed. Sensitivity analysis indicated that the surfclam population in the south was adequately modeled using M=0.15. Despite this uncertainty, the overfishing status determination is relatively certain because the overall fishing mortality rate is low and almost

certainly less than $F_{threshold}$=M=0.15 based on sensitivity testing, survey size and age distribution and various other model calculations. Similarly, quota catch projections indicate the probability of overfishing or overfished conditions are <1% even at the extremes of a large range of biomasses.

Survey dredge efficiency has been difficult to estimate with reasonable precision. It is likely that dredge efficiency is affected by local conditions such as substrate properties, currents and wind. It may be highly variable from site to site. This variance was ignored in previous assessments. Procedures for estimating dredge efficiencies were modified considerably for this assessment based on Hennen et al (2011) and the incorporation of previously unrecognized uncertainty.

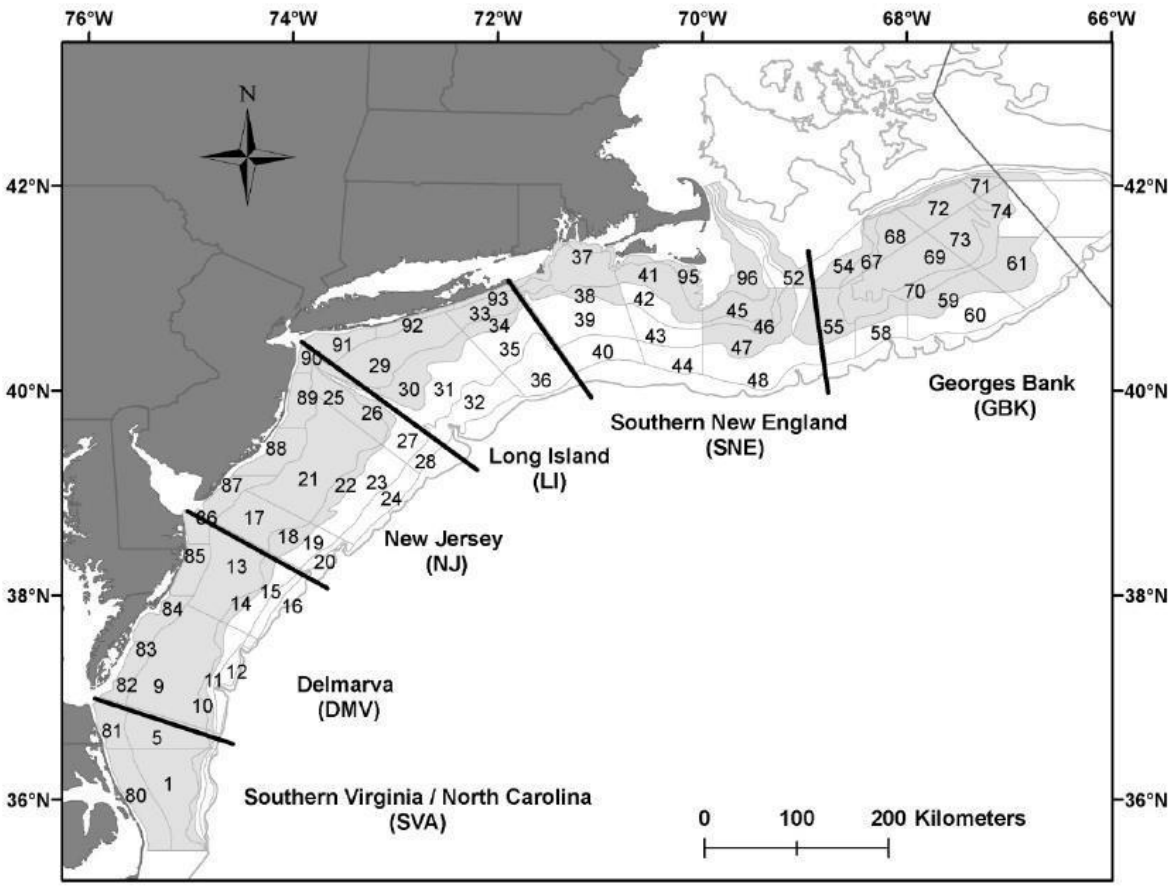


Figure 10. Assessment regions for the Atlantic surfclam stock in the U.S. Exclusive Economic Zone (EEZ). NEFSC shellfish strata with potential surfclam habitat are shown in grey and identified by stratum ID numbers (NEFC 2013).

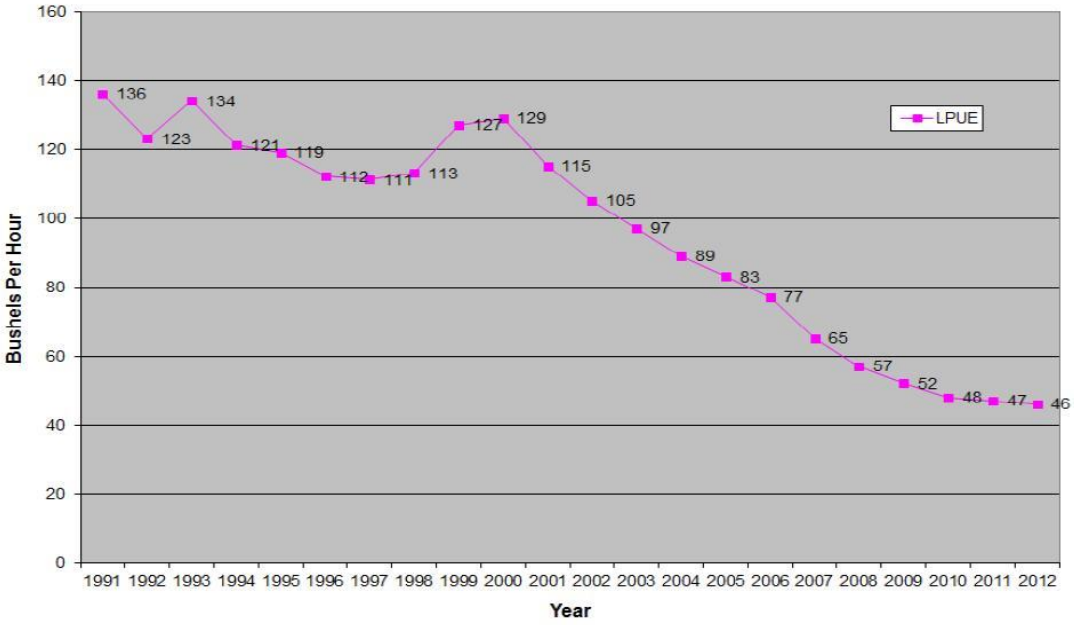


Figure 11. Surfclam landings per unit effort (bushels per hour) 1991-2012 (2012 trips reported through May 09 2012 only) (MAFMC 2012).

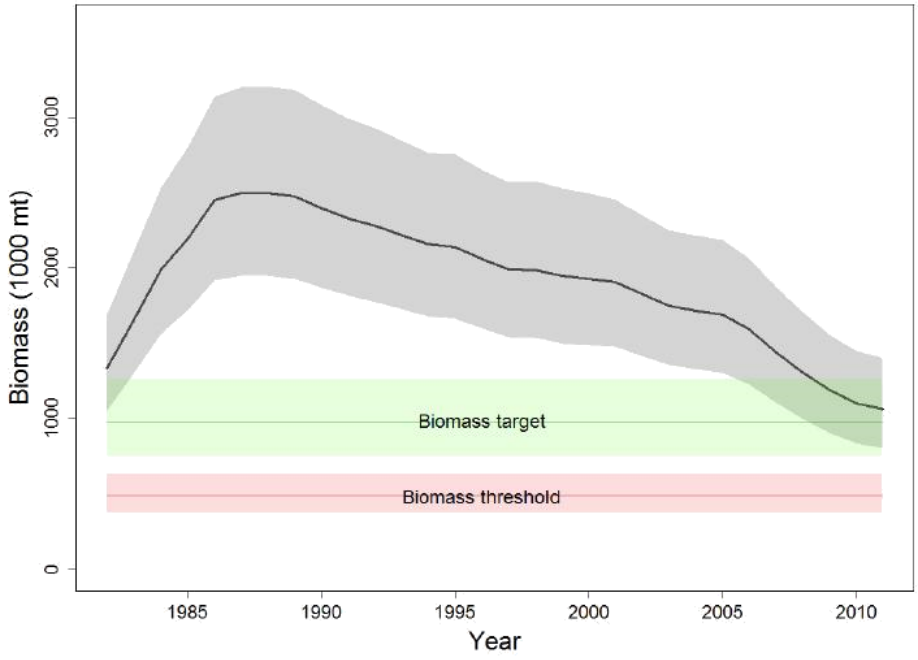


Figure 12. Whole surfclam stock biomass status estimates with approximate 95% confidence intervals on the estimates and reference points. Source: Stock Assessment Summary (NEFSC 2013).

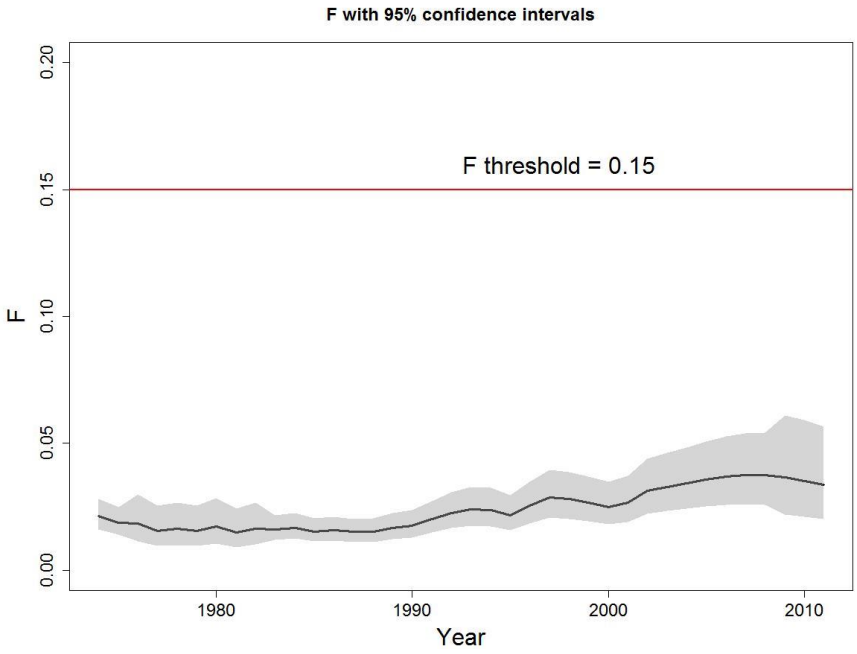


Figure 13. Whole surfclam stock fishing mortality estimates with approximate 95% confidence intervals, and the overfishing threshold. Source: Stock Assessment Summary (NEFSC 2013).

Management

The Fishery Management Plan (FMP) for Atlantic surfclam (*Spisula solidissima*) became effective in 1977. The FMP established the management unit as all Atlantic surfclams in the Atlantic EEZ. The FMP is managed by the Mid-Atlantic Fishery Management Council (Council), in conjunction with the National Marine Fisheries Service (NMFS) as the Federal implementation and enforcement entity. The primary management tool is the specification of an annual quota, which is allocated to the holders of allocation shares (Individual Transferable Quotas (ITQs)) at the beginning of each calendar year as specified in Amendment 8 to the FMP (1988). This process is overseen by the MAFMC Scientific and Statistical Committee (SSC) and in essence that SSC sets the ABC (catch limits) for the surfclam fishery annually, http://static1.squarespace.com/static/511cdc7fe4b00307a2628ac6/t/51c1bedbe4b01e46e939c8c8/1371651803801/May+2013+SSC+Report.V2.pdf.

The minimum size limit for surfclams is considered, and may be suspended, on an annual basis. The regulations provide the following guidance for suspension of the minimum size: “Upon the recommendation of the MAFMC, the Regional Administrator may suspend annually, by publication in the FEDERAL REGISTER, the minimum shell-length standard, unless discard, catch, and survey data indicate that 30 percent of the surfclams are smaller than 4.75 inches (12.065 cm) and the overall reduced shell length is not attributable to beds where the growth of individual surfclams has been reduced because of

density dependent factors." (76 FR 60623, Sept. 29, 2011) The minimum size for surfclams has been suspended each year in recent years. There is no current Federal minimum size for ocean quahogs.

In addition to the Federal waters fishery, there is a small fishery prosecuted in the state waters of New York and New Jersey, but this is not included in the UoA. The FMP, including subsequent Amendments and Frameworks, is available on the Council website at: http://www.mafmc.org.

An Individual Transferable Quota (ITQ) system was implemented in 1990 for the surfclam and ocean quahog fisheries; the first such system established for a U.S. federal fishery (MAFMC 2014a). Prior to that, the surfclam fishery was managed through limited entry, quarterly quotas and fishing time restrictions (MAFMC 2014a); 128 vessels operated in the fishery (MAFMC 2003). By the mid-1980s, effort limitations combined with overcapacity resulted in vessels operating only 6 hours every other week. Within two years of implementation of the ITQ program, fleet size was reduced by 54%, and capacity utilization was increased by 150% (MAFMC 2014a). Labor was displaced as a result of improved economic efficiency. The ITQ system's design allowed for shares to be traded or leased to any person or entity, with no pre-conditions of vessel ownership or limits on the amount of ITQ shares owned by an entity. As a result, market consolidation and vertical integration have increased over time. In general, the surfclam landings have been substantially less than the quota in the last decade.

As noted previously, for the surfclam resource in the federally managed fishing areas, the Council's SSC sets the ABC each year, and under the FMP the ABC equals the ACL ("annual catch limit"). The ACL then may be reduced by the Council if there is management uncertainty when it sets the annual catch target (annual quota). In 2012 the MAFMC adopted, and NMFS approved, Amendment 16 to the surfclam and ocean quahog FMP as part of an omnibus amendment establishing the equivalent of a harvest control rule/risk policy for all of the MAFMC managed resources. That control rule/risk policy now may be found at 50 CFR §648.21, and it establishes a required procedure for ensuring that F is reduced as the threshold reference point is approached according to the following rules: For stocks with a ratio of B to Bmsy of 1.0 or higher (i.e., the stock is at Bmsy or higher), the maximum probability of overfishing (based upon peer reviewed assessments) may not exceed 35%. As the ratio of B/Bmsy becomes less than 1.0 and continues to decline, the allowable maximum probability of overfishing declines commensurately, in a linear fashion, until the probability of overfishing becomes zero at a B/Bmsy ratio of 0.10. So in a scenario where the biomass is diminishing, falling below Bmsy and approaching the threshold, in order to conform with the allowable probability of overfishing, the quota must be commensurately reduced.

3.3B Ocean Quahog

Taxonomic classification

Class: Bivalvia

Order: Veneroida

Family: Mactridae

Genus: *Arctica*

Species: *islandia*

Biology

(Text adapted from Cargnelli, L.,S. Griesbach, D. Packer, and E. Weissberger. 1999. Essential Fish Habitat Source Document: Ocean Quahog, Arctica islandica, Life History and Habitat Characteristics. NOAA Tech. Memo. NMFS-NE-148.)

Introduction

The ocean quahog, *Arctica islandica*, is a bivalve mollusk (Figure 13) found in temperate and boreal waters on both sides of the North Atlantic (Weinberg 1995). In U.S. waters, quahogs are managed under the Mid-Atlantic Fishery Management Council's Atlantic Surfclam and Ocean Quahog Fishery Management Plan (MAFMC 1997).

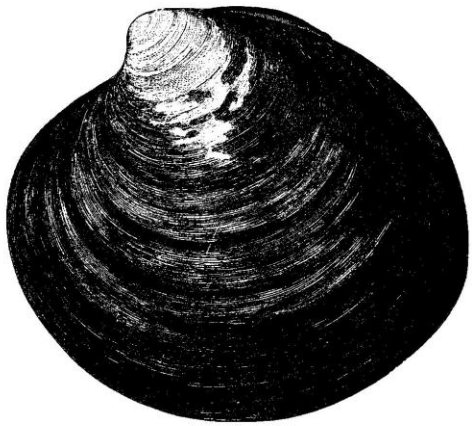


Figure 14. The ocean quahog, *Arctica islandica* (from Goode 1884).

Life History

The eggs and larvae of ocean quahogs are planktonic, drifting with currents until the larvae metamorphose into juveniles and settle to the bottom (MAFMC 1997). Eggs range in size from 80-95 µm in diameter (Loosanoff 1953). Larvae go through three stages of development, with the duration of each stage being temperature dependent. Fertilized eggs hatch into planktonic trochophore larvae, which develop into veliger larvae, the first larval stage to possess a bivalved shell. Veligers in turn develop into pediveligers, a transitional "swimming-crawling" larval stage with development of a foot for burrowing.

The minimum larval development period of ocean quahogs is 55 days at 8.5-10°C (Lutz *et al.* 1981, 1982), 60 days at 10-12°C, (Landers 1972, 1976), and 32 days at 13°C (Lutz *et al.* 1981, 1982). There is some variation in reported lengths at which metamorphosis occurs, from 175-200 µm (Landers 1972, 1976) to 240 µm (Lutz *et al.* 1981, 1982).

Mann and Wolf (1983) studied larval behavior in the laboratory. Trochophores were negatively geotactic (i.e., tend to move up in the water column), showed no phototaxis (i.e., did not orient themselves toward light), and showed no change in swimming behavior when water pressure was changed from 1-3 bar. Veligers also showed no phototaxis, but veligers 160-190 µm long moved upward with an increase in pressure and downward with a decrease in pressure. However, larger veligers showed no response to pressure change.

Growth of ocean quahogs is relatively fast during the juvenile stage. In a 3-year laboratory study, Lutz *et al.* (1982) found that quahog length ranged from 1.0 to 3.9 mm 7.5 months after metamorphosis. Kraus *et al.* (1989, 1992) reported a laboratory growth rate of 18.5 mm/year for the first two years of life, and 7.3 mm/year for the third year. In a one-year field caging study, Kennish *et al.* (1994) found that quahogs 9.2-19.9 mm shell length grew an average of 10-22 mm/year.

Recruitment of juveniles into the population is relatively low. The protracted spawning period suggests that recruitment may occur at low levels over several months, rather than in a single strong pulse. Kennish and Lutz (1995) attribute low recruitment to adverse environmental factors (poor substrate, high temperatures) and predation on recently settled individuals.

The ocean quahog is among the longest-lived and slowest growing of marine bivalves and may reach a maximum age of 225 years (Ropes and Murawski 1983; MAFMC 1997). They grow very slowly or not at all and individuals of similar size may vary greatly in age. Quahogs off Long Island grew 0.56 mm/year in 1970 and 1.17 mm/year in 1980, while those off New Jersey grew an average of 1 mm in 1.6 years. In Whitsand Bay, UK, quahogs grew 0-1.5 mm/year (Kennish *et al.* 1994; Kennish and Lutz 1995). Ocean quahogs from Georges Bank appear to be the youngest (Ropes and Pyoas 1982).

Growth rates may be reduced at high density. Beal and Kraus (1989) noted that growth was reduced by a factor of 1.2 when density was increased from 323-645 clams/m^2. Growth is also dependent upon temperature. Stable isotopes show a consistent growth shutdown temperature of about 6°C for a clam from Nantucket Shoals, implying a May-December growing period (Weidman and Jones 1993).

Distribution

In the Western Atlantic, the ocean quahog is distributed on the continental shelf from Newfoundland to Cape Hatteras (Weinberg 1995). Greatest concentrations are in offshore waters south of Nantucket to the Delmarva Peninsula (Serchuk *et al.* 1982). The inshore limit of their distribution appears to be defined by the 16°C bottom isotherm in the summer months (Mann 1989). They are found in relatively shallow water in eastern Maine (but never intertidally) and in deeper, more offshore waters south of Cape Cod (MAFMC 1997).

The terms pre-recruit and recruit are used here in describing the distributions of juveniles and adults. These terms refer to the exploited and unexploited portions of the stock. Ocean quahogs are exploited at a minimum shell height of 8 cm; thus, pre-recruits are ≤ 7 cm, and recruits are ≥8 cm.

Little is known about the distribution or abundance of ocean quahog eggs and larvae in the field. Mann (1985) noted quahog larvae in southern New England waters in May (1-30 m depth) and from July to November (20-40 m depth). The highest larval concentration was 512 larvae/m^3 in September at a 30 m depth. High larval concentrations were associated with temperatures of 14-18°C. The presence of larvae in May suggests that larvae may survive over the winter. Larval settlement is believed to occur throughout the adult distribution range (Mann 1989).

Eggs and larvae are not enumerated by the Northeast Fisheries Science Center (NEFSC) Marine Resources Monitoring, Assessment and Prediction (MARMAP) program.

NEFSC summer ocean quahog surveys [see Reid *et al*. (1999) for details] collected ocean quahogs from Georges Bank to Cape Henry, Virginia (Figure 15 and Figure 16). The greatest number of catches was made from Long Island to the Delmarva Peninsula. They occur further offshore south of the Hudson Canyon. The distribution of pre-recruits (≤ 7 cm) and recruits (≥8 cm) appears to be the same. However, pre-recruits are not sampled well by the survey gear. Thus, Figure 15 may not accurately reflect the actual distribution of pre-recruits. The Gulf of Maine was not surveyed; however, quahogs tend to be found in fishable concentrations in relatively nearshore waters of the Gulf (Weinberg 1998).

Reproduction

The environmental stimuli for spawning are unclear. Jones (1981) notes that the initiation of spawning may be coincident with the highest bottom temperature. Mann (1982) suggests that temperature is probably a spawning stimulus, but only in conjunction with other stimuli, such as increases in pH, food availability, and increases in dissolved oxygen. In the laboratory, rapid temperature changes, salinity changes, or sperm suspensions did not induce spawning in ripe individuals (Landers 1976).

Ocean quahogs mature very slowly. Rowell *et al.* (1990) report the mean age of sexual maturity for Nova Scotian quahogs to be 13.1 years for males and 12.5 years for females. The earliest age of maturity was 7 years for both sexes, and maturity occurred at about 49 mm shell length. Ropes *et al.* (1984b) found

that immature clams off Long Island were 2-8 years old, and 19 to 46 mm long. Thompson *et al.* (1980b) reported the average age of maturity for Middle Atlantic Bight quahogs was 9.38 years, but this was extremely variable.

Ocean quahog spawning is protracted, lasting from spring to fall. Multiple annual spawnings may occur at the individual and population levels (Mann 1982). Off Rhode Island, Loosanoff (1953) reports ocean quahog spawning from late June to late October. Mann (1982, 1985) reported a more protracted spawning period for the same region from May to November, with the most intense spawning occurring from August to November. Off New Jersey, spawning occurred from September to November, and sometimes persisted into January (Jones 1981). Fritz (1991) noted higher visceral weight in ocean quahogs off Cape May in spring and summer than in fall and winter, suggesting late summer spawning. Off Nova Scotia, spawning occurred from July to September; in some years, all individuals showed evidence of partial spawning from February to May (Rowell *et al.* 1990).

Food Habits

Ocean quahogs are suspension feeders on phytoplankton, using their relatively short siphons which are extended above the surface of the substrate to pump in water. Extremely high algal concentrations may interfere with feeding (Winter 1970). In the laboratory, Winter (1969) showed that the maximum rate of algal filtration by adult quahogs occurred at 20^{o}C and 50x10^{6} cells/l, but such high algal concentrations are unlikely to occur in the field. In a 24 hour period, two feeding periods alternate with two digestion periods (Winter 1970).

Millions of microscopic plants (phytoplankton) thrive in nearly every drop of coastal seawater. In the presence of sunlight and sufficient nutrients to grow, these plants photosynthesize and multiply, creating a “bloom.” While most of the thousands of species of algae are harmless, this species is one of a few dozen that create potent toxins. The swimming, photosynthetic cells of *A. fundyense* are responsible for blooms in the northeast U.S. A closely related species called *Alexandrium tamarense* also occurs in these waters but *A. fundyense* is more abundant and thus its name is used to simplify discussions. The motile cells of *A. fundyense* originate from the germination of dormant cysts that accumulate in bottom sediments and allow the species to survive cold winter temperatures and unfavorable growing conditions. The cysts can also be resuspended by tides and storms.

The toxins produced by *A. fundyense* accumulate in filter-feeding shellfish such as clams, mussels and oysters making them unsafe for people and animals to eat. There is no risk to people who consume the flesh of fish, lobsters, and shrimp or who swim in the ocean. If eaten in sufficient quantity, these contaminated shellfish can result in illness or even death from a poisoning syndrome called paralytic shellfish poisoning, or PSP. Portions of Georges Bank have been closed for ocean quahog harvest due to PSP.

Predation

Many animals prey on ocean quahogs. Invertebrate predators include rock crabs (Stehlik 1993), sea stars (Kennish *et al.* 1994), and other crustaceans (Kraus *et al.* 1991). Teleost predators of ocean quahogs include longhorn sculpin, *Myoxocephalus octodecemspinosus*, ocean pout, *Macrozoarces americanus* (Packer and Langton, in prep.), haddock (Clarke 1954), and cod (Clarke 1954; Brey *et al.* 1990). Medcof and Caddy (1971) noted many predators feeding on quahogs damaged by a dredge. These included cod, winter flounder, sculpin, skates, moon snails, and hermit crabs. Other potential predators seen in the dredge tracks but not observed feeding included eelpout, sea stars, and whelks.

Habitat Characteristics

(Information on the habitat requirements and preferences of ocean quahogs concentrates primarily on U.S. stocks.)

Although larvae in laboratory studies can survive temperatures as high as 20°C, ocean quahogs tend to grow optimally between 13 and 15°C (Mann and Wolff 1983). Field studies southwest of Cuttyhunk, Massachusetts, Mann (1985) showed that the highest concentrations of larvae occurred between 14 and 18°C from August to September. They were found at depths of 1-30 m in May and from 20-40 m from late July to November. Larvae were collected at an average salinity of 32.4 ppt.

Juvenile ocean quahogs are found offshore in sandy substrates (Kraus *et al.* 1989, 1992) but may survive in muddy intertidal environments if protected from predators (Kraus *et al.* 1991). Witbaard *et al.* (1997) showed that laboratory-reared juvenile quahogs were able to grow at temperatures as low as 1°C. Shell growth increased tenfold between 1 and 12°C, however the greatest change in growth rate occurred in the lower temperature range of 1-6°C. Small changes in spring bottom water temperatures may have a large impact on the resulting shell growth (Witbaard *et al*. 1997). Juveniles have been shown to survive temperatures as high as 20°C (Kraus *et al.* 1989, 1992). In the Middle Atlantic Bight, juvenile ocean quahogs are typically found at depths of 45-75 m and at salinities of 32-34 ppt.

Adult ocean quahogs are usually found in dense beds over level bottoms, just below the surface of the sediment which ranges from medium to fine grain sand (Medcof and Caddy 1971; Beal and Kraus 1989; Brey *et al.* 1990; Fogarty 1981; MAFMC 1997). Based on field distributions on both sides of the Atlantic, Golikov and Scarlato (1973) estimated the optimal temperature for ocean quahogs to be 6-16°C. Mann (1989) reported the inshore limit of quahog distribution as the 16°C bottom isotherm in summer months. Merrill *et al.* (1969) reported a lethal temperature of 13-16°C; quahogs held at 21°C died in a few days. Although the species has been found at depths of 14-82 m, most are found at depths of 25 to 61 m (Merrill and Ropes 1969; Serchuk *et al.* 1982) and some have been found as deep as 256 m (Ropes 1978). Ocean quahogs are found at oceanic salinities, but Oeschger and Storey (1993) successfully kept them at 22 ppt in the lab for several weeks.

Ocean quahogs are capable of surviving low dissolved oxygen levels. In both the laboratory and field, quahogs can burrow in the sand and respire anaerobically for up to seven days (Taylor 1976). Declining O_2 tension results in an increased rate of ventilation, reduced O_2 utilization, and heart rate changes

(Brand and Taylor 1974; Taylor and Brand 1975). Under anoxic conditions, enzymes are modified to reduce metabolism and energy release (Oeschger 1990; Oeschger and Storey 1993). Quahogs may also undergo self-induced anaerobiosis (Oeschger 1990). Even with the ability to survive hypoxic conditions, ocean quahogs may still experience negative effects of low oxygen levels. During a hypoxic event off New Jersey in 1976, up to 13.3% of ocean quahogs died in the shoreward part of the population. However, quahogs in deeper water were not subjected to hypoxia (Ropes *et al.* 1979).

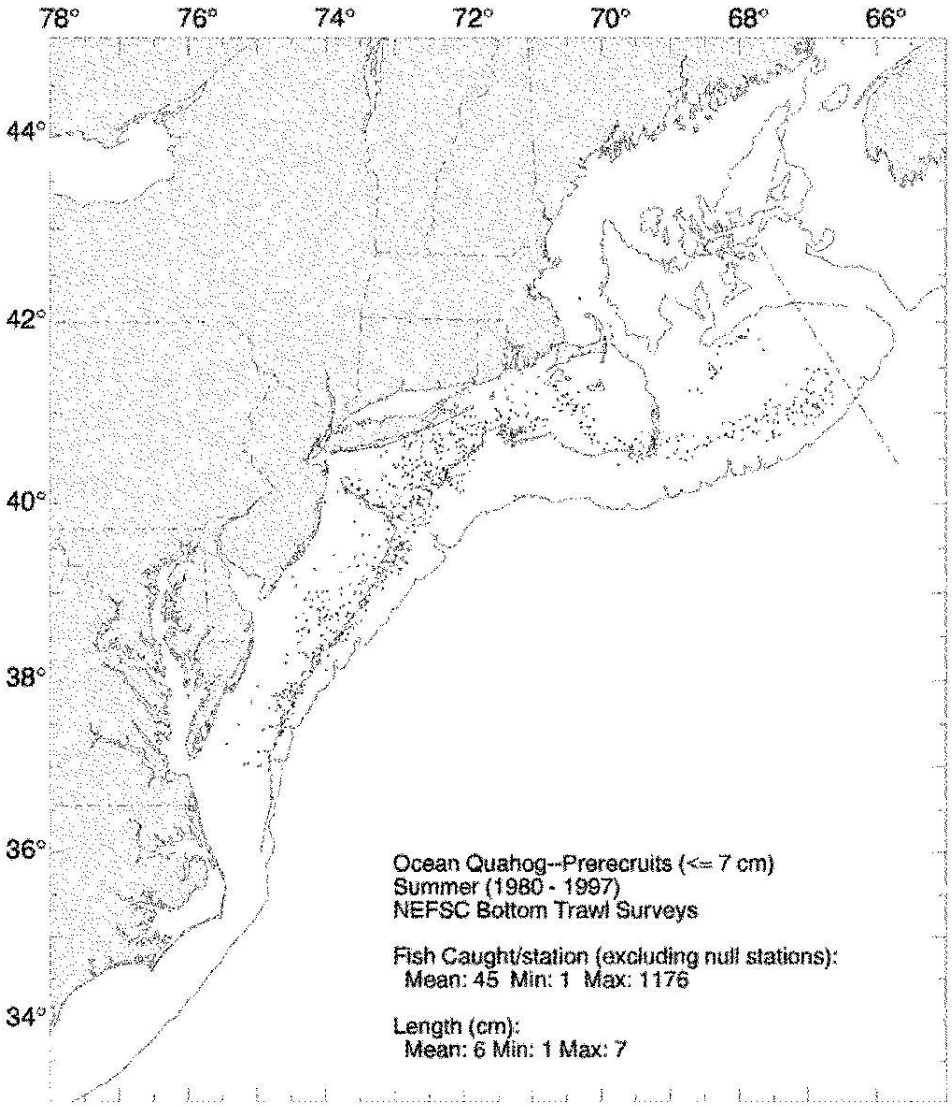


Figure 15. Distribution of ocean quahog pre-recruits (≤7 cm) collected during NEFSC summer ocean quahog surveys [see Reid *et al.* (1999) for details]. Black dots represent stations where ocean quahogs were taken. The Gulf of Maine was not surveyed.

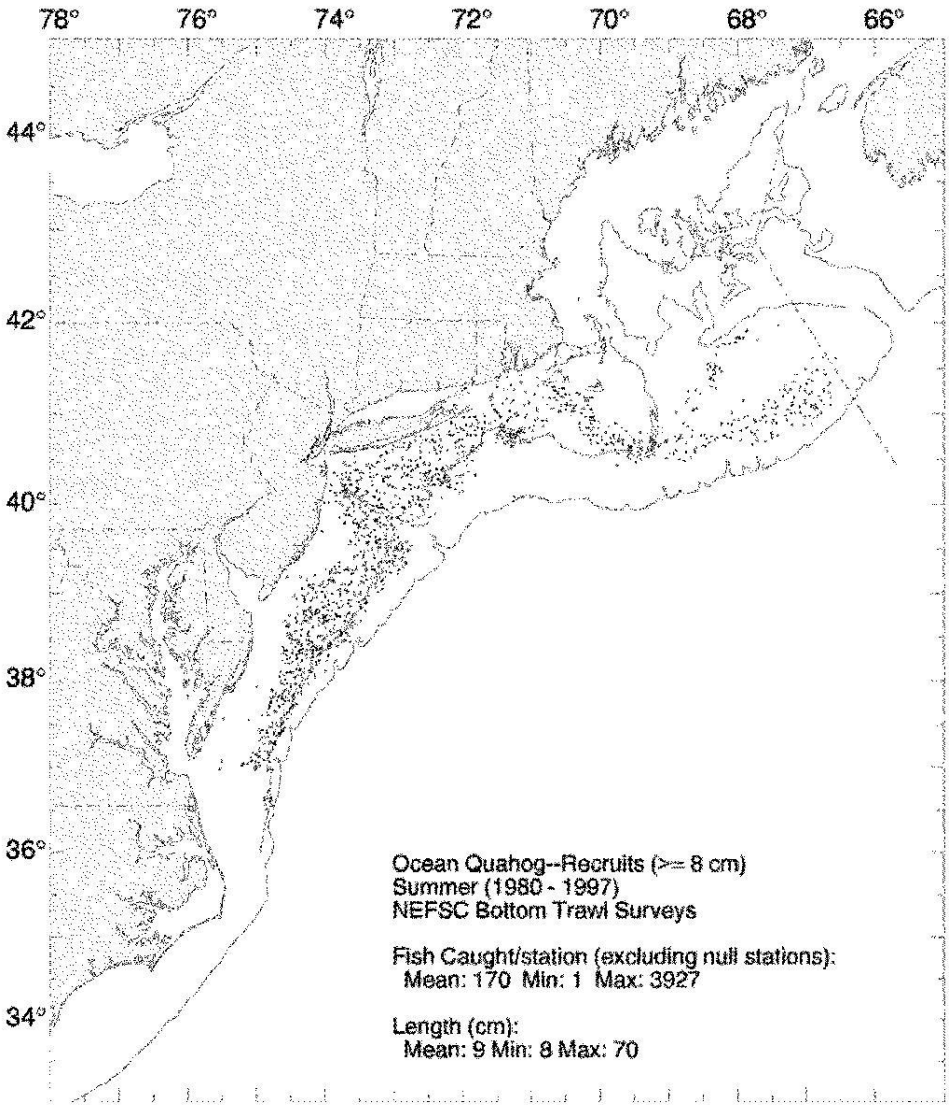


Figure 16. Distribution of ocean quahog recruits (≥ 8 cm) collected during NEFSC summer ocean quahog surveys [see Reid *et al.* (1999) for details]. Black dots represent stations where ocean quahogs were taken. The Gulf of Maine was not surveyed.

Fishery Fleet Profile and Landings

(Text adapted from Mid-Atlantic Fishery Management Council Ocean Quahog Information Document - April 2014)

The commercial fishery for ocean quahog in federal waters is prosecuted with large vessels (20-40 m) and hydraulic dredges, and is very different from the small Maine fishery prosecuted with small vessels (35-45 ft) targeting small quahogs for the local fresh, half shell market and using dry dredges: this latter fishery is not included in the UoA. The fishable stock in federal waters is increasingly found in northern regions (Long Island, Southern New England, and Georges Bank). In 1978 Georges Bank contained 33% of the biomass but by 2008 this had risen to 45%. Ocean quahog landings and commercial quotas from the UoA are given below in Tables 10 and 11. The distribution of the fishery has changed over time, with the bulk of the fishery from 1980-1990 being prosecuted off the Delmarva, to more Northern areas 1990-present (Figures 16 and 17).

The center of concentration of the ocean quahogs harvest was off eastern Long Island in 2006 (Figure 17 and Figure 18), 74% of the annual harvest was taken from a small, high-yielding one degree square in this area (percentages in 2010 and 2011 were 54 and 61%, respectively). Adjacent squares to the east and southwest off New Jersey have provided the next highest yields. Other areas in southern waters off Delmarva Peninsula (Delaware, Maryland and Virginia) are also important, but catch rates are lower. Similar to the surfclam fishery, seasonal area closures have been in place since 1990 due to the presence of the paralytic shellfish poisoning (PSP) toxin.

Landings increased from about 3 million bushels in 1979 to 5 million bushels in 1992, and then declined back to 3 million bushels by 2011 (Table 10 and Table 11, and Figure 19). The steepest decline was from 1992 to 2000 when the landings were just over 3 million bushels. The landings subsequently increased to just over 4 million bushels in 2003, but declined again after that. Declining catch rates and high fuel prices have reduced the profitability of catching ocean quahogs (MAFMC 2012). In 1997 and 1998, there was a shift toward utilization of lower-priced ocean quahog meat, which resulted in fishermen almost reaching the quota (MAFMC 2003). However, fuel prices subsequently rose, and combined with an increasing scarcity of ocean quahogs and low prices, fishermen returned focus to surfclams, which are found closer to shore. This trend continued in 2000, and harvest dropped to the lowest level in two decades (3.161 million bushels); 30% of quota was unharvested (MAFMC 2003).

The increase in landings from 2000 to 2003 resulted from the entry into the fishery of large, newly constructed vessels with improved efficiency. This drove an increase in ex-vessel revenue and landings increased by 17% in 2001, following by a 5% increase in 2002 and in 2003 (MAFMC 2012). Excess supply in 2004 resulted in another decline which continued into 2005. In 2005, there was an increase in the federal quota (to 5.333 million bushels), 45% of which was un-harvested. This was the largest percentage surplus on record. While the same market forces affected the surfclam fishery, the impact was more severe for ocean quahogs because their value has been roughly half that of surfclams.

In 2011 landings totaled 2.111 million bushels, but landings increased in 2012 and 2013 to 3.454 and 3.201 million bushels in 2012 and 2013 respectively. Previous declines in harvests have been attributed to a number of factors: reduced productivity of ocean quahog beds as dense beds are fished down and not replaced by new growth of the long-lived species, high fuel costs because ocean quahog are located further offshore than surfclams, and consolidation of quota onto a few vessels that may have reached their capacity, requiring the entry of new vessels to increase harvest (MAFMC 2003).

The total number of vessels participating in the ocean quahog fisheries outside the state of Maine has experienced a downward trend as the fisheries moved beyond a market crisis in 2005 where major users of clam meats reduced their purchases from industry and stopped advertising products like clam chowder in the media (Table 12). The costs to vessels harvesting clams have increased significantly, with the greatest component being the cost of diesel fuel. Trips harvesting quahogs have also increased in length as catch rates have declined steadily. The 30 or so vessels that reported landings during 2004 and 2005 declined and coast-wide harvests consolidated to approximately 20 vessels in the subsequent years.

Table 10. Federal Ocean Quahog Quotas and Landings: 1998 - 2016.

Year	Landings[a] ('000 bu)	Quota ('000 bu)	% Harvested
1998	3,897	4,000	99%
1999	3,770	4,500	86%
2000	3,161	4,500	73%
2001	3,691	4,500	84%
2002	3,871	4,500	89%
2003	4,069	4,500	93%
2004	3,825	5,000	79%
2005	2,940	5,333	57%
2006	3,066	5,333	60%
2007	3,366	5,333	65%
2008	3,426	5,333	65%
2009	3,443	5,333	65%
2010	3,554	5,333	68%
2011[b]	3,116	5,333	60%
2012[b]	3,454	5,333	66%
2013[b]	3,201	5,333	61%
2014[c]	845[d]	5,333	NA
2015[c]	NA	5,333	NA
2016[c]	NA	5,333	NA

NOTES: [a] 1 ocean quahog bushel has a meat weight of approximately 10 lb or 4.5 kg. A metric ton of ocean quahog meats is equivalent to 220 bushels of live ocean quahogs. [b] For 2011-2013, the Scientific and Statistical Committee recommended an overfishing limit (OFL) for 2011-2013 = 34,800 mt, and an acceptable biological catch (ABC) = 26,100 mt. [c] For 2014-2016, the SSC did not recommend an OFL. They recommended a constant ABC of 26,100 mt, for 2014-2016. [d] Incomplete landings year. NA = Not yet available. Source: NMFS Clam Vessel Logbook Reports.

Table 11. Ocean Quahog Landings by Area: 2009-2013. Source: Dan Hennan Pers. Comm. (NEFSC 2014).

a) mt meats

Year	Southern VA	Delmarva	NJ	LI	Southern New England	Georges Bank	Other	Total
2009	0	211	2,416	8,617	4,280	17	1	15,542
2010	0	428	2,315	9,892	3,472	13	0	16,120
2011	0	290	1,868	10,238	1,740	0	0	14,136
2012	0	0	1,400	11,622	2,271	104	77	15,474
2013	0	0	358	9,878	4,094	164	0	14,494

b) bushels ('000)

Year	Southern VA	Delmarva	NJ	LI	Southern New England	Georges Bank	Other	Total
2009	0	47	533	1,900	944	4	0	3,426
2010	0	94	510	2,181	765	3	0	3,554
2011	0	64	412	2,257	384	0	0	3,116
2012	0	0	309	2,562	501	23	17	3,411
2013	0	0	79	2,178	903	36	0	3,195

Table 12. Federal Fleet Profile, 2003 through 2013. Source: NMFS Clam Vessel Logbooks

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Non-Maine Vessels Harvesting BOTH surfclams & ocean quahogs	14	12	9	9	8	8	12	12	13	7
Non-Maine Vessels Harvesting only ocean quahogs	15	12	9	8	10	7	9	7	6	9
Total Non-Maine Vessels	29	24	18	17	18	15	21	19	19	16

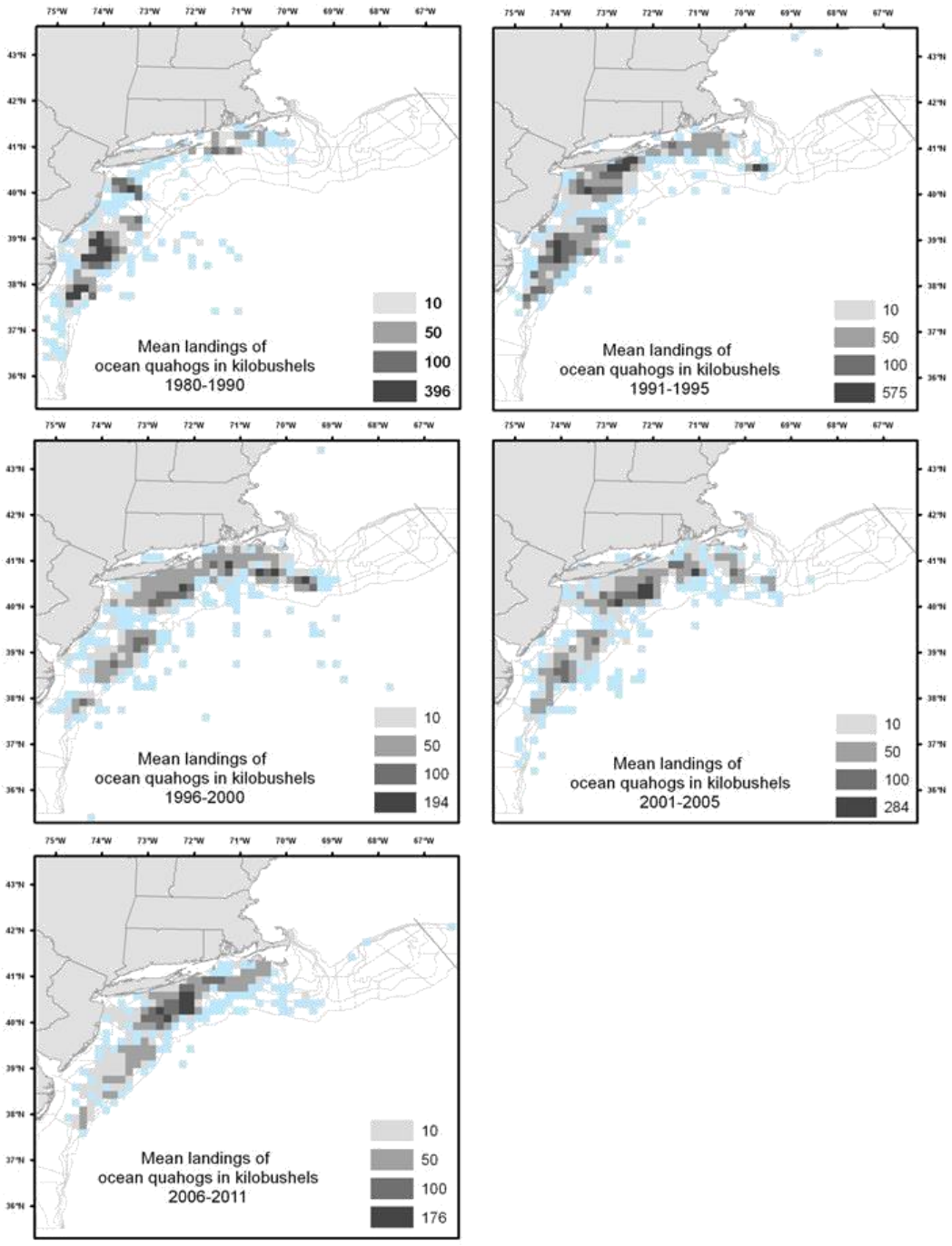


Figure 17. Ocean quahog landings by ten-minute square (TMSQ), the finest scale location for landings reported in logbooks, for 1980-2011. TMSQ in light blue had reported landings, but from fewer than three vessels (1 kilobushel = 1000 bu y-1). Source: Stock Assessment Update (Chute at al. 2013).

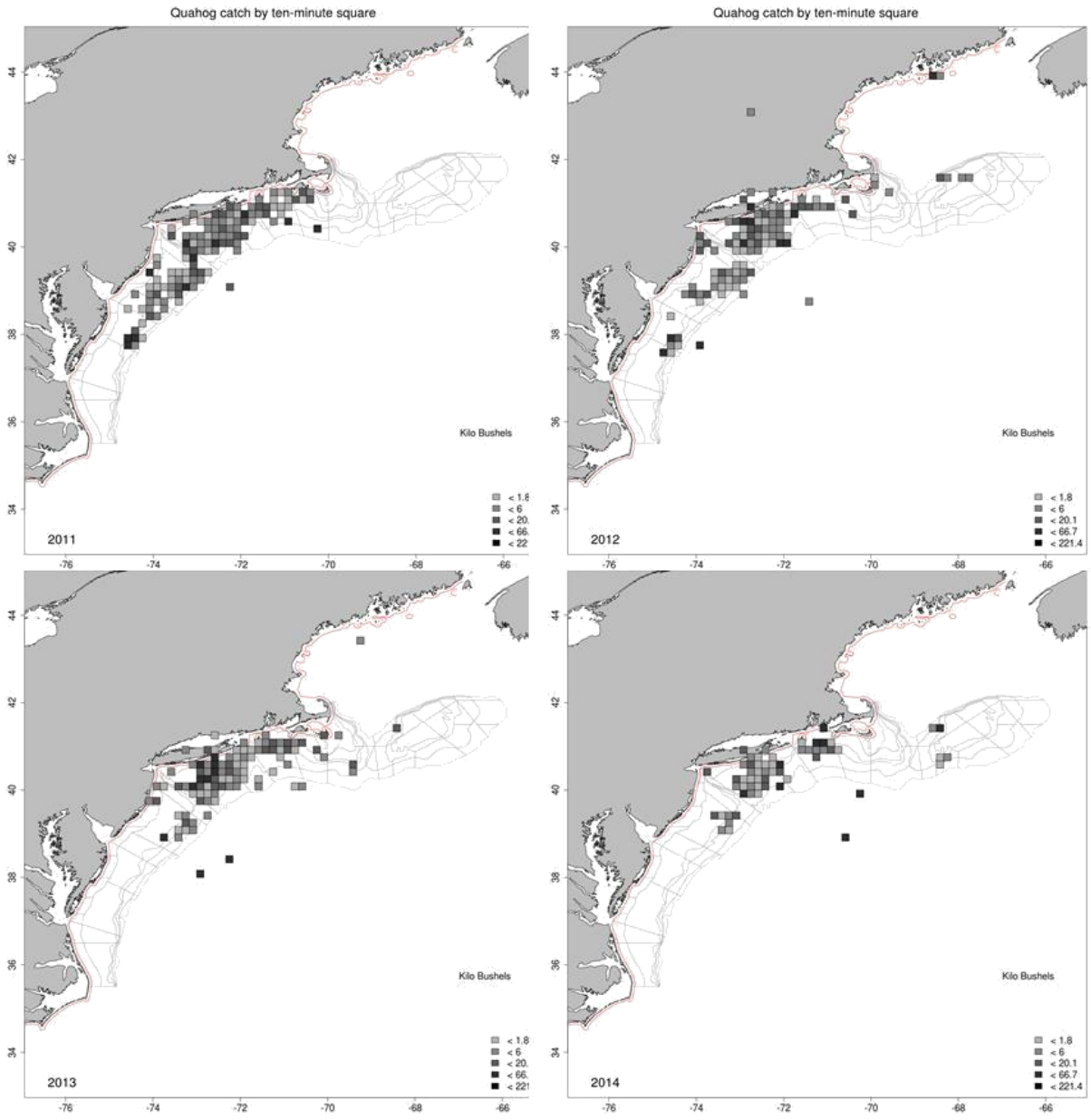


Figure 18. Ocean quahog landings by ten-minute square (TMSQ), the finest scale location for landings reported in logbooks, for 2011-2014. TMSQ in light blue had reported landings, but from fewer than three vessels (1 kilobushel = 1000 bu y-1). Source: Dan Hennen Pers. Comm. (NEFSC 2014).

Figure 19. Federal Ocean Quahog Quotas and Landings: 1979 – 2013 (MAFMC 2012, 2014d).

Stock Assessment

(Text adapted from Chute A., Hennen D., Russell R. and Jacobson L. 2013. Stock assessment update for ocean quahogs (Arctica islandica) through 2011. U.S. Dept Commer, Northeast Fish Sci Cent Ref Doc.)

Stock assessments for ocean quahog in the EEZ were completed by the NEFSC in 1995, 1998, 2000, 2004, 2007 and 2009. The assessment before the most recent (NEFSC 2009) concluded that the EEZ ocean quahog resource was not overfished and that overfishing was not occurring). The most recent ocean quahog assessment update (Chute et al. 2013) used data from 1978 through 2011 in a forward projecting stock assessment model, based on the Deriso-Schnute delay-difference equation. This was the same peer-reviewed and approved method developed at the NMFS Stock Assessment Workshop 48 (NEFC 2009).

The model was run for the whole stock, the exploited part of the stock only, and each individual assessment region (Table 13 and Figure 20) except for SVA. For both the exploited part of the stock (SVA, DMV, NJ, LI and SNE combined) and the whole stock (exploited regions plus GBK), fishable biomass continued to trend downward. Fishing mortality trended upward from 1978 through 1990 in the exploited region, but has been fairly stable since catches and biomass have both fallen. Estimates of fishable biomass are decreasing in all regions. The biomass estimates for GBK in the last assessment showed a slight upward trend, but a smaller estimated survey swept-area biomass in 2011 affected the model trends in biomass and surplus production negatively.

Table 13. Ocean quahog stock assessment regions.

Ocean quahog stock assessment Region	Abbreviation
U.S. Exclusive Economic Zone	EEZ
Maine	MNE
Georges Bank	GBK
Southern New England	SNE
Long Island	LI
New Jersey	NJ
Delaware/Maryland/Virginia	DMV
Southern Virginia and North Carolina	SVA

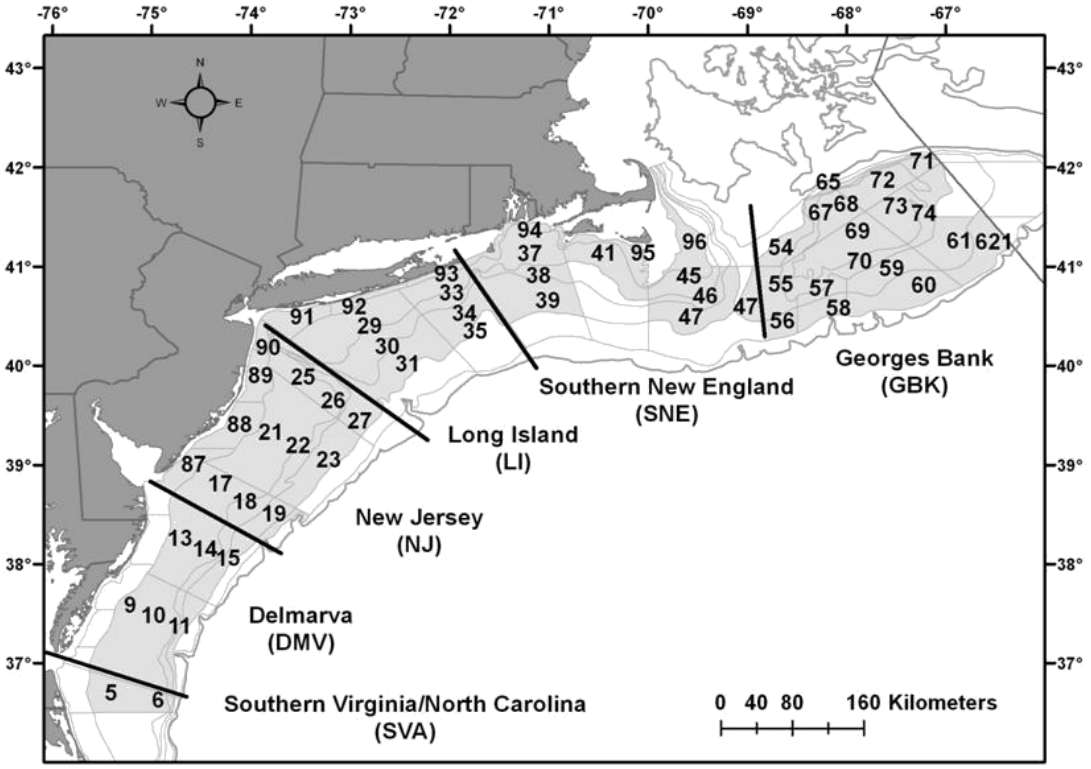


Figure 20. Map of ocean quahog assessment regions, and individual strata used for ocean quahogs

Chute et al. (2013) characterize the ocean quahog population as an unproductive stock with infrequent recruitment, which is therefore vulnerable to overfishing. During SARC 48 (NEFSC 2009) Biological Reference Points (BRPs) for ocean quahogs were revisited and changes were recommended based on the unique population dynamics of very long-lived species with low rates of adult natural mortality. The revised BRPs were peer reviewed and considered the best science (Chute et al. 2013) and were used in management decisions from the time that they were recommended. Details of the reasoning behind the BRP revisions and analysis done to explore the implications of a range of potential BRP values were provided in the 2009 assessment report (NEFSC 2009).

Amendment 17 to the FMP modified the way in which BRPs are incorporated into the FMP. Rather than using specific definitions, the FMP now includes broad criteria to allow for greater flexibility in

incorporating changes to the definitions of the maximum fishing mortality threshold and/or minimum stock size threshold as the the best scientific information becomes available, consistent with National Standards 1 and 2 (MAFMC 2016). Amendment 17 eliminated the previous conflict between the defined BRPs in the FMP and the revised BRPs recommended by SARC 48 that were being used in the stock assessment but were not consistent with the defined BRPs. The following present the biological reference points (as revised with SARC 48) that were immediately adopted in the stock assessment process and were brought into consistency with the FMP through Amendment 17:

B_{Target}

The ocean quahog biomass target used to be $B_{Target} = B_{MSY}$, which is assumed to be half the virgin biomass of the whole stock. This was revised after the SARC 48 review to be half of the fishable fraction of the whole stock biomass during 1978 (considered pre-fishery). The revised biomass target value was 1.73 million metric tons of meats.

$B_{Threshold}$

The biomass threshold used to be $B_{Threshold}$= ½ B_{MSY} (or ¼ the virgin biomass of the whole stock). The revised $B_{Threshold}$ is 40% of the 1978 fishable fraction of the whole stock biomass, which was judged to be more realistic. The revised biomass threshold value for the whole stock is 1.39 million metric tons of meats.

F_{Target}

F_{Target} was originally F0.1, and applied to the exploited area only. The revised F_{Target} was a value of F below the threshold, but in an ITQ fishery this was determined by the quota set for the year and therefore at the discretion of the managers. By default it applies to the exploited area only.

$F_{Threshold}$

$F_{Threshold}$ used to be F25% (the fishing mortality rate that reduces lifetime egg production to 25% of its potential). It was decided to revise $F_{Threshold}$ to F45% (egg production at 45% of potential) as it was better suited to unproductive stocks. The revised fishing mortality threshold for the exploited area is 0.022 y^{-1}.

The ocean quahog fishery represents an unusual situation with regard to sustainability. It is unlikely that the resource can be fished to levels that impair recruitment because product value is low and harvesting costs are high. Only dense beds of ocean quahogs are profitable to fish. Fishing may become unprofitable even before the stock reaches the level that would produce the maximum sustainable physical yield. This situation can easily be diagramed using the Gordon-Schaefer fishery production model (Gordon 1954). The likely case for the ocean quahog fishery is that the cost curve crosses the catch/revenue curve to the left of the maximum sustainable yield. As an ITQ fishery, the “race for fish” and the dissipation of economic rents that occur in open access fisheries would not occur. We would expect quota holders to seek to obtain the maximum economic yield from the fishery, which is generally half-way between the origin and the point where the cost curve crosses the revenue curve. With a high-cost, low-value fishery, profits can only be maintained with high catch rates, which require high abundance.

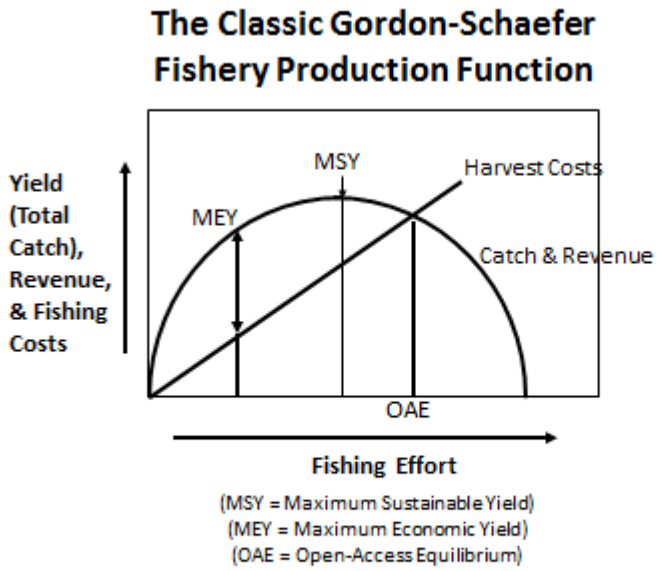


Figure 21. The Gordon-Schaefer fishery model (Gordon 1954) illustrates how the relationship between harvest costs and catch revenues determines whether economics and the prevailing management system will prevent a fishery from being overfished. The point of maximum economic yield will always be more conservative than MSY in a fishery where harvest costs are greater than zero.

The 2013 stock assessment update refers to the above possibility with the statement that: "MSY theory is probably not applicable to ocean quahogs, because their very low productivity may preclude economically viable levels of sustained catch." (Chute et al. 2013) The issue here is not one of resource sustainability, but a question of fishery sustainability. In the situation presented by ocean quahogs, bio-economic theory predicts that the fishery would reach equilibrium at a level of fishing effort and catch that produces the maximum economic yield. This would likely occur with relatively low harvest levels and corresponding higher biomass than would occur in a fishery operating at MSY. The nature of fisheries is such that maximum economic yield is always more conservative than maximum sustainable yield.

The new biological reference points for ocean quahogs are not referred to as MSY reference points because the potential productivity of the ocean quahog stock under fishing is unknown (MAFMC 2010). Despite that fact, the ocean quahog resource is protected from excessive depletion by two controlling elements, one legal and one economic. The law requires biological reference points for fishing mortality (F) and for biomass (B). Targets are BRPS that represent desirable stock conditions, and thresholds are BRPs that identify undesirable stock conditions (Chute et al. 2013). Scientific advice provided to the Council's Scientific and Statistical Committee will guide the setting of the Acceptable Biological Catch. Economics, as described above, may dictate smaller catches than are considered biologically acceptable, as has been the case in the ocean quahog fishery for many years.

According to the June 2013 assessment, the stock was not overfished and overfishing was not occurring, relative to the biological reference points (Chute et al. 2013). Whole stock fishable biomass during 2011 was 2.96 million mt meats (Figure 22), which was above the revised B_{target} of 1.73 million mt and the revised $B_{threshold}$ of 1.39 million mt. The fishing mortality rate F during 2011 for the stock in

the exploited region was $0.010y^{-1}$ (Figure 23), below the revised $F_{threshold}$ of 0.022 y^{-1}. Fishing mortality for the exploited area of the stock was also below the previous $F_{threshold}$ of 0.08 y^{-1}, and whole stock biomass was above the previous $B_{threshold}$ of 0.89 million mt.

After three decades of fishing at a low F, in 2011 the fishable stock biomass in the southernmost regions of Southern VA, Delmarva, and NJ was less than half of 1978 pre-fishery levels (Chute et al. 2013). Biomass in the more northern regions of LI increased after 1978 due to a recruitment event and growth, but then began to decrease in the early 1990s when recruitment declined and the fishery gradually began to move north into these regions. Survey length frequencies show that a low level of recruitment occurs on a continuous basis.

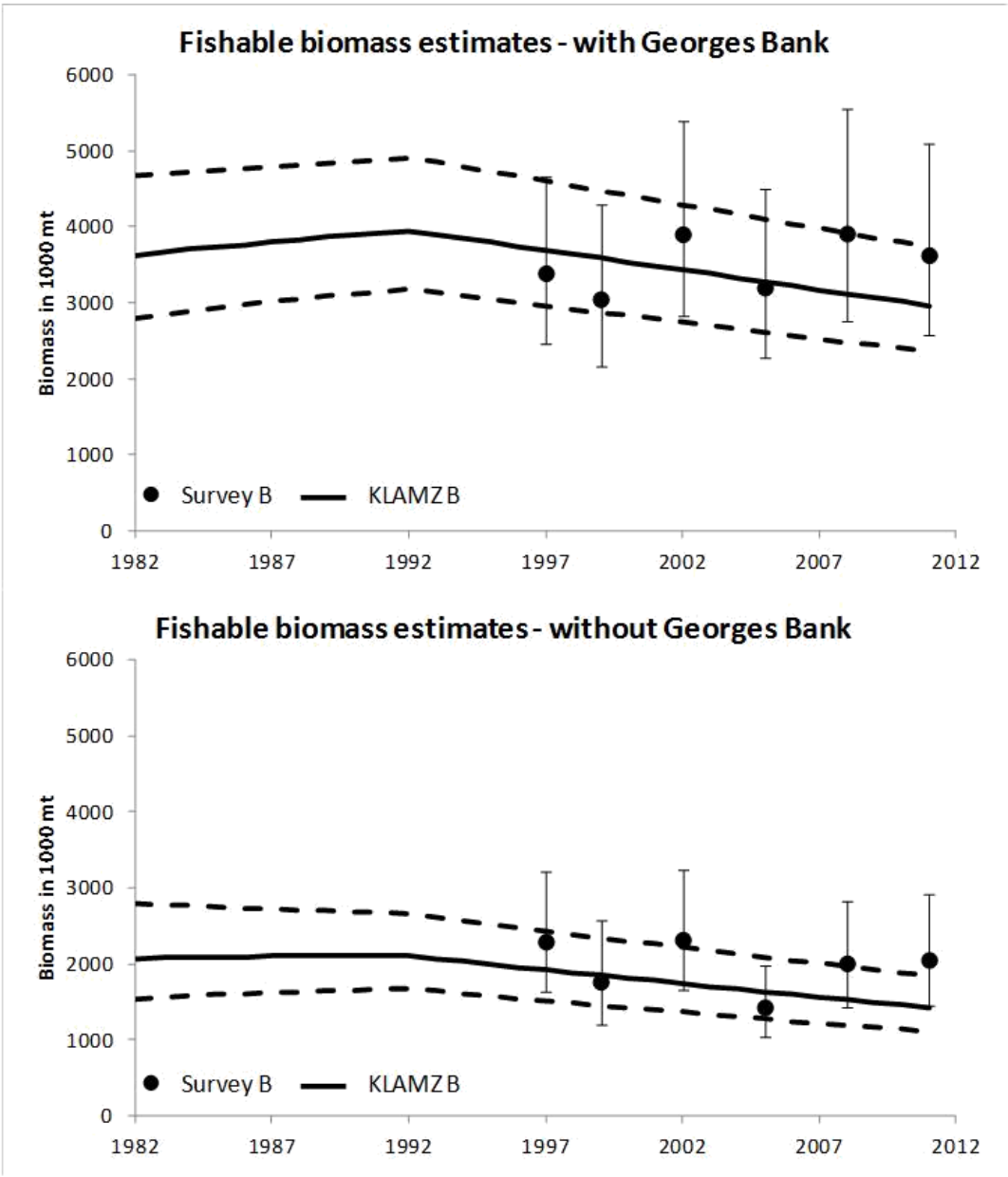


Figure 22. Model estimates of fishable biomass for the entire stock (top) and the exploited regions (bottom), 1982-2011. Source: Stock Assessment Update (Chute at al. 2013)

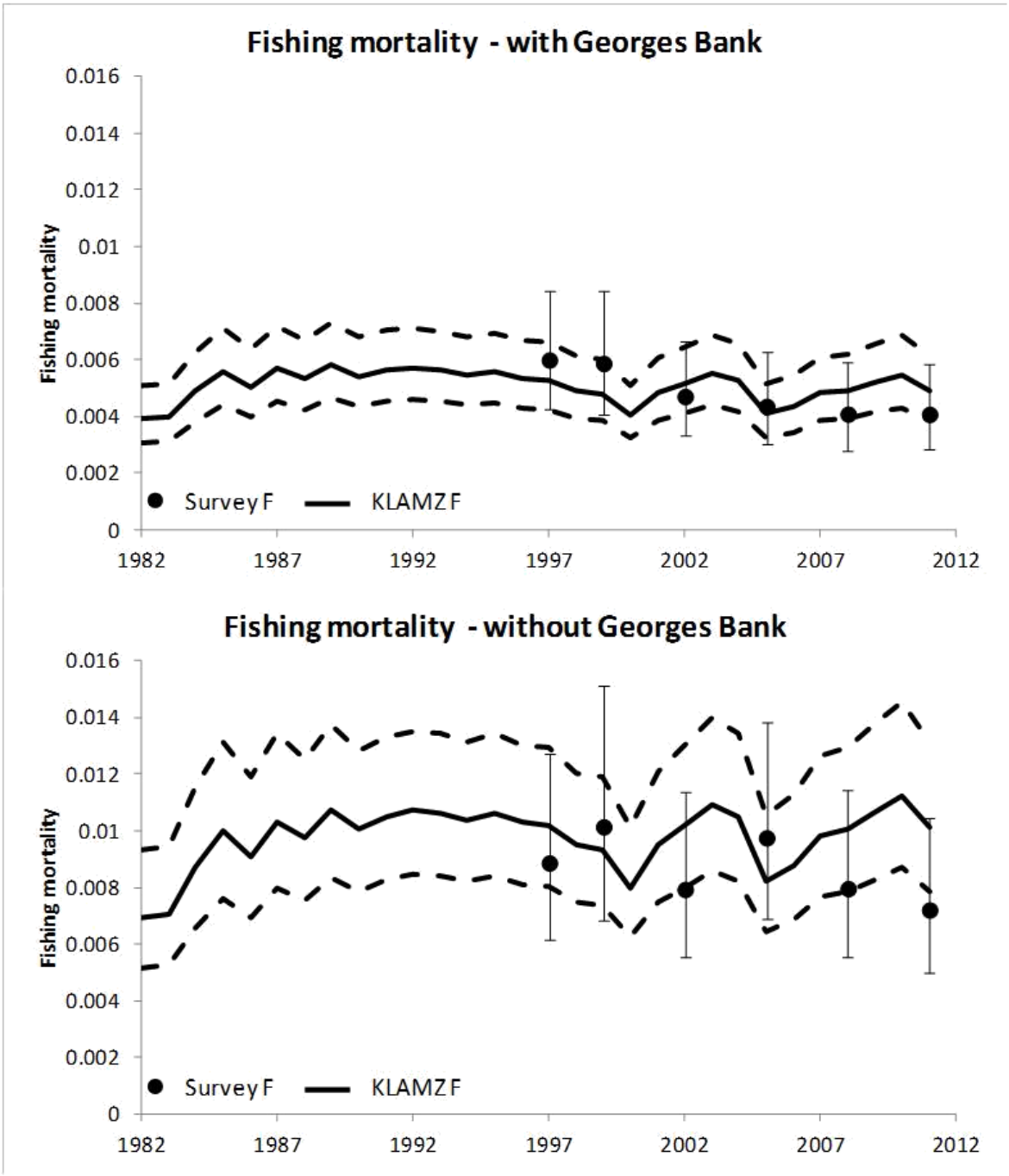


Figure 23. Estimates of fishing mortality for the entire stock (top) and the exploited regions (bottom), 1982-2011. Source: Stock Assessment Update (Chute at al. 2013).

According to MAFMC (2012), assuming the availability of the 45% of the resource that is on Georges Bank, there is no probability of overfishing for the entire stock even at the maximum level of 6 million bushels allowed by the FMP. The F45% threshold times the current biomass would yield a catch of 140.5 million pounds of meats (14.0 million bushels). Ocean quahogs have never been overfished since the inception of the fishery in the late 1970s. Prior to June 15, 2016, the Council had a specified Optimum Yield (OY) range in the FMP (since the early 1980s) of 40.0 to 60.0 million pounds (4 to 6 million bushels). Amendment 17 eliminated this OY range for both species as of June 15, 2016. In the future, as part of the normal specifications process, the Council's Scientific and Statistical Committee will recommend Acceptable Biological Catch limits. The Surfclam and Ocean Quahog Advisory Panel will develop recommendations for commercial quotas, including optimum yield recommendations. This information will be provided to the Council to inform its decisions regarding annual catch limits, catch targets, and commercial quotas (USOFR 2016b.). The Council is prohibited by law from setting catch limits higher than the ABC recommended by the Scientific and Statistical Committee.

Management

(text adapted from Mid-Atlantic Fishery Management Council Ocean Quahog Information Document - April 2014)

The Fishery Management Plan (FMP) for ocean quahog (*Arctica islandica)* became effective in 1977. The FMP established the management unit as all ocean quahog in the Atlantic EEZ. The FMP is managed by the Mid-Atlantic Fishery Management Council (Council), in conjunction with the National Marine Fisheries Service (NMFS) as the Federal implementation and enforcement entity. The primary management tool is the specification of an annual quota, which is allocated to the holders of allocation shares (Individual Transferable Quotas (ITQs)) at the beginning of each calendar year as specified in Amendment 8 to the FMP (1988). In addition to the Federal waters fishery, there is a small fishery prosecuted in the state waters of Maine. Note that the Maine state waters fishery is not part of the UoA, and though some vessels may operate in both state and federal waters they do so under distinct permit and cage tagging systems. See the Traceability section for more detail. The federal FMP, including subsequent Amendments and Frameworks, is available on the Council website at: http://www.mafmc.org. Additional more specific background information is in the P3 section of this assessment report.

An Individual Transferable Quota (ITQ) system was implemented in 1990 for the surfclam and ocean quahog fisheries; the first such system established for a U.S. federal fishery (MAFMC 2014a). The ITQ system's design allowed for shares to be traded or leased to any person or entity, with no pre-conditions of vessel ownership or limits on the amount of ITQ shares owned by an entity. As a result, market consolidation and vertical integration have increased over time.

In 2012 the MAFMC adopted, and NMFS approved, Amendment 16 to the surfclam and ocean quahog FMP as part of an omnibus amendment establishing the equivalent of a harvest control rule/risk policy for all of the MAFMC managed resources. That control rule/risk policy now may be found at 50 CFR §648.21. Ocean quahogs are covered under subsection (b)(1) pertaining to stocks that are not subject to a rebuilding plan, due to its "atypical life history." The quahog resource has been deemed "atypical" by the SSC primarily because of its highly unusual longevity – of as much as 200 years – relative to other fishery resources.

For the ocean quahog resources in the federally managed fishing areas, the Council's SSC sets the ABC each year, and under the FMP the ABC equals the ACL ("annual catch limit"). The ACL then may be reduced by the Council if there is management uncertainty when it sets the annual catch target (annual quota). The new control rule/risk policy cited above establishes a required procedure for ensuring that F is reduced as the threshold reference point is approached according to the following rules: For stocks with a ratio of B to Bmsy of 1.0 or higher (i.e., the stock is at Bmsy or higher), the maximum probability of overfishing (based upon peer reviewed assessments) may not exceed 35%. As the ratio of B/Bmsy becomes less than 1.0 and continues to decline, the allowable maximum probability of overfishing declines commensurately, in a linear fashion, until the probability of overfishing becomes zero at a B/Bmsy ratio of 0.10. So in a scenario where the biomass is diminishing, falling below Bmsy and approaching the threshold, in order to conform with the allowable probability of overfishing, the quota must be commensurately reduced.

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 and bycatch species that are returned to the water (assessed under either Performance Indicator 2.1 and 2.2), and species that are considered endangered, threatened or protected (ETP) by the federal or state government, 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, use of bait in some fisheries (not this one) 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).

Cumulative Impacts under MSC FCR Version 2.0

To ensure that the cumulative impact of all MSC fisheries is within sustainable limits, a UoA assessed against standard V2.0 may need to consider the combined impact of itself and other overlapping UoAs. This determination will include other UoAs assessed against earlier versions of the CR (e.g., V1.3) as cumulative impacts need to be calculated among fisheries. UoAs assessed using default trees prior to CR v2.0 do not have to initiate this evaluation.

V2.0 of the MSC standard requires that any fishery under assessment that has spatial overlap with the Units of Assessment of any other MSC certified fisheries, be explicitly considered with respect to cumulative impacts in Principle 2.

'Overlapping UoAs' are assessed at different levels depending on which PI is evaluated. For P2 primary species, teams need to evaluate whether the cumulative impact of overlapping MSC UoAs hinders the recovery of 'main' primary species. For secondary species, cumulative impacts only need to be considered in cases where two or more UoAs have 'main' catches that are 'considerable', defined as a species being 10% or more or the total catch. For ETP species, the combined impacts of MSC UoAs needs to be evaluated, but only in cases where either national and/or international requirements set catch limits for ETP species.

All of the requirements for cumulative impacts for species are applicable to their respective Outcome PIs. For habitats, in contrast, cumulative impacts are evaluated in the management PI (2.4.2). The requirements here aim to ensure that vulnerable marine ecosystems (VMEs) are managed such that the impact of all MSC UoAs do not cause seriious and irreversible harm to VMEs.

Overview of Non-target Catch

The analysis for P2 is made considering that the UoA is composed by the U.S. Atlantic ITQ permitted surfclam and ocean quahog fleet, and therefore considers the expanse of the permitted fishing area. The sole gear type employed by fishers in the UoA is the hydraulic clam dredge.

Primary species

For the purposes of a MSC evaluation, primary species are those managed species in the catch, and within the scope of the MSC program (fishes or shellfish), and not defined by the client as the target (evaluated under Principle 1). Primary species will usually be species of commercial value to either the UoA or fisheries outside the UoA, with management tools controlling exploitation as well as known reference points in place. In addition, the institution or arrangement that manages the species (or its local stock) will usually have some overlap in jurisdiction with the UoA fishery.

Secondary species

In contrast to managed, primary species, secondary species include fish and shellfish species that are **not** managed according to reference points. Secondary 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 be landed intentionally to be used either as bait or as food for the crew or for other subsistence uses, but may also 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 Scoring Issues (SIs) 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.
>
> 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.

Background

Various species are caught incidentally by the hydraulic clam dredge fishery for surfclams and ocean quahogs, and will be impacted to some degree by the prosecution of the fishery. Non-target interactions in the surfclam and ocean quahog, hydraulic dredge fishery are also relatively low compared to the other fisheries managed by the MAFMC. For non-target species that are managed under their own FMP, incidental catch/discards are also considered as part of the management of that fishery.

The fish species that have the potential to be bycatch in clam dredges vary by region. In the Mid-Atlantic, habitat of Atlantic surfclams and ocean quahogs overlaps with habitat of summer flounder, scup, black sea bass, squid, mackerel, butterfish, bluefish and dogfish. In the Northeast, clam habitat is shared with Atlantic cod, haddock, monkfish, ocean pout, American plaice, pollock, redfish, white hake,

windowpane flounder, winter flounder, witch flounder, yellowtail flounder, Atlantic halibut and Atlantic sea scallops. Many highly migratory species also overlap in habitat with the Atlantic surfclams and ocean quahogs but are able to travel faster than the hydraulic dredges and not expected to be impacted (Malchoff 1999, NMFS 2000).

Clam dredges used in the subject fisheries are designed to capture 80-95% of the target catch, retain minimal unmarketable clams, and result in low bycatch of other species (Wallace and Hoff 2005). Bycatch of juvenile finfish is minimal because the fishery occurs on sandy bottom areas, while these species tend to be found in areas of structured bottom, including corals and rocks. Nuckols III (1998) reported that tows for surfclams in waters less than 30 meters depth may result in higher bycatch than tows in deeper water.

There is no minimum size in effect for landing surf clams or ocean quahogs (See Section: Fisheries Regulations to Meet Objectives). The marketable clam size is industry set according to the processors requirements. The bar spacing in the cage or bag section of the hydraulic calm dredge is set to provide a size distribution of clams that is marketable to processors. As a result, “there is no discarding” of “undersize” clams because there are no undersize clams (NEFSC 2013). There may be some incidental mortality for clams left on the bottom due predation, if the clams do not re-burrow, but incidental mortality is accounted for in the respective stock assessment reports (estimated at 12% for surfclam and 5% for ocean quahog) (NEFSC 2013, Chute et al. 2013).

Wallace and Hoff (2004) reported that fishing on surfclams and ocean quahogs resulted in no significant bycatch of other species. During three clam surveys conducted by the Northeast Fishery Science Center approximately ninety percent of the total number of animals caught were surfclams and ocean quahogs, with approximately 85% of them collected alive (Wallace and Hoff 2004). The 1,577 survey tows caught only 210 fish, with little skate comprising over half of these. One percent of the catch was Atlantic sea scallops (Wallace and Hoff 2004). The scientific survey gear contained a liner in the dredge to collect all objects encountered, meaning that the commercial clam dredges probably retain less than the survey gear. The dredge bars in the commercial gear are also spaced further apart to retain only the targeted species. As a further incentive, processers may decrease payment to vessels for large amounts of other objects in the tows other than the targeted clams (Wallace and Hoff 2004). The low bycatch in the scientific surveys is thought to be reflected in the commercial catch, although it is not recorded (Malchoff 1999, NMFS 2000).

Fishery Specific Data

For the purpose of this MSC full assessment, it was necessary to evaluate catch data collected at sea during commercial fishing operations to determine the species composition of the catch for each directed target species fishery. The primary database used to assess catch characteristics and discarding is the NMFS Observer Program database, which includes data from trips that had trained observers onboard to document discards. The following data was provided by Toni Chute of the NMFS NEFSC for the surfclam and ocean quahog, hydraulic clam dredge fisheries. Unfortunately, there are only a limited number of observations, 30 trips in the ocean quahog fishery and 16 trips in the surfclam fishery (Figure 24 and Table 14). The observations are about one decade old, however, the gear has not changed in the last decade, and the fishery has been prosecuted in essentially the same manner and same areas for the last several decades; Therefore, the data are believed to be sufficiently

representative of the current fishery. This was confirmed at the onsite meeting with the NMFS NEFSC and MAFMC staff. In fact, they noted that these data and the conclusions that this is a particularly "clean fishery" is confirmed periodically on the scientific sampling surveys for the surfclam resource.

However, there is clearly a need for more recent data on catch in theses fisheries, and it is reported at the site visit that more intensive observer coverage has been initiated in these fisheries starting in 2016 (http://www.nefsc.noaa.gov/fsb/SBRM/). These data should be reviewed in future annual audits of these fisheries.

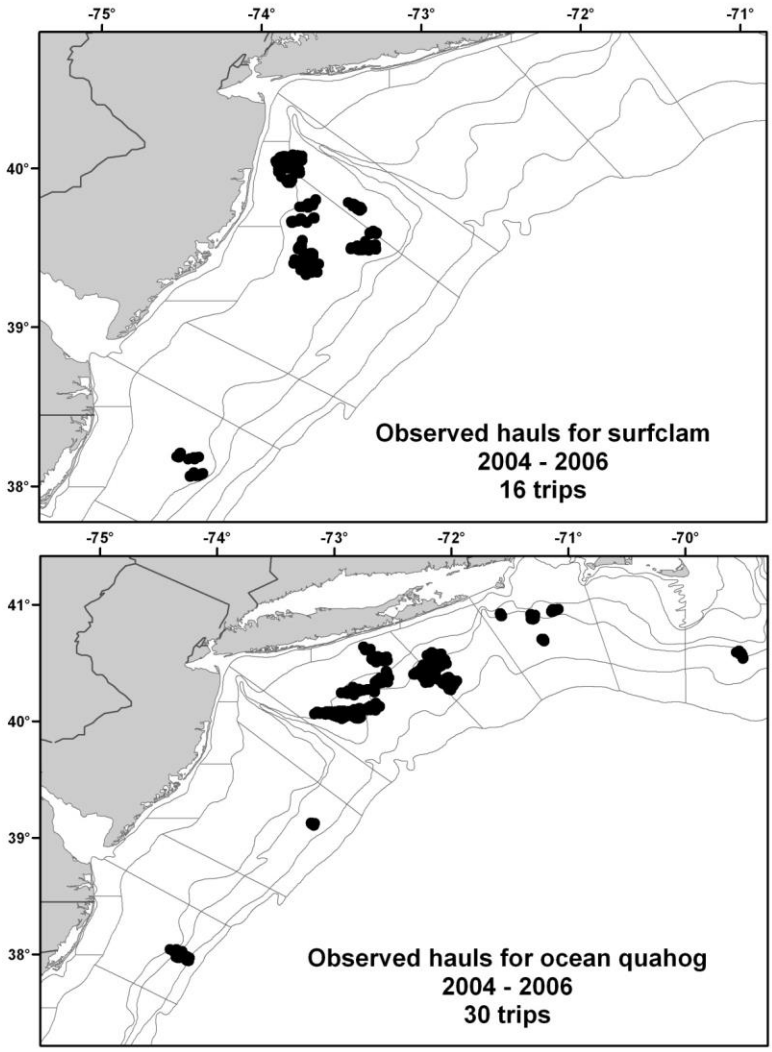


Figure 24. Maps showing the locations of observed trips for the surfclam and ocean quahog fisheries. Map provided by T. Chute NMFS NEFSC. Note that these observed trips correspond well with the spatial range of landings illustrated in previuos figures.

Table 14. Distribution of observed trips for the ocean quahog and surfclams by year, provided by T. Chute NMFS NEFSC.

Ocean quahog		Surfclam	
year	observed trips	year	observed trips
2004	9	2004	5
2005	17	2005	7
2006	4	2006	4
total	30	total	16

Table 15. Mean live bycatch was estimated to be about 8% with a range of 0-19 % for the ocean quahog fishery, and 3% with a range from 0-7% for the surfclam fishery, data provided by T. Chute NMFS NEFSC.

Ocean quahog			Surfclam		
	mean	range		mean	range
debris/shell	34%	0% - 234%	debris/shell	9%	1% - 51%
live bycatch	8%	0% - 19%	live bycatch	3%	0% - 7%

From the bycatch distribution summary and the percent live bycatch amount provided by NMFS, NEFSC for surfclam and ocean quahog fisheries (Table 15), the species composition of the catch for each fishery was estimated (Table 16 and Table 17). Based on the percentage of the species captured for each fishery, and the status of the management of the fishery for those species, the primary and secondary, major and minor classifications were assigned.

Table 16. Catch distribution by species for the surfclam fishery based on observed trips in the 2004-2006 time period, noting primary and secondary species, and major and minor species.

Live catch species	Mean lbs sampled per trip	Percent of total catch	Primary or Secondary	Major or Minor
surfclams	16200	97.00	Target	
sea scallop	207	1.24	Primary	Minor
ocean quahog	101	0.61	Primary	Minor
little skate	55	0.33	Primary	Minor
stargazer, unclassified	36	0.22	Secondary	Minor
Monkfish	35	0.21	Primary	Minor
spiny dogfish	16	0.10	Primary	Minor
sea star, unclassified	9	0.05	Secondary	Minor
moon snail, unclassified	6	0.04	Secondary	Minor
sponge, unclassified	5	0.03	Secondary	Minor
horseshoe crab	5	0.03	Secondary	Minor
sand dollar	3	0.02	Secondary	Minor
snail, unclassified	3	0.02	Secondary	Minor
winter skate	2	0.01	Primary	Minor
rock crab	1	0.01	Secondary	Minor
skate, unclassified	1	0.01	Secondary	Minor
eggs, unclassified	1	0.01	Secondary	Minor
sum live bycatch	**486**	**3.00**		
sum total catch	**16686**	**100.00**		

Table 17. Catch distribution by species for the ocean quahog fishery based on observed trips in the 2004-2006 time period, noting primary and secondary species, and major and minor species.

Live catch species	Mean lbs sampled per trip	Percent of total catch	Primary or Secondary	Major or Minor
ocean quahogs	22062	92.00	Target	
sea scallop	856	4.46	Primary	Minor
little skate	311	1.62	Primary	Minor
skate, unclassified	134	0.70	Primary	Minor
monkfish	92	0.48	Primary	Minor
snail, unclassified	43	0.22	Secondary	Minor
spiny dogfish	22	0.11	Primary	Minor
winter skate	19	0.10	Primary	Minor
rock crab	19	0.10	Secondary	Minor
jonah crab	9	0.05	Secondary	Minor
sea star, unclassified	9	0.05	Secondary	Minor
whelk, unclassified	5	0.03	Secondary	Minor
mollusk, unclassified	4	0.02	Secondary	Minor
summer flounder	6	0.03	Primary	Minor
ocean pout	2	0.01	Secondary	Minor
crab, unclassified	2	0.01	Secondary	Minor
longhorn sculpin	1	0.01	Secondary	Minor
sum live bycatch	**1534**	**8.00**		
sum total catch	**19175**	**100.00**		

Surfclam Non-target Species

Data from Table 16 was used to determine the MSC defined primary and secondary species related to the catch of the target species, surfclams. Based on this analysis, there are no species that must be considered under "Main" Primary species (evaluated under SG80 for PIs 2.1.1, 2.1.2, and 2.1.3), as the catch of no species other than the target species exceed 5%. Primary minor species are considered under the SG100 scoring issues and these include: sea scallop, little skate. monkfish, spiny dogfish, and winter skate. Ocean quahog is not scored as a non-target species, as it is also its own target species.

Primary (non-target) Species

There are no important Primary, minor species that fall close to, but below, either the 5% inclusion level for resilient species or the 2% inclusion level for less resilient species. Sea scallop and spiny dogfish are MSC certified fisheries, and the stocks of these species are neither overfished nor experiencing overfishing, relative to their reference points. Monkfish is also a managed species, and it is not overfished nor experiencing overfishing, relative to its reference points. Finally, winter skate is managed under the Northeast Skate Complex FMP, and while it is considered to be experiencing overfishing, is it not considered to be overfished. Given the very small amount of bycatch of winter skate in the surfclam fishery, 0.01% of the catch of surfclams, it is not believed that the surfclam fishery is a serious issue for winter skate, relative to other fisheries (otter trawls) that capture large numbers of winter skate as bycatch.

Secondary (non-target) Species

There are no "Main" Secondary species for evaluation, to be evaluated under performance indicators 2.2.1, 2.2.2, and 2.2.3, as the catch of no species other than the target species exceed 5%. Secondary minor species that are managed, but for which there are no reference points but are considered under

the SG100 scoring issues, include only horseshoe crab. The horseshoe crab fishery is managed by ASMFC, and while there is no stock status determination, and no reference points, landings have been consistent with quotas and state allocations since the early 2000s when quotas were instituted by ASMFC. The surfclam fishery comprises a small proportion of the directed horseshoe crab fishery (~5%). There are no minor species close to the 5% inclusion level for resilient species, and no "less-resilient" species were close to the 2% threshold. Other secondary minor species include creatures that are not part of any regular fishery.

Ocean Quahog Non-target Species

Data from Table 17 was used to determine the MSC defined primary and secondary species related to the catch of the target species, ocean quahogs. Based on this analysis, there are no species that must be considered under "Main" Primary species (evaluated under SG80 for PIs 2.1.1, 2.1.2, and 2.1.3), as the catch of no species, other than the target species, exceed 5%.

Primary (non-target) Species

Primary minor species are considered under the SG100 scoring issues and these include: sea scallop, little skate, unclassified skate, monkfish, spiny dogfish, winter skate, and summer flounder. There are no important minor species that fall close to, but below, either the 5% inclusion level for resilient species or the 2% inclusion level for less resilient species. Sea scallop and spiny dogfish are MSC certified fisheries, and the stocks of these species are neither overfished nor experiencing overfishing, relative to their reference points. Monkfish is also a managed species, and it is not overfished nor experiencing overfishing, relative to its reference points. Summer flounder is managed under the Summer flounder, scup, sea bass FMP by the MAFMC. It has been determined that the summer flounder stock is currently experiencing overfishing, but is not overfished. Given the very small amount of bycatch of summer flounder in the ocean quahog fishery, 0.03% of the catch of ocean quahogs, it is not believed that the ocean quahog fishery is a serious issue for summer flounder, relative to other commercial and recreational fisheries that target summer flounder. Finally, winter skate is managed under the Northeast Skate Complex FMP, and while it is considered to be experiencing overfishing, it is it not considered to be overfished. Given the very small amount of bycatch of winter skate in the surfclam fishery, 0.01% of the catch of surfclams, it is not believed that the ocean quahog fishery is a serious issue for winter skate, relative to other fisheries (otter trawls) that capture large numbers of winter skate as bycatch.

Secondary (non-target) Species

There are no Secondary main species for MSC evaluation, evaluated under performance indicators 2.2.1, 2.2.2, and 2.2.3, as the catch of no species other than the target species exceed 5%. Secondary minor species are considered under the SG100 scoring issues include jonah crab, which is managed by the Atlantic States Marine Fisheries Commission, but for which there are no reference points. There are no minor species close to the 5% inclusion level for resilient species, and no "less-resilient" species were close to the 2% threshold. Other secondary minor species include creatures that are not part of any regular fishery.

Endangered, Threatened and Protected (ETP) Species

ETP species in the MSC system are defined as species that are listed in the following fashion:

1. Species recognized by national legislation and/or binding international agreements to which the jurisdictions controlling the fishery under assessment are party. Species are to be evaluated as ETP are those listed in the following binding international agreements:

a. Appendix 1 of the Convention on International Trade in Endangered Species (CITES), unless it can be shown that the particular stock of the CITES listed species impacted by the UoA under assessment is not endangered.

b. Binding agreements concluded under the Convention on Migratory Species (CMS), including:

i. Annex 1 of the Agreement on Conservation of Albatross and Petrels (ACAP);

ii. Table 1 Column A of the African-Eurasian Migratory Waterbird Agreement (AEWA);

iii. Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS);

iv. Annex 1, Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS);

v. Wadden Sea Seals Agreement;

vi. Any other binding agreements that list relevant ETP species concluded under this Convention.

2. Species classified as 'out-of scope' (amphibians, reptiles, birds and mammals) that are listed in the IUCN Redlist as vulnerable (VU), endangered (EN) or critically endangered (CE).

Outcome/Management

Pursuant to the Marine Mammal Protection Act (MMPA), NMFS publishes a List of Fisheries (LOF) annually, classifying U.S. commercial fisheries into one of three categories based on the relative frequency of incidental serious injuries and/or mortalities of marine mammals in each fishery.

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. Individuals fishing in Category I or II fisheries must comply with requirements of any applicable take reduction plan. The Potential Biological Removal (PBR) is the product of minimum population size, one-half the maximum productivity rate, and a recovery factor (Waring *et al*. 2014), and is used as a standard metric against which mortalities in a stock may be assessed. PBR is really designed as a metric to be used when comparing all estimated annual, anthropogenic mortalities, so as to decide if a marine mammal stock should be considered a strategic stock. A strategic stock is defined by the MMPA *"as a marine mammal stock-- for which the level of direct human-caused mortality exceeds the potential biological removal level; which, based on the best available scientific information, is declining and is likely to be listed as a threatened species under the ESA within the foreseeable future; or which is listed as a threatened or endangered species under the ESA, or is designated as depleted under the MMPA."* While there is considerable analysis that goes into estimating PBR, in fact it is not a limit as compared to fishery based limits (target and threshold).

Categorization of fisheries is based on the following two-tiered, stock-specific approach:

Tier 1 - Considers the cumulative fishery mortality and serious injury of a given marine mammal, for that particular stock. If the total annual mortality and serious injury rates of mammals within a given mammal stock resulting from all fisheries are less than or equal to ten percent of the stock's potential biological removal rate (PBR), all fisheries associated with this stock fall into Category III. If mortality and serious injury rates are greater than ten percent of PBR, the following Tier 2, analysis occurs.

Tier 2 - Considers fishery-specific mammal mortality and serious injury for a particular mammal stock. Specifically, this analysis compares fishery-specific annual mortality and serious injury rates to a given mammal stock's PBR to designate the fishery as a Category I, II, or III fishery. Category I fisheries have frequent incidental mortality or serious injury of marine mammals; Category II fisheries have occasional incidental mortality or serious injury of marine mammals; and Category III fisheries have a remote likelihood of/no known incidental mortality or serious injury of marine mammals

No ETP species were listed by observers as encountered by the fishery. The surfclam and ocean quahog fishery in the Mid-Atlantic is classified as a Category III fishery, meaning there is no known injury or mortality to marine mammals. The hydraulic dredge is not known to impact marine mammals, turtles, seabirds, or other protected species. Turtles, which have been taken in trawl fishing gear and sea scallop dredges, have not been reportedly taken in clam dredges (MAFMC-NMFS. 2012).

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 LOF, and based on the categorization of fisheries as described above, resources are allocated for addtional at sea observer coverage for fisheries that are considered a risk to ETP species.

Habitat Impacts

(*Some text taken from pre-assessment and the NEFMC Omnibus EFH Amendment 2)*

Background

Towed bottom fishing gears, including hydraulic dredges used in the Atlantic surfclam and ocean quahog fisheries, 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). The high pressure water and cutting bar used to extract clams associated with hydraulic dredges can impact the seabed to deeper depths than would otherwise be impacted.

A 2001 workshop on the potential habitat impacts of fishing gears used in the Northeast region concluded that there are potentially large, localized impacts of hydraulic clam dredges on the biological

and physical structure of sandy benthic habitats (Northeast EFH Committee 2002, MAFMC 2003). As a result, the Mid-Atlantic Fishery Management Council concluded in Amendment 13 that there may be some adverse effects of clam dredging on Essential Fish Habitat (EFH); the effects, however, are of short duration and minimal because the fishery occurs in primarily high energy sand habitats and in a relatively small area when compared to the areas impacted by scallop dredges or bottom trawls and when compared to the overall high energy sand area on the continental shelf. The workshop panel further concluded that biological communities would recover within months to years, depending on the affected species, and physical structure within days in high energy environments to months in low energy environments.

Habitat Impact Evaluation under the MSC Framework

When assessing the status of habitats and the impacts of fishing, teams are required to consider the full area managed by the local, regional, national, or international governance body(s) responsible for fisheries management in the area(s) where the UoA operates (this is called the "managed area" for assessment purposes). In this case, the relevant management agency is the Mid-Atlantic Fisheries Management Council and the managed area is the federal waters (3nm – 200nm) stretching from the Maine/Vermont border to North Carolina/South Carolina border.

According MSC FCRV2.0 SA3.13.3, the assessment team must determine and justify which habitats are commonly encountered, vulnerable marine ecosystems (VMEs), and minor (i.e., all other habitats) for scoring purposes, [where]:

- A commonly encountered habitat shall be defined as a habitat that regularly comes into contact with a gear used by the UoA, considering the spatial (geographical) overlap of fishing effort with the habitat's range within the management area(s) covered by the governance body(s) relevant to the UoA; and
- A VME shall be defined as is done in paragraph 42 subparagraphs (i)-(v) of the FAO Guidelines 7 (definition provided in GSA3.13.3.2[2]) [as having one or more of the following characteristics: uniqueness or rarity, functional significance, fragility, Life-history traits of component species that make recovery difficult, and/or structural complexity]. This definition shall be applied both inside and outside EEZs and irrespective of depth."

[2] According to MSC FCRV2.0 GSA 3.13.3.2: "VMEs have one or more of the following characteristic, as defined in paragraph 42 of the FAO Guidelines:

- Uniqueness or rarity – an area or ecosystem that is unique or that contains rare species whose loss could not be compensated for by similar areas or ecosystems
- Functional significance of the habitat – discrete areas or habitats that are necessary for survival, function, spawning/reproduction, or recovery of fish stocks; for particular life-history stages (e.g., nursery grounds, rearing areas); or for ETP species
- Fragility – an ecosystem that is highly susceptible to degradation by anthropogenic activities
- Life-history traits of component species that make recovery difficult – ecosystems that are characterised by populations or assemblages of species that are slow growing, are slow maturing, have low or unpredictable recruitment, and/or are long lived
- Structural complexity – an ecosystem that is characterised by complex physical structures created by significant concentrations of biotic and abiotic features"

Both commonly encountered and VME habitats are considered 'main' habitats for the purposes of scoring PI 2.4.3 (habitat information) (GSA3.13.3).

Commonly Encountered Habitat in the Surfclam and Ocean Quahog Fishery

The main habitat where Atlantic surfclams and ocean quahogs are harvested that is impacted by the hydraulic clam dredge fishery is shallow, dynamic sandy substrate with no vegetation or benthic structures (Wallace and Hoff 2005). At the depths where surfclams are fished, the seabed sediments are disturbed and re-suspended by storms and by strong bottom currents in some locations.

Ocean quahog habitat consists mostly of finer sand and silt/clay substrates which are deeper than the surfclam habitat and less affected by natural physical disturbances. Neither species is found in commercial quantities in gravel or mud habitats or in waters deeper than 250 feet. Surfclam and ocean quahog habitats are both considered to be 'high energy' environments in which the recovery times after a dredge passes is relatively short (Wallace and Hoff 2005, MAFMC 2011). Tracks left by mobile gear can endure for 16 hours in hard sand sediments and up to 5 hours in soft sediments (MAFMC 2003), but tracks left by hydraulic calm dredges may endure longer as they are deeper.

Vulnerable Marine Ecosystems (VME) in the Surfclam and Ocean Quahog Fishery

The definition of VME provided by MSC SA3.13.3.2[1] and related guidance is based on the 2009 FAO International Guidelines for the management of Deep-sea Fisheries in the High Seas. Although the FAO Guidelines were written for deep-sea fisheries, for MSC purposes the Guidelines' VME characteristics also considered to apply to non-deep-sea fisheries, and the definition of VME could include other species groups and communities for MSC assessment purposes. MSC guidance further states that it intends that the CAB consider VME's and 'potential' VMEs as accepted, defined, or identified by relevant management authorities. Only defined VME's are considered under 2.4.1, while 'potential' VME's should be additionally recognized under 2.4.2 as a precautionary measure.

In the United States, there is no explicit VME designation. NOAA's website identifies 5 types of habitat in their Habitat Protection website (http://www.habitat.noaa.gov/protection/index.html): Coastal wetlands, corals, essential fish habitat (EFH), rivers: hydropower and fish passage, and Cape Fear River Partnership. Of these, only coral and EFH are relevant to the marine fisheries within UoA jurisdiction.

EFH are identified, described, and mapped for every federally managed fish species. Designation of EFH does not confer particular protections, rather management councils use EFH designations to identify sensitive habitats and apply appropriate regulations (such as gear restrictions) where appropriate because all FMPs are required to evaluate and minimize to the extent practicable fishing impacts on all EFH. Habitat Areas of Particular Concern (HAPC), are a subset of EFH, and are habitat types and/or geographic areas identified by any of the eight regional fishery management councils and NOAA Fisheries as priorities for habitat conservation, management and research. As in EFH, HAPC designation does not confer any inherent protection measure. However, Within the EFH consultation process, HAPCs encourage increased scrutiny and more rigorous conservation recommendations for reducing adverse impacts to fish habitat. (Regional HAPC Report – May 2016)

The assessment team considers the EFH and HAPC designations as effective in focusing habitat protection regulations, but considers the designation too broad to fit the intent of the VME designation as EFH pertain more to fish species specific characteristics rather than habitat-specific characteristics

described in the FAO guidelines above. However, EFH and HAPC have helped identify habitat areas for protection via FMP amendments that provide protection to deep sea coral zones and four canyon areas. These protection areas, described in further detail below, are considered VME's for assessment purposes.

VME 1: Deep Sea Coral Zones

The Deep Sea Corals Amendment (draft) to the Atlantic Mackerel, Squid, and Butterfish (MSP) FMP identifies two types of coral zones for protection (see http://www.mafmc.org/actions/msb-am16 for further information, Figure 25):

- A Broad coral zone, consisting of a large, deep area, the vast majority of which is beyond the depths of current fishing effort. This area is intended to limit and prevent the expansion of current commercial gear use into these deeper areas.
- A set of discrete coral zones, which are smaller areas of known or highly likely coral presence. These include specific offshore canyons and slope areas.

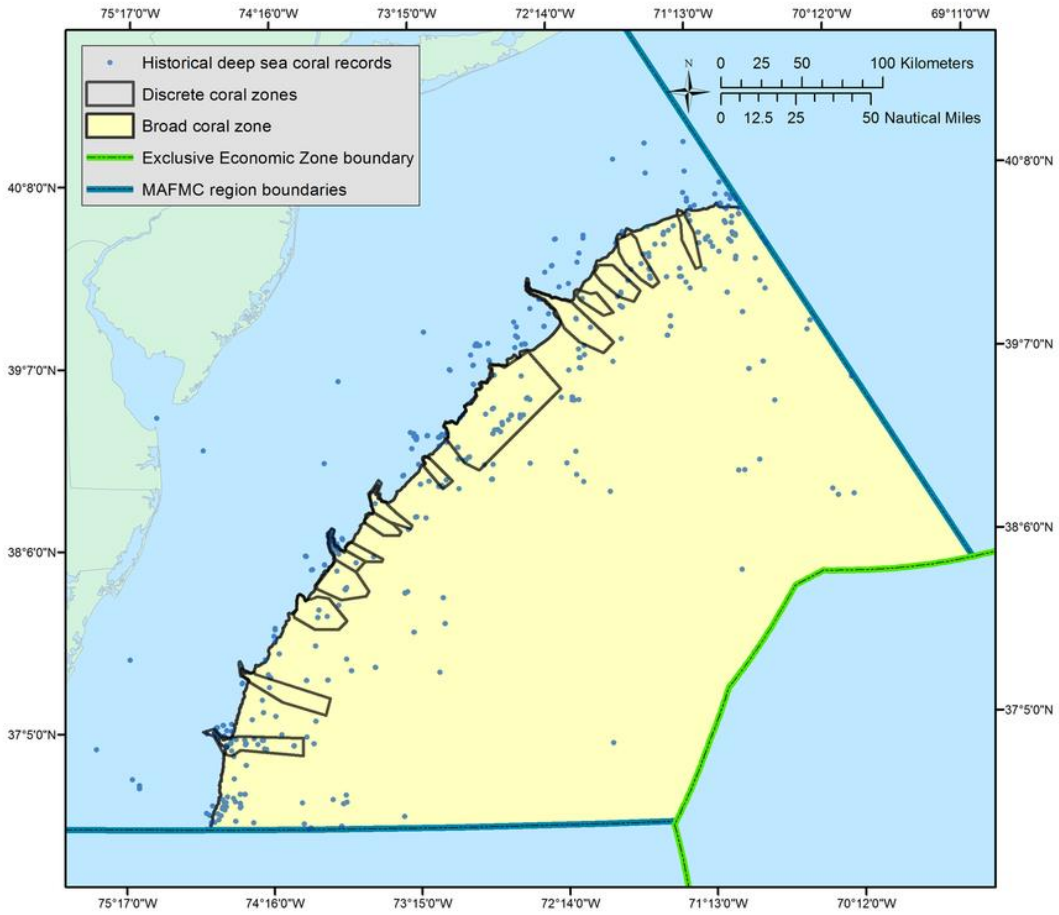


Figure 25. Proposed broad and discrete deep sea coral zones in the Mid-Atlantic Council Region (http://www.mafmc.org/actions/msb-am16). The combined area is approximately 99,000km^2.

Within both zones, the council has recommended prohibiting all bottom-tending gear types, except deep sea red crab trap fishing, or American lobster trap fishing (or others managed by the Atlantic States Marine Fisheries Commission). The surfclam and ocean quahog fishery is not capable of operation within the proposed protected area as the depth is beyond reach of the hydraulic clam dredge gear. The Council has approved provisions to permit vessel transit through coral protection

zones with a requirement that gear be stowed during such transit. The Amendment is written under the MSP FMP, but the protections will apply to all federally managed fisheries operating with relevant gear types in the designzted coral zones.

The amendment is currently under review by NMFS, with the final rule expected in October 2016.

VME 2: Canyon Gear Restricted Areas

Amendment 1 to the Golden Tilefish FMP defined a subste of areas with HAPC designation, where HAPCs were defined as clay outcrop/pueblo habitats within four canyon areas: Norfolk, Veatch, Lydonia, and Oceanographer. This HACP designation did not confer any habitat protections, but Amendment 1 separately established gear restricted areas (GRAs) for bottom trawling gear within and adjacent to the four canyons (Figure 26).

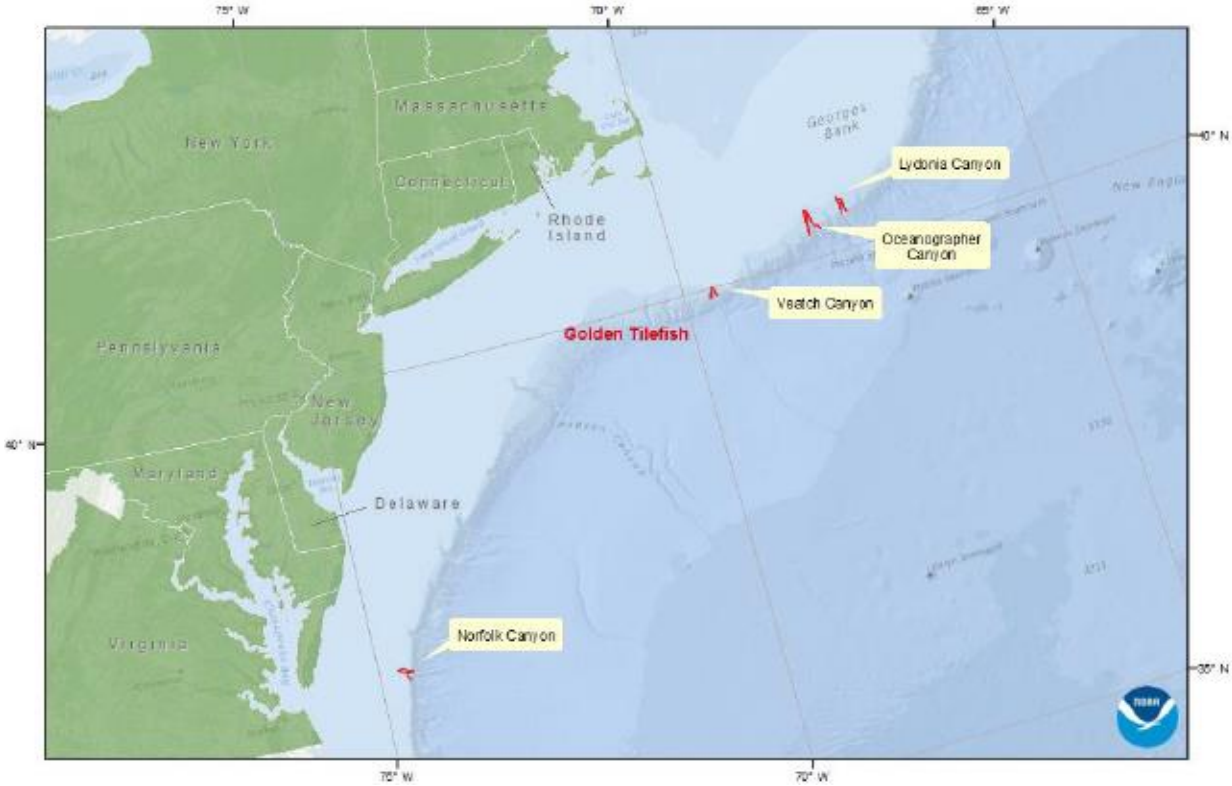


Figure 26. Canyons protected by bottom trawling gear restriction via Amendment 1 to the Golden Tilefish FMP. Source: http://www.habitat.noaa.gov/pdf/Regional-HAPC-Report-May-2016.pdf

These protected VME habitats are found at depths greater than 200m, and the seabed from 450 meter seaward, are all far beyond the operating depth of the clam dredge fishery.

Interaction between the Hydraulic Clam Dredge Fishing Gear and Habitat

Hydraulic clam dredges operate in soft bottom areas consisting of large grain sand, fine sand, sand and small grain gravel, sand and small amounts of mud, and sand and very small amounts of clay (MAFMC 2003). Most tows for the Atlantic surfclam and ocean quahog fishery are made in large grain sand. Boat captains prefer not to tow in areas where gear can be lost or damaged. Tows are also limited to sandy sediment to reduce the risk that mud will be blown into the clam bodies and reduce clam quality (Figure 27 and Figure 28). Note that there is a significant area of the continental shelf essentially closed to hydraulic dredging for clams (Figure 29), for reasons associated pollution degraded habitat, and

Paralytic Shellfish Poisoning (PSP) area and testing closures. The Georges Bank region had not been open to ocean quahog fishing since 1990 due to the risk of paralytic shellfish poison (PSP) contamination. Portions of this area were reopened to harvesting at the beginning of 2013 with experimental fishing in years prior. Georges Bank contains about 43% of total ocean quahog fishable biomass (2011 NEFSC survey data) and approximately one third of the Atlantic surfclam biomass (assessment through 2011). These closures offer some protection to habitat from the clam dredge fishery.

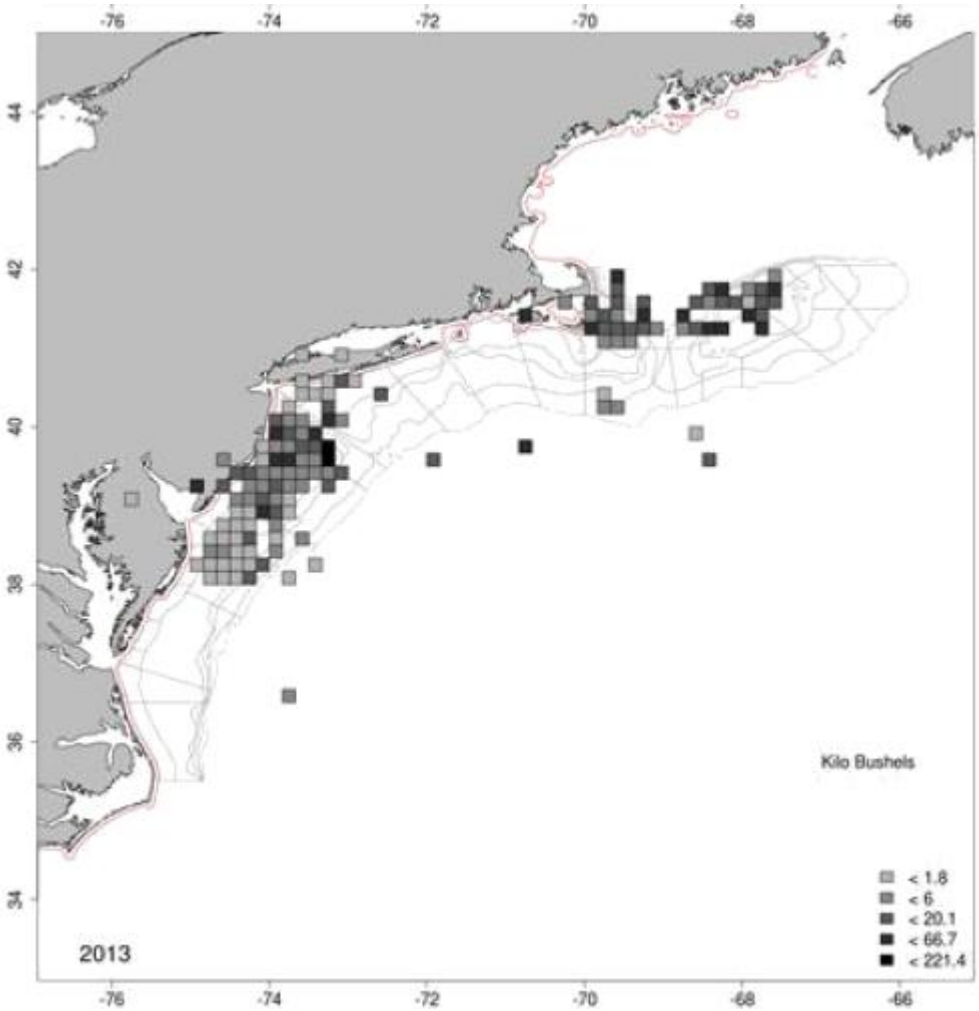


Figure 27. Map showing the geographic distribution of surf clam landings in 2013 based on FV logbook data classified by 10' squares. The squares located off the continental shelf are based on erroneous landing reports

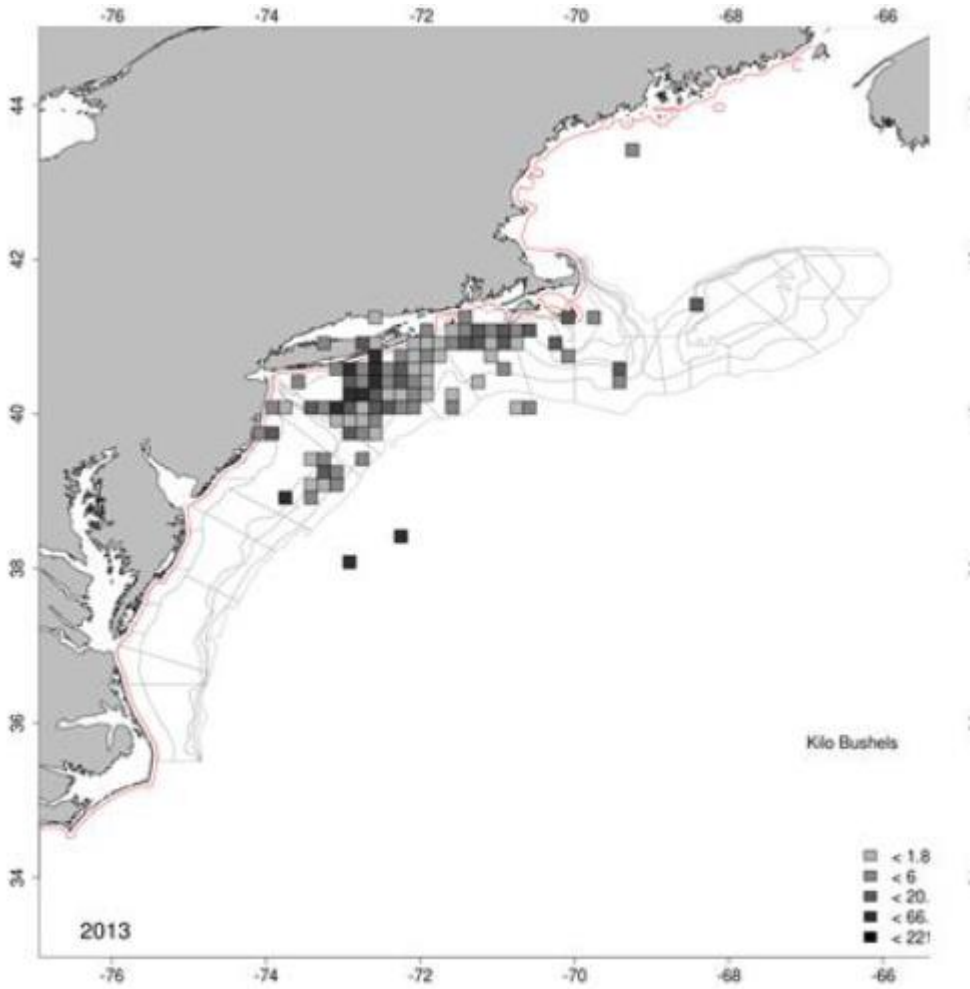


Figure 28. Map showing the geographic distribution of ocean quahog landings based on FV logbook data classified into 10' squares. The squares located off the continental shelf are based on erroneous landing reports.

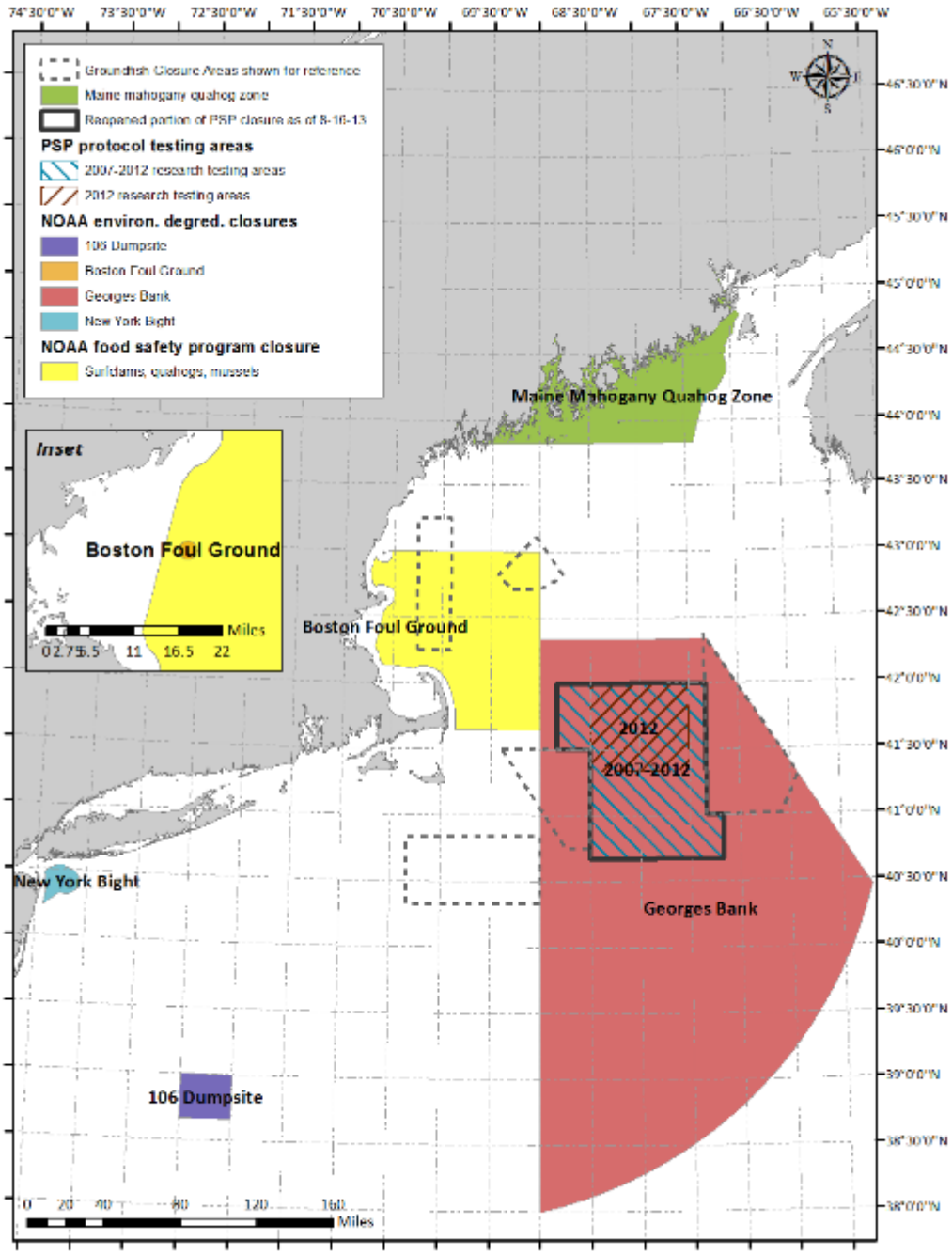


Figure 29. Management closed areas relevant to the clam fishery. The year round groundfish closure areas are shown for reference – vessels dredging for surfclams or ocean quahogs are exempted from the Western Gulf of Maine, Cashes Ledge, and Nantucket Lightship closures. (NEFMC, 2016)

The type of dredge used and the practices employed have variable impacts on habitat. In the surfclam and ocean quahog fisheries, two types of hydraulic dredges are used: stern rig and side rig dredges. For side rig dredges, a chain bag drags behind the dredge and smooths the trench created by the dredge. This chain bag results in more damage to small clams and other bycatch than occurs with the stern rig dredge (MAFMC 2003). The latter is a giant sieve that allows small clams and other bycatch to fall out of and into the trench with minimal injury. Improvements in the gear efficiency have decreased bottom time and helped limit the harvest to a relatively small area within the Mid-Atlantic Bight, recalling the fact that this fishery is limited not by quota, but by market demand.

Hydraulic dredges use high pressure water jets to inject water into the sediment ahead of the dredge blade and scour out the clam shells; The "knife" or cutting edge on the leading bottom edge of the dredge opening picks up clams and ocean quahogs that have been separated from the sediment and guides them into the body of the dredge (i.e. the cage) (MAFMC 2003). Water penetrates about 8-10 inches into the sediment. Too much pressure will blow sediment into the clams and decrease quality. The knife is 5.5 inches deep for surfclams and 3.5 inches deep for ocean quahogs. If the knife is the incorrect size, the clams and ocean quahogs can be cut and damaged, leading to increased mortality of clams left on the bottom (MAFMC 2003). Dredge tows begin at about 2.5 knots and slow as the dredge accumulates clams. The dredge is retrieved when the speed drops below 1.5 knots. Tows can last a few minutes in very dense beds; however, a typical tow is fifteen minutes in length (MAMFC 2003).

As noted previously, surfclams are harvested primarily in a small area off of the New Jersey and Long Island coasts where the bottom is a sandy substrate, while ocean quahogs are harvested over a larger spatial area, including offshore waters. Areas with higher densities of clams are more likely to be dredged intensively, leading to a higher percentage of the bottom being affected (MAFMC 2003). A high proportion of the area where surfclams are found off of New Jersey is affected by dredging due to the small spatial scale and homogenous bottom. Additionally, surfclams grow more rapidly than ocean quahogs so the areas where they are found are dredged every few years. Areas where ocean quahogs are found are left undredged for many years, and these areas are more likely to be dredged as discrete patches, surrounded by undisturbed areas.

Fishery Habitat Impact Assessment

As part of the recent NEFMC development of the Omnibus Essential Fish Habitat Amendment 2, seabed vulnerability to fishing gear impacts was evaluated using the Swept Area Seabed Impact (SASI) approach (NEFMC, 2016). SASI was developed by the Council's Habitat Plan Development Team to assist them in evaluating adverse effects across FMPs, developing measures to minimize those effects, and analyzing the impacts of those measures. This model builds on the approach proposed in DeAlteris et al (1999) and tested in Narragansett and Bay, and further applied to the Northeast region shelf (DeAlteris, 2005). The approach was approved by the SSC, as well as by a peer-review panel convened specifically to assess the validity of using the SASI approach for development and analysis of management measures. It was applied to all fishing gears used within the northeast region including hydraulic clam dredges.

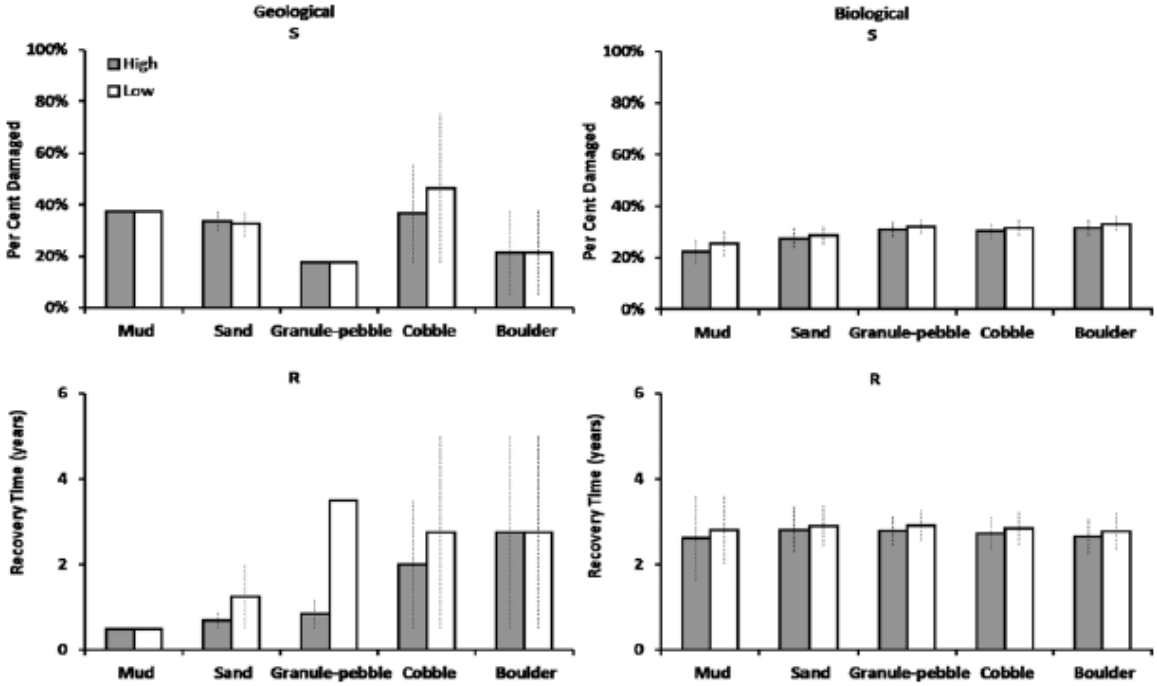
The SASI approach consists of a vulnerability assessment and a spatial model. The vulnerability assessment reviewed the habitat impacts literature relevant to Northeast U.S. fishing gears and seabed types, and created a framework for organizing and generating susceptibility and recovery values for

seabed features based on a scale of relative differences for use in the SASI model. Although both seafloor and water column aspects of habitat are important in determining fish distributions, the focusof the vulnerability assessment is seabed features since fishing activities do not substantively alter the water column. The vulnerability assessment identified low-energy granule-pebble, cobble- and boulder-dominated habitats as being the most vulnerable to fishing impacts. 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. Sea floor substrate and energy maps were created to serve as a foundation for a modeling approach that examines the spatial distribution of vulnerable seafloor habitats. Two data sources were used to develop the substrate map: a video survey conducted by the University of Massachusetts Dartmouth School for Marine Science and Technology, which captures all grain sizes, and the USSEABED database compiled by the United States Geological Survey which consists mainly of grab samples and focuses on mud, sand, and granule-pebble grain sizes only. The substrate classification follows the Wentworth Scale. Seafloor energy was classified as either high or low energy based on model estimates of flow rate at the seabed or according to depth in locations where flow estimates were unavailable. More details on the methodology are available in Grabowski et al. 2014.

Various seabed features such as sand waves or sponges were inferred to occur in particular substrate-energy types. Then the seabed features were given susceptibility and recovery scores according to the nature of the fishing gear impact (i.e. the type of gear and how it interacts with the seabed). The initial effect of the gear (susceptibility) and the recovery duration were scored on a scale of zero to three. The scores were based on interpretations from the literature review, which provided information specific to the susceptibility of benthic habitat features likely to be impacted by each gear type and the time required for those habitats to return to their pre-impact functional value.

Bar charts comparing susceptibility and recovery scores for geological and biological features in high and low energy environments for two different types of mobile fishing gears (otter trawls and hydraulic clam dredges) are shown (Figure 30) (taken from Grabowski et al. 2014). It is necessary to note that the modeled effects are per unit of area impacted. Further it is useful to note that sensitivity analyses demonstrated that recovery scores are an important driver of model results, with longer recovery times contributing to higher estimates of vulnerability. For comparison purposes, otter trawl, the lower left panel shows the highest geological recovery scores associated with cobble and boulder habitats in high energy environments (shaded bars). The hydraulic dredge vulnerability assessment (and model) operates differently as only two substrate types were evaluated given assumptions about seabed types in which the gear can be fished. In this case, longer recovery times in low energy habitats (open bars) are a key driver of the vulnerability results. Note the differences in the scale of the various results on the vertical axis, which translates to the magnitude of the vulnerability scores across the gear types (high for hydraulic dredges, low for the fixed gears, moderate for otter trawls and scallop dredges). So, the conclusion from this analysis is that the impact per km^2 swept area of the hydraulic dredge is substantially greater than otter trawls and most other gear types.

a. Otter Trawls



b. Hydraulic Dredges

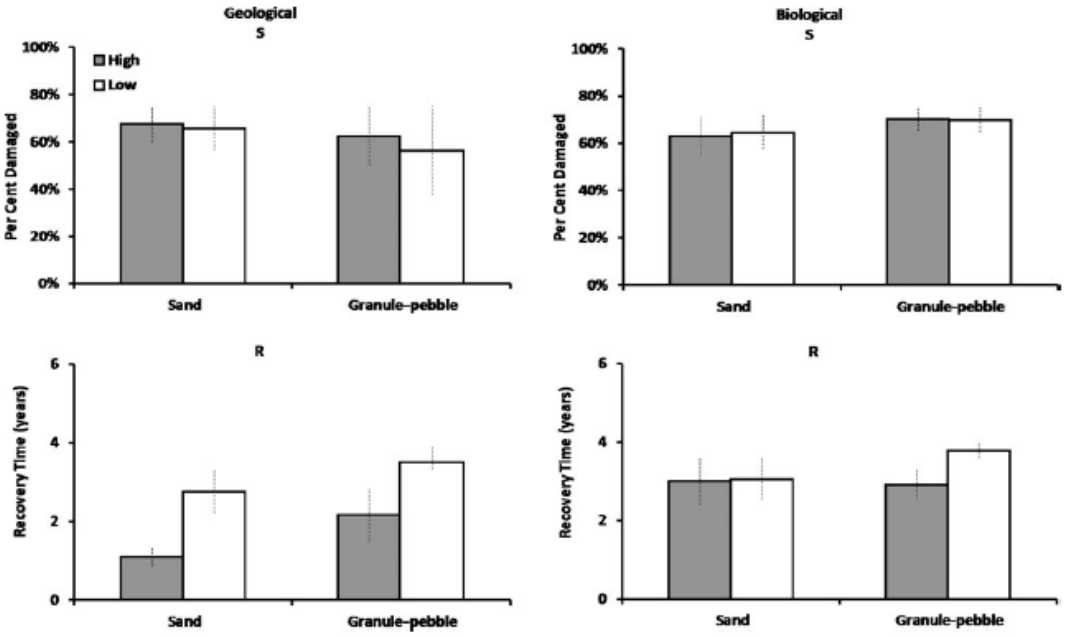
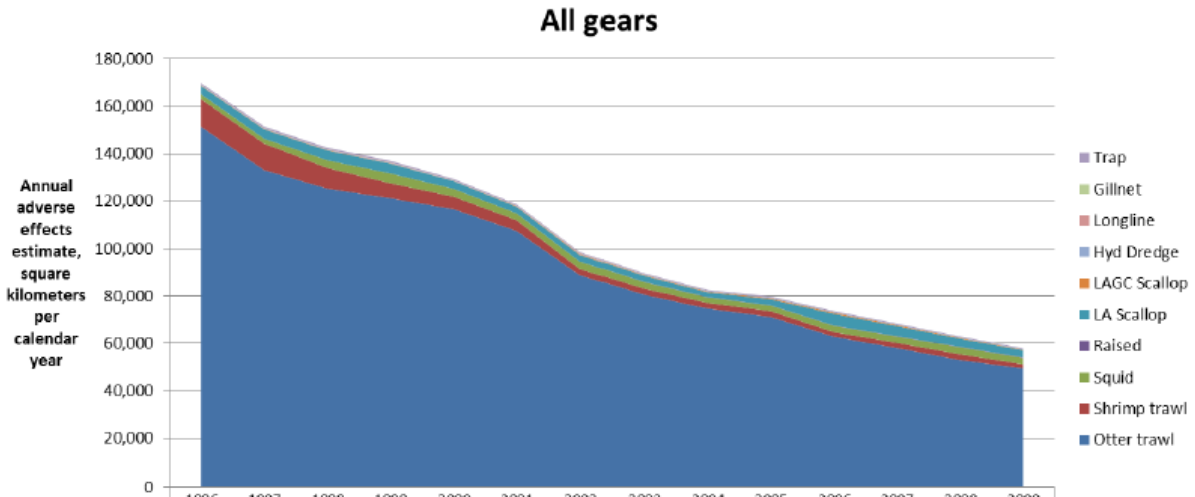


Figure 30. Mean susceptibility (% damaged) and recovery (time in years) of biological and geological features from otter trawls (a) and hydraulic dredge gear (b) impacts; hatched verticals error bars are ±1 SE, (taken from Grabowski et al., 2014). Shaded bars represent high energy environments while open bars represent low energy environments.

The fishery operates in a very small proportion of the total area with sandy bottom habitat (NEFSC 2002). Most of the 40,000 square nautical miles of continental shelf between the Virginia/North Carolina border and Nantucket Island (69° W longitude) is characterized by sandy bottom. In 2000 the spatial area impacted by the hydraulic clam dredge in federal waters was about 110 square nautical

miles. This is quantitatively demonstrated in Figure 31 and the table below the figure, of the estimated realized adverse effects from the SASI model by gear type and calendar year. Note that from the plot the annual adverse impacts of the hydraulic clam dredge are imperceptible relative to otter trawls and scallop dredges, and from the table below the plot, it is evident that in 2009 the most recent data available, the annual adverse impact of hydraulic clam dredges is about 2% of otter trawls, and 8% of scallop dredges. Note that the only two MSC certified fisheries that overlap with the surfclam and ocean quahog fisheries are dogfish, partially harvested with otter trawls, and sea scallops harvested with scallop dredges.



	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 31. Comparison of estimated realized adverse effects from the SASI model by gear type and calendar year. All values in km2.

In summary, while the impacts of the hydraulic calm dredge are substantial per unit of swept area, due to the relatively small area swept, the overall adverse impacts of the hydraulic clam dredge fishery are relatively small, as compared to otter trawls and scallop dredge fisheries. Further, the VME's identified in the managed area of the UoA are beyond the operating depth of the UoA. Management systems in place ensure that vulnerable and important habitats are identified, and that impacts are considered on a fishery-specific and cumulative basis within federal FMPs. 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. (50 CFR Ch. VI § 600.815). Finally, information to inform habitat management has been bolstered by the recent Omnibus Essential Fish Habitat Amendment 2, which assessed seabed vulnerability to fishing gear impacts was evaluated using the Swept Area Seabed Impact (SASI) approach (NEFMC, 2016).

Ecosystem Impacts

Background

Atlantic surfclams are sedentary suspension feeders using siphons which are extended above the surface of the substrate to pump in water. They feed on phytoplankton. Predators of surfclams include certain species of crabs, sea stars, snails, and other crustaceans, as well as fish predators such cod and haddock.

Ocean quahogs are suspension feeders, feeding on phytoplankton, and use siphons which are extended above the surface of the substrate to pump in water. Predators of ocean quahogs include certain species of crabs, sea stars, and other crustaceans, as well as fish species such as sculpins, ocean pout, cod, and haddock.

Benthic invertebrates such as surfclams and ocean quahogs play an important role in energy transfer within marine systems by consuming a broad range of benthic biomass and subsequently becoming important prey items for fish and other upper trophic level animals. Benthic invertebrates such as molluscs and corals filter phytoplankton and suspended detritus from the water column. As such, these animals serve as important conduits to pelagic and benthic habitats. In total, over two thousand species of benthic invertebrates have been identified on the Northeast Continental shelf, although most are relatively rare. Some of the more prominent benthic biomass trends throughout the NES LME include increases in American lobster, sea scallop, and sea star populations, and decreases in ocean quahog and Atlantic surfclam populations in recent years (Ecosystem Assessment Program 2012).

Information is available to broadly understand the key elements of the ecosystem and the main functions of the components in the ecosystem are known. The NEFSC produces an Ecosystem Status report for the Northeast Shelf Large Marine Ecosystem, and this is updated regularly (see http://www.nefsc.noaa.gov/publications/crd/crd1207/crd1207.pdf). This report summarizes the key ecosystem elements, both abiotic and biotic, which are monitored regularly, or can be estimated from data available over time. These include sea surface temperature, stratification, the CPR color index of phytoplankton abundance, zooplankton biovolume, total fish biomass, the ratio of pelagic to demersal fish biomass, mean length of the NEFSC survey catch, invertebrate landings, fish landings, and the mean trophic level of the catch. Interestingly, the landings of surfclams and ocean quahogs contribute to the invertebrate landings index, but are small relative to other fisheries including lobsters, crab, squid and sea scallops

Management

Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, and some have been investigated in detail. As mentioned previously in this report, the surfclam and ocean quahog fisheries are small and localized, and targeting only two species of many benthic invertebrates serving the same overall functions within the ecosystem. In addition, biomass trends for both species are monitored, and although they are decreasing in some areas, they are increasing in others (e.g. George's Bank quahogs), and populations of other species (e.g. scallops) filling a similar ecosystem niche are increasing, and there appears to be no relationship between the declining biomass trends in surfclam and ocean quahog and population trends of dependent predators,

which are also monitored closely. The fishery is at least highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be serious or irreversible harm (defined by MSC “in relation to the capacity of the ecosystem to deliver ecosystem services”). Neither surfclams nor ocean quahogs are key participants in the transfer of energy through the trophic web as described by the MSC low-trophic-level species requirements. Because of the nature of hydraulic dredging as a towed, bottom fishing activity, the impact of the fishery is focused on the seabed, and there are no known impacts on the pelagic environment. Additionally, there are very low levels of bycatch in these fisheries, and habitat damage is considered to be temporary and localized.

Because of the nature of the fishery (species prosecuted, gear deployed, areas fished) the ecosystem impacts are expected to be negligible. As such, there is no fishery-specific management strategy pertaining to ecosystem impacts. However, because these fisheries are primarily managed according to a federal FMP in compliance with the MSFCMA, 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 (See National Fisheries Management Section).

3.5 Principle Three: Management System Background

Area of Operation and Relevant Jurisdictions

The Unit of Assessment includes two species (surfclams and ocean quahogs), both harvested by hydraulic dredges in federal waters (3-200 miles) off the coast of the United States from Cape Hatteras to the U.S.-Canada offshore boundary. Each species is considered a single stock throughout its range in U.S. waters (MAFMC 1977). The surfclam and ocean quahog fisheries in the U.S. Exclusive Economic Zone fall under a single, U.S. federal jurisdiction and are managed by the National Marine Fisheries Service (NMFS) and the Mid-Atlantic Fishery Management Council (MAFMC). The fishery is also regulated by the New England Fishery Management Council (NEFMC) with regard to habitat protection in areas under the jurisdiction of the NEFMC. 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 surfclam and ocean quahog fisheries within 3 miles of shore. Those fisheries are not part of this assessment. States also have memoranda of understanding (MOUs) with the National Marine Fisheries Service and other federal agencies that authorize them to enforce federal fishery and shellfish sanitation program regulations.

Since 1977 the Atlantic surfclam and ocean quahog fisheries have been managed under a single Fishery Management Plan (FMP). The FMP was developed by the MAFMC 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 Atlantic surfclams and ocean quahogs in the U.S. Atlantic EEZ. The FMP has been amended 16 times through 15 amendments and 1 framework action.

National Fisheries 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

Consultation, Roles & Responsibilities, and Decision Making Processes

Both the surfclam and ocean quahog fisheries are managed primarily through the Surfclam and Ocean Quahog Fishery Management Plan (FMP) developed by the MAFMC under the MSFCMA. The small fisheries managed separately in state-waters are not part of the Unit of Certification (other than with respect to P1 target stock issues).

Under the MSFCMA, fisheries management plans contain legal requirements that are codified in the Code of Federal Regulations (USOFR 2016). 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 surfclam and ocean quahog are as follows:

- National Marine Fisheries Service ("NMFS") (NOAA) – final approving authority for the SCOQ 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 of both clam species, 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 surfclam/quahog fishery through the initiation, development, and 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 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.
- Surfclam and Ocean Quahog Committee of the MAFMC – committee comprised of eight 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.
- Surfclam and Ocean Quahog Advisory Panel – comprised of seven representatives of the fishing industry and the public who use their knowledge and experience in the fishery to advise the Surfclam and Ocean Quahog Committee and the MAFMC concerning the performance of the fishery and any proposed changes in the management system.

Decisions about management of the surfclam and ocean quahog fisheries 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).

Fishery-Specific Management and Objectives

The surfclam and ocean quahog fisheries have explicit short and long term objectives which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2.

Since 1977 the Atlantic surfclam and ocean quahog FMP has been amended 16 times through 15 amendments and 1 framework action. The original FMP had three objectives:

- Rebuild the declining surfclam populations to allow eventual harvesting approaching the 5O million pound level, which is the present best estimate of the maximum sustainable yield (MSY), based on the average yearly catch from 1960·1976.
- Minimize the short-term economic dislocations to the extent possible consistent with objective 1 and promote economic efficiency.

- Prevent the harvest of the ocean quahog from exceeding biologically sound sustainable yield levels, and direct the fishery toward maintaining optimum yield. (MAFMC 1977)

Amendment 8 adopted four objectives (MAFMC 1988) that continue to guide management of the fishery today. They are:

1. Conserve and rebuild Atlantic surfclam and ocean quahog resources by stabilizing annual harvest rates throughout the management unit in a way that minimizes short term economic dislocations.
2. Simplify to the maximum extent the regulatory requirement of surfclam and ocean quahog management to minimize the government and private cost of administering and complying with regulatory, reporting, enforcement, and research requirements of surfclam and ocean quahog management.
3. Provide the opportunity for industry to operate efficiently, consistent with the conservation of surfclam and ocean quahog resources, which will bring harvesting capacity in balance with processing and biological capacity and allow industry participants to achieve economic efficiency including efficient utilization of capital resources by the industry.
4. Provide a management regime and regulatory framework which is flexible and adaptive to unanticipated short term events or circumstances and consistent with overall plan objectives and long term industry planning and investment needs.

History of the Fishery Management Plan

The Original FMP (1977) (http://www.mafmc.org/surfclams-quahogs/) included the objectives listed above and the following management provisions:

- Established management of surfclam and ocean quahog fisheries through September 1979
- Established quarterly quotas for surfclams
- Established annual quotas for ocean quahogs
- Established effort limitation, permit, and logbook provisions
- Instituted a moratorium on entry into the surfclam fishery for one year to allow time for the development of an alternative limited entry system such as a "stock certificate" program
- The FMP has been amended as follows:
- Amendment 1 (1979)
    - Extended management authority through December 31, 1979
    - Maintained the moratorium
- Amendment 2 (1979)
    - Extended the FMP through the end of 1981
    - Divided the surfclam portion of the management unit into the New England and Mid-Atlantic Area
    - Introduced a "bad weather make up day"
    - Maintained the moratorium in the Mid-Atlantic Area
- Amendment 3 (1981)
    - Extended the FMP indefinitely

- Imposed a 5.5" surfclam minimum size limit in the Mid-Atlantic Area (Note that the minimum size limit has been suspended by the Regional Administrator in recent years as provided for in the FMP)
- Expanded the surfclam fishing week in the Mid-Atlantic Area to Sunday - Thursday from Monday – Thursday
- Established a framework basis for quota setting
- Proposed a permit limitation system to replace the moratorium which was disapproved by NMFS
- NMFS extended the moratorium

- Amendment 4 (1984)
  - Provided that any unharvested portion of a bimonthly allocation be added to the immediately following bimonthly allocation rather than being prorated over all remaining bimonthly periods and that trip and weekly limits be by vessel classes based on relative fishing power
  - Amendment 4 was implemented on an emergency basis for 180 days beginning 1 July 1984
  - NMFS subsequently determined that the document was not structurally complete for review
- Amendment 5 (1985)
  - Allowed for revision of the surfclam minimum size limit provision (The minimum size limit has been suspended annually in recent years.)
  - Extended the size limit throughout the entire fishery
  - Instituted a requirement that cages be tagged
- Amendment 6 (1986)
  - Divided the New England Area into the Nantucket Shoals and Georges Bank Areas, the dividing line being 69° N Longitude
  - Combined the provisions of Amendment 4 with the Mid-Atlantic Council's Amendment 6 into one document
  - Replaced the bimonthly quotas with quarterly quotas
  - Eliminate the weekly landing limits for the Nantucket Shoals Area
  - Clarified the quota adjustment provisions for the Nantucket Shoals and Georges Bank Areas
  - Established one landing per trip provision
- Amendment 7 (1987)
  - Changed the quota distribution on Georges Bank to equal quarterly quotas
  - Revised the roll over provisions
- Amendment 8 (1988)
  - Replaced the regulated fishing time system in the surfclam and ocean quahog fisheries with an individual transferable quota (ITQ) system
  - Established new objectives for the FMP
- Amendment 9 (1996)
  - Revised the overfishing definitions for surfclams and ocean quahogs in response to a scientific review by NMFS
- Amendment 10 (1998)

- Provided management measures for the small artisanal fishery for ocean quahogs (mahogany clams) off the northeast coast of Maine

- Amendment 11 (1998)
  - Achieved consistency among Mid-Atlantic and New England FMPs on vessel replacement and upgrade provisions, permit history transfer and splitting and renewal regulations for fishing vessels issued Northeast Limited Access Federal Fishery permits
- Amendment 12 (1998)
  - Brought the FMP into compliance with the new and revised National Standards and other requirements of the 1996 Sustainable Fisheries Act
  - Established a framework adjustment process
  - Implemented an Operator Permit requirement for fishermen that did not already have them for other fisheries
  - The Regional Administrator partially approved Amendment 12 with the exceptions of the proposed surfclam overfishing definition and the fishing gear impacts to EFH section.
- Amendment 13 (2003)
- Appendices
  - Addressed various disapproved sections of Amendment 12
- Amendment 14 (2007)
  - Standardized bycatch reporting methodology
- Framework 1 (2007)
  - Addressed issues related to Vessel Monitoring Systems (VMS) and enforcement
- Amendment 16 (2011)
- Established Annual Catch Limits (ACLs) and Accountability Measures (AMs)
- Amendment 15 (2015)
- Final Rule
  - Standardized Bycatch Reporting Methodology
- Amendment 18 (2015)
- Final Rule
  - Eliminated the requirement for vessel owners to submit "did not fish" reports for the months or weeks when their vessel was not fishing
  - Removed some of the restrictions for upgrading vessels listed on Federal fishing permits
- Amendment 17 (2016)
  - Establishes a cost recovery program for the individual transferable quota (ITQ) fishery, as required by the Magnuson-Stevens Act.
  - Contains provisions to remove the optimum yield ranges from the management plan and to change how biological reference points are incorporated into the plan.

Fisheries Regulations to Meet Objectives

(This summary of the surfclam and ocean quahog regulations is taken from https://www.greateratlantic.fisheries.noaa.gov/regs/infodocs/scoqinfosheet.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.)

Permits

There are three categories of permits in the fishery. Two are open access permits, one for surfclam and one for ocean quahog. These two permits, although open access, are ITQ permits for their respective species. To fish under these open access ITQ permits, a permit holder must have previously received an allocation or must obtain allocation through an allocation transfer. The third permit category is a limited access permit, and is only for harvesting Maine mahogany quahogs north of 43°50' N. latitude. This portion of the fishery is not included in the UoA.

ITQ Allocations (§ 648.70)

Each fishing year (FY), NMFS determines the initial allocations of surfclams and ocean quahogs for the next FY by multiplying the total quota by each allocation holder's allocation percentage. Each allocation is then converted to a number of clam cage tags (1 tag = 32 bushels or 60 ft^3). The procedures used to make initial allocations are described under "Access Rights," below.

Cage Tag Transfer Program (§ 648.70)

www.greateratlantic.fisheries.noaa.gov/permits/forms/SFOQ%20tag%20transfer%20form.pdf. An ITQ permit holder who owns an allocation may transfer part or all of his/her allocation to any qualified entity. There are two types of transfers available: Permanent ITQ allocation transfers and temporary cage tag transfers. There is no limit on the number of transfers permitted per year. An application for transfer may not be made between October 15 and December 31 of each year for administrative reasons. The cage tag transfer form can be obtained from NMFS.

Cage Tags (§ 648.75)

At the beginning of each FY, NMFS publishes a notice in the Federal Register announcing an approved vendor for cage tags. Each allocation permit comes with instructions for ordering the appropriate cage tags. The number of tags authorized is based on the owner's initial allocation and any allocation received through transfers. Each tag represents 32 bushels of clams.

Tags expire at the end of the FY for which they are issued. If tags are lost or stolen, the owner must notify NMFS, with the number s of the lost/stolen tags, by telephone as soon as the loss or theft is discovered and in writing within 24 hours. Thereafter, the reported tags are no longer valid for use. Lost or stolen tags may be replaced if the proper notice was provided. Replacement tags may be purchased from the vendor with a written authorization from NMFS.

Before offloading, all cages that contain surfclams or ocean quahogs must be tagged with a valid tag. It must be fixed on or as near as possible to the upper crossbar of the cage. The tag or tags must not be removed until the cage is emptied by the processor, at which time the processor must promptly remove and retain the tag(s) for 60 days beyond the end of the calendar year, unless otherwise directed by authorized law enforcement agents.

If a vessel fishing under an IFQ allocation is not a capable of carrying cages, it must offload unshucked surfclams or ocean quahogs into properly tagged cages.

Minimum Size (§ 648.72)

The minimum length for surfclams is 4.75 inches. Length is measured at the longest dimension of the surfclam shell. No more than 50 surfclams in any cage may be less than the minimum size limit. If more than 50 surfclams in any inspected cage of surfclams are less than 4.75 inches in length, all cages landed on that trip are deemed to be in violation of the minimum size restriction and may be seized and the operator may be subject to additional penalties. However, the minimum size limit is considered, and may be suspended, on an annual basis. The minimum size for surfclams has been suspended each year in recent years. There is no Federal minimum size limit for ocean quahogs.

Maine Mahogoney Quahog Zone Requirements (§ 648.76)

A vessel issued a limited access Maine mahogany quahog permit and fishing for or possessing ocean quahogs within the Maine mahogany quahog zone (north of 43°50' N. latitude) must land its catch in the State of Maine. The annual quota for harvest of mahogany quahogs from within the Maine mahogany quahog zone is 100,000 Maine bushels (1 Maine bushel = 1.2445 ft^3). The quota may be revised annually.

Catch from vessels with IFQ permits fishing in the Maine mahogany quahog zone will be counted against their respective surfclam or ocean quahog allocation.

All mahogany quahogs landed for sale in Maine by vessels issued a Maine mahogany quahog permit and not fishing for an IFQ allocation are applied against the Maine mahogany quahog quota, regardless of where the mahogany quahogs are harvested.

Shucking At Sea (§ 648.74)

A vessel owner may apply to NMFS to shuck surfclams or ocean quahogs at sea. If approved, NMFS will determine whether such trips will require an at-sea observer. Additionally, NMFS will publish notification in the Federal Register to determine a conversion factor for shucked meats to accurately calculate the amount of surfclams or ocean quahogs harvested in the shell. No vessels covered by the UoA are currently shucking surfclams or ocean quahogs at sea.

Reporting Requirements

Any vessel issued a surfclam or ocean quahog permit is required to have an operational vessel monitoring system (VMS). Also, the owner or operator of any vessel issued an ocean quahog/surfclam permit must maintain on board the vessel and submit to NMFS an accurate surfclam/ocean quahog report for all fishing trips. Surfclam/ocean quahog reports must be postmarked or received within 3 days after the end of each reporting week.

Additionally, if species other than surfclam or ocean quahog are being retained, an additional fishing vessel trip report (VTR) must be submitted to NMFS as well. Instructions for completing the VTR can be found at: www.greateratlantic.fisheries.noaa.gov/ro/fso/vtr.htm

Sale/Purchase Requirements

Surfclams or ocean quahogs may be sold only to persons possessing a valid surfclam/ocean quahog dealer permit obtained from NMFS. Surfclams or ocean quahogs must be purchased only from vessel owners possessing a valid surfclam or ocean quahog vessel permit.

All federally permitted seafood dealers are required to report all purchases of fish to NMFS via computer, using one of the approved electronic means, unless otherwise directed by NMFS.

Closed Areas (§ 648.73)

There are a number of areas closed to the harvesting of surfclams/ocean quahogs. Such areas are closed either due to environmental degradation, concentrations of undersized surfclams, or due to toxins that cause paralytic shellfish poisoning (PSP). Charts and coordinates of closure areas may be obtained at: https://www.greateratlantic.fisheries.noaa.gov/regs/infodocs/scoqinfosheet.pdf.

(i) A portion of the Georges Bank Closed Area has been reopened for Atlantic surfclam and ocean quahog harvesting provided a vessel abides by the following regulations in addition to the traditional surfclam and ocean quahog regulations: (http://www.greateratlantic.fisheries.noaa.gov/nr/doc/12/12scoqgeorgesbankareareopenphl.pdf) Obtain a letter of authorization (LOA) from the National Marine Fisheries Service (NMFS). The LOA must be carried onboard for all trips into the area. The LOA application will be sent out annually in your permit renewal package or it can be obtained by calling the Permits Division at (978) 282-8438; and

(ii) The vessel must adhere to the terms and conditions of the testing protocol as adopted into the National Shellfish Sanitation Program by the Interstate Shellfish Sanitation Conference. All surfclams and ocean quahogs harvested from the area must be handled in accordance with the terms and conditions of the protocol from the first point of harvest through completion of testing and release by the State Shellfish Control Authority (SSCA). A copy of the protocol is attached for your reference and can is also located at www.nero.noaa.gov/sfd/clams/ApprovedProtocol.pdf; and

(iii) Submit to NMFS a document from the SSCA detailing that the state will accept your vessel's landings. Please note that the SSCA may also require you to develop an agreement of understanding with the state, outlining any additional requirements the state may have; and

(iv) Develop and submit to NMFS a written onboard lot segregation plan. The SSCA in the intended state of landing and the U.S. Food and Drug Administration (FDA) must approve the proposed lot segregation plan. The plan must also be maintained onboard the vessel conducting the harvesting; and

(v) Prior to leaving port at the start of a fishing trip, the vessels' owner or operator must declare its intent to fish in the area by calling the Northeast Vessel Monitoring System (VMS) Team at (978) 281-9274. The vessels' owner or operator must also declare either an Atlantic surfclam or ocean quahog trip through the vessel's VMS unit. In the future VMS codes will be developed that are specific to the Reopened Portion of the GB Closed Area. In the meantime, vessels will have to declare their intent to fish in the area by calling the Northeast VMS Team at the start of a trip as well as declaring an Atlantic surfclam or ocean

quahog trip on their VMS unit.

Access Rights

Amendment 8 to the Surfclam and Ocean Quahog FMP was approved in March 1990 and replaced the previous moratorium on vessel permits and limits on fishing days with an individual transferable quota system. Any U.S. vessel can obtain a vessel permit to fish for surfclams and ocean quahogs, but can only fish under an allocation permit that authorizes a specific harvest quantity. Amendment 8 specifies that:

- Surfclams and ocean quahogs must be landed pursuant to an allocation permit. An allocation permit takes the form of (1) an individual allocation certificate specifying the share of the annual surfclam and/or ocean quahog quota the allocation is worth, {2) surfclam and/or ocean quahog cage tags equivalent to the cages resulting from applying the individual allocation to the annual quota, and (3) any documentation issued by NMFS concerning the transfer of individual allocations and cage tags.
- The Regional Director may establish fees for the allocation permit; that is, issuing the allocation permit document, issuing the annual allocation of cage tags, and issuing any documentation concerning the transfer of cage tags and allocations. Authorization to charge administrative costs includes allowing the Regional Director to arrange for cage tags to be produced and distributed by a specified vendor.
- Only persons qualified to own permitted fishing vessels under United States law are eligible to own allocation permits.
- Information concerning allocation permits is considered public information since it is information given to the fishermen by NMFS rather than information received from the fishermen, which is specified by the Magnuson Act as confidential.
- Allocation permits may be suspended, revoked, or modified by the Regional Director for violations of this FMP. (MAFMC 1990)

Amendment 8 specified the procedure that was used in awarding initial allocation permits:

Within two calendar quarters following implementation of this Amendment, allocation permits will be issued to owners or operators of permitted vessels which harvested surfclams or ocean quahogs (based on logbook reports) between 1 January 1979 and 31 December 1988. The amount of the initial distribution (that is, the percentages shown on the individual allocation permit) of surfclams will be based on the following formula. For vessels with permits to fish for surfclams and ocean quahogs in any Area (that is, vessels with permits issued pursuant to the moratorium; permits designated by NMFS as SF-1) the initial surfclam distribution will be based on the following formula: a. The surfclam catch (in bushels) that each permitted vessel caught (based on logbook reports) for calendar years 1979, 1980, 1981, 1982, 1983, 1984, 1985 (counted twice), 1986 (counted twice), 1987 (counted twice), and 1988 (counted twice) will be determined. b. The worst two years will be deleted from each vessel's history. The resulting number (in bushels) will be summed for the entire fleet and each vessel's ratio of the total calculated. c. The cost factor {vessel length X width x depth) of each vessel will be calculated, summed for the fleet, and each vessel's ratio to the total calculated. The vessel's historical ratio contributes 80% to the vessel's initial allocation. The cost factor contributes 20% to the vessel's initial allocation.

For vessels with permits to fish for surfclams in only the New England Area {permits designated by NMFS as SF-7) the surfclam catch will be the average of the catch for the years actually fished between 1979 and 1988, inclusive. The lowest catch year will be deleted from each vessel's history. This number (in bushels) will be included in the total for the total surfclam fleet (moratorium and New England Area only) to calculate the individual vessel's ratios. They will then be included with the moratorium vessels in the above allocation.

For purposes of calculating historical participation, vessels that have replaced other vessels will be credited with the catch of the vessels they replaced. The amount of the initial distribution (that is, the percentages shown on the individual allocation) for ocean quahogs will be based on the following formula:

- The average ocean quahog catch (in bushels) that each permitted vessel caught (based on logbook reports) for those years the vessel actually reported landings for calendar years 1979 through 1988, with the vessel's lowest catch year not counted, will be determined.
- The sum of all of the vessels' averages will be divided into each vessel's average to calculate each vessel's ratio to the total.
- The ratio will be applied to each year's annual quota to calculate each vessel's annual allocation. Prior to issuing the initial allocation permits, the Regional Director will inform each vessel owner or operator of the data upon which the allocation will be based (for example, logbook reports and/or vessel dimensions from the U.S. Coast Guard documentation records). Owners or operators will have 30 days to document if any of these data are incorrect and need to be changed. The logbook submitted is the official document and cannot be changed or submitted after the due date as a basis of seeking a change in allocation. An error by NMFS in compiling the original report is a basis for change. Once the final annual quotas for surfclams and ocean quahogs have been published by the Regional Director for any year, NMFS will calculate the number of cage tags by applying the appropriate percentages (from the individual allocation) to the annual quota for each species. These bushel allocations will then be divided by 32 (bushels per cage) to yield the appropriate number of cages for which cage tags may be issued. The cage tags are valid only for the calendar year for which they are issued. Surfclam tags may not be used on cages containing ocean quahogs and ocean quahog tags may not be used on cages containing surfclams.

Monitoring, Control and Surveillance

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 surfclam and ocean quahog fisheries, 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;
- Catch and Effort database to track catch against allocations;
- Electronic vessel monitoring systems (VMS) on each vessel;

- And, potential catch seizure and significant fines and loss of fishing privileges for violations of regulations.

There is an explicit and statutory sanction framework that is applied for violations of fishery regulations. Sanctions for violations in the Northeast Region of the U.S. are listed in 50 CFR 600.740:

> *"The Magnuson-Stevens Act provides four basic enforcement remedies for violations, in ascending order of severity, as follows:*
>
> > *(1) Issuance of a citation (a type of warning), usually at the scene of the offense (see 15 CFR part 904, subpart E).*
> >
> > *(2) Assessment by the Administrator of a civil money penalty.*
> >
> > *(3) For certain violations, judicial forfeiture action against the vessel and its catch.*
> >
> > *(4) Criminal prosecution of the owner or operator for some offenses. It shall be the policy of NMFS to enforce vigorously and equitably the provisions of the Magnuson-Stevens Act by utilizing that form or combination of authorized remedies best suited in a particular case to this end.*
>
> *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 administrative law judges."*

In a 1990 review of ITQ fisheries, Eugene Buck of the Congressional Research Service wrote that:

> *"Before the ITQ program, enforcement costs in this fishery were exceptionally high because unusually stringent management regulations were in effect -- the Coast Guard closely monitored the number of trips and fishing hours of each individual vessel. Now extensive monitoring is no longer necessary; dockside monitoring alone is considered adequate." (Buck 1995)*

Starting in 2015, surfclam and ocean quahog vessels have been required to carry onboard observers who document the catch composition. This requirement resulted from changes in the MSFCMA that required all fishery management plans (FMP) to "establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery."

The NOAA/NMFS web site (http://www.nefsc.noaa.gov/fsb/SBRM/) explains that:

> *"In 2007, the New England and Mid Atlantic Fishery Management Councils, in coordination with NOAA Fisheries, developed a standardized bycatch reporting methodology (SBRM) for all FMPs in the Northeast Region through an overarching amendment to these FMPs, known as the SBRM Omnibus Amendment. After this amendment was implemented, a legal challenge was filed (Oceana v Locke) in Federal court. The U.S. District Court initially found in favor of the Government on all counts. However, that ruling was appealed by the plaintiffs, and the U.S. Court of Appeals issued an opinion that found fault with one element of the amendment—called the prioritization process- and ordered that the amendment be vacated and remanded to the agency for further proceedings. This meant that the amendment was no longer in effect, and would need to be revised and re-adopted by the Councils.*
>
> *In response to the Court's order, the Councils formed a new fishery management action team (FMAT) consisting of staff from the New England Fishery Management Council, the Mid-Atlantic Fishery Management Council, the Atlantic States Marine Fisheries Commission, and NOAA Fisheries' Greater Atlantic Regional Fisheries Office and Northeast Fisheries Science Center, to*

develop alternatives that would address the deficiencies identified by the Court. The FMAT developed new alternatives for the prioritization process, and incorporated some of the suggested improvements that were identified in a 2011 review of the SBRM process. Following a review by its ad hoc Standard Bycatch Reporting Methodology (SBRM) Committee, the full New England Fishery Management Council approved the SBRM Amendment with the exception of several motions that addressed technical issues, at its April 2014 meeting. Prepared by staff at NOAA Fisheries Greater Atlantic Regional Fisheries Office, the action was an effort to determine whether the methods and processes previously used to estimate fisheries discards needed to be modified and/or supplemented. Based on public comments from a range of stakeholders and the input of both the Mid-Atlantic and New England Councils, the new action will establish standards of precision for bycatch estimation for all Northeast Region fisheries, and serve to document the SBRM established for all fisheries managed through the two Councils… A revised SBRM Amendment was adopted by both Councils in 2014, and approved by NMFS in March 2015. A final rule is pending. Following the requirements in the revised SBRM Amendment, each year we will post a report of estimated discards for the previous year and a report of observer sea-day allocations for the coming year using the new formulaic prioritization process."

Under the new SBRM requirements, the number of scheduled observer seadays for the Ocean Quahog/Surfclam dredge fishery for April 2015 through March 2016 is shown in Table 18.

Table 18. Northeast Fisheries Observer Program, Seaday Schedule, April 2015 - March 2016, version 2 (http://www.nefsc.noaa.gov/fsb/SBRM/2015/NEFOP_seaday_schedule_April_2015_March%202016_version2.pdf)

Fishery	Area	Sea Days
Ocean Quahog/Surfclam Dredge (negear 400, 386)	MD	2
Ocean Quahog/Surfclam Dredge (negear 400, 386)	NJ	71
Ocean Quahog/Surfclam Dredge (negear 400, 386)	NY	2
Ocean Quahog/Surfclam Dredge (negear 400, 386)	MA	45
Ocean Quahog/Surfclam Dredge (negear 400, 386)	ME	20
Total Observer Sea Days, April 2015 - March 2016		**140**

MAFMC and NMFS staff have reported that the surfclam and ocean quahog fisheries have not had any serious compliance issues and there is no evidence of systematic non-compliance. To verify this via records, the assessment team, with the help of the client group, submitted a Freedom of Information Act (FOIA) request to NOAA OLE. This process began in April of 2016, with records released in July of 2016. The assessment team requested the following information:

1. All documents that constitute or quantify dockside inspections under the authority of NMFS of surfclam and ocean quahog landings for each of the years 2010 through 2015.
2. All documents that constitute or quantify all citations issued by NMFS or NOAA for violations of surfclam and ocean quahog regulations for each of the years 2010 through 2015.
3. All documents that constitute or quantify permit sanctions resulting from violations of federal surfclam and ocean quahog regulations, imposed on surfclam and ocean quahog ITQ permit holders, for each of the years 2010 through 2015.
4. All documents that constitute or quantify the total amount of fines resulting from violations of federal surfclam and ocean quahog regulations, assessed on surfclam and ocean quahog ITQ permit holders or operators, for each of the years 2010 through 2015.

The FOIA records included 210 pages pertaining to 10 incident reports, each of which ranged from 3-96 pages in length. All incident records provided took place 2010-2013. No records were provided for years 2014-2015. For a summary of the FOIA request process, and a summary of the records provided, see Appendix 6.

Review and Audit of the Management Plan

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 operational management of the surfclam/quahog 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.
- Surfclam and Ocean Quahog Committee of the MAFMC – committee comprised of MAFMC members charged with initial responsibility for interacting with industry, and for recommending to full Council proposed changes in FMP/management regs and proposed annual quotas.
- Surfclam and Ocean Quahog 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, and the management system as a whole is part of the federal regional fisheries management system that was established under the MSA. 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 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. (MRAG 2014)

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.

Recognised Interest Groups

Table 19. Identified stakeholders in the U.S. Atlantic Surfclam and Quahog fisheries.

Stakeholder Category	Stakeholder and special interest
Government agencies with fishery management / research responsibility	National Marine Fisheries Service ("NMFS") (NOAA) – final approving authority for the SCOQ 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 of both clam species, 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 operational management of the surfclam/quahog fishery, including development, review and 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. Surfclam and Ocean Quahog Committee of the MAFMC – committee comprised of MAFMC members charged with initial responsibility for interacting with industry, and for recommending to full Council proposed changes in FMP/management regs and proposed annual

	quotas.
International Governmental Bodies	No international bodies have oversight regarding the surfclam / quahog resource; all of the resource is harvested within U.S. territorial waters, or within state waters that are not part of this assessment.
Non-Governmental Conservation/Public Interest Organizations	The voting membership of the MAFMC and its committees and advisory panels includes representatives of ENGO's. Beyond that, ENGO's have shown little interest in the surfclam/quahog resource and, with rare exceptions, have not participated in management and/or quota decision-making by the MAFMC or NMFS.
The Fishing Industry and Associated Supply Chains	Atlantic Capes and LaMonica Fine Foods Truex Kelleher. Cape Cod Fisheries Preservation Trust MAFMC Surfclam and Ocean Quahog Advisory Committee Members
Adjacent or Potentially Affected Fisheries	Massachusetts Lobstermen's Association Rhode Island Lobstermen's Association Atlantic Offshore Lobstermen's Association Monkfish fishery representatives Eastern New England Scallop Association Fisheries Survival Fund
Community or Tribal Entities or Individuals	**None**
Consumers	Individual consumers access products from the surfclam and ocean quahog fisheries through major food service suppliers such as Sysco, Heinz, and Darden; and retail stores carrying clam products.

Arrangements for On-going Consultations

The fishery conservation and management system created by the MSFCMA s 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.

Planned Education and Training for Interest Groups

No education and training for interest groups is contemplated.

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.

According to the Fishery Performance Report for 2016, “The most critical current challenge to the surfclam and ocean quahog fishery is the New England Council's Omnibus Habitat Amendment which has the potential to ban bottom tending mobile gear (including clam dredges) from high energy sand environments where the surfclam and ocean quahogs fishery is the only fishery being prosecuted. This action has the potential impact on the spatial distribution of the fishery, which will result in biological impacts as well as social and economic impacts. It also impacts the Mid-Atlantic Council's ability to manage its jurisdictional fishery for surfclam and ocean quahogs.” (http://static1.squarespace.com/static/511cdc7fe4b00307a2628ac6/t/553e94cae4b084a8fb933a9a/1430164682711/SCOQ_FPR_for2016.pdf)

The MAFMC and surfclam and ocean quahog industry advisors participate in the ongoing deliberations of the NEFMC concerning the Omnibus Habitat Amendment.

4. Evaluation Procedure

4.1 Harmonised 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 surfclam and ocean quahog fisheries share a management system and spatial overlap with the U.S. Atlantic Spiny Dogfish fishery, requiring harmonization consideration for Principles 2 (habitat impacts) and 3. The surfclam and ocean quahog fishery also spatially overlaps with the U.S. Atlantic Sea Scallop fishery, requiring further Principle 2 harmonization consideration for habitat PIs. 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 19-22 below.

Principle 1

No harmonization is required for P1, as there are no other MSC certified fisheries that take surfclams and ocean quahogs. There is a MSC-certified arctic surfclam fishery out of Banquereau and Grand Bank, Canada, but this is a different species (*Mactromeris polynyma*), and therefore is not considered an overlapping fishery and is not required for consideration for harmonization purposes.

Principle 2

The surfclam and ocean quahog fishery shares seabed with otter trawl portion of the U.S. spiny dogfish fishery, MSC certified in 2013, and the U.S. Atlantic sea scallop fishery, MSC certified in 2013. The surfclam and ocean quahog fisheries do not have bycatch of any significant amount (i.e. no main primary or secondary species), so there are no cumulative impact issues with regard to catch species. The hydraulic dredge used in the clam fisheries has no reported interactions with ETP species, so there are no cumulative impact issues with regard to ETP species. Therefore, the cumulative impact issues to be addressed relate to habitat impact management (PI 2.4.2) only. Neither of these fisheries were assessed under V2.0, and therefore these fisheries have not been required to consider cumulative impacts under 2.4.2. Therefore, while the cumulative impacts of the MSC UoAs and non-MSC UoAs are considered where appropriate, harmonization is not applicable for this PI at this time. The scallop and spiny dogfish operate with different gear types than the surfclam and ocean quahog fishery, and therefore 2.4.X are likewise not considered applicable for harmonization.

Principle 3

The surfclam and ocean quahog fishery shares a management system (MAFMC-managed) with the spiny dogfish fishery, MSC certified in 2013. 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.

Table 20. Fisheries in the MSC System Considered for Harmonization.

Fishery	Status	Principles for Harmonization	MSC Assessment Tree Version	Conformity Assessment Body
1 U.S. Atlantic Spiny Dogfish	Certified 2012, Suspended February 19, 2015, Re-instated May 28, 2015	P2 Cumulative Impacts and P3	CRV1.3	Intertek Moody
2 U.S. Atlantic sea scallop	Certified 19 Dec 2013	P2 Cumulative Impacts	CRV1.3	Intertek Moody

Table 21. Principle 3 Alignment of Scores for Harmonization with the Spiny Dogfish Fishery.

PI	Gill Nets	Long Line	Trawl Gear	Surfclam & Ocean Quahog	Comments
3.1.1	90	90	90	100	The CAB for spiny dogfish gave the management system a score of 80 for "Consistency with Laws" and for "Legal Rights." The rationale provided in the spiny dogfish PCR would seem to support SG 100, but the CAB gave the fishery a score of 80 on these SG. We score the surfclam and ocean quahog fishery as 100 on all the SG for PI 3.1.1.
3.1.2	100	100	100	100	Consistent
3.1.3	100	100	100	100	Consistent
3.1.4	80	80	80	NA	The PI is no longer applicable
3.2.1	100	100	100	100	Consistent
3.2.2	90	90	90	90	Consistent
3.2.3	60	75	75	80	The spiny dogfish assessment was conducted shortly after a review of federal enforcement (NOAA 2010) found "systemic, nationwide issues adversely affecting NOAA's ability to effectively carry out its mission of regulating the fishing industry. If not addressed by NOAA's senior leadership, these issues have the potential to further strain the tenuous relationship that exists in the Northeast Region, and to become problematic in NOAA's other regions. Fishing laws and regulations are highly complex, making compliance by those in the industry difficult even with the best of intentions". These problems were not evident in the surfclam and ocean quahog fisheries and have been addressed by NOAA leadership. The federal gill net fishery for spiny dogfish had a particular problem with enforcement of the use of pingers that is not relevant to the surfclam and ocean quahog fishery.
3.2.4	100	100	100	100	3.2.4 was 3.2.5 in V 1.3

4.2 Previous Assessments

This fishery has not previously undergone full MSC assessment. A pre-assessment was completed in December of 2014 by MRAG Americas, Inc. Based on the findings of the pre-assessment, the client group decided to proceed into full assessment, which was announced via the MSC website on December 22nd, 2015. Copies of this and all assessment downloads are available here: https://www.msc.org/track-a-fishery/fisheries-in-the-program/in-assessment/north-west-atlantic/us-atlantic-surfclam-and-ocean-quahog/us-atlantic-surfclam-and-ocean-quahog?searchterm=us+at

4.3 Assessment Methodologies

This assessment was conducted by SCS Global Services, an accredited MSC CAB The fishery was assessed using the MSC Certification Requirements Version 2.0, April, 1 2015 and the reporting template used in this report is also V2.0. The default assessment tree was used without adjustments. There were no stakeholder comments regarding the fishery announcement, including the team nominated and use of the default assessment tree.

4.4 Evaluation Processes and Techniques

Site Visits

The assessment team selected the visit site 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 meeting with representatives of the client took place in Falmouth, MA on March 31, 2016. A meeting with agency representatives took place at the Northeast Fishery Science Center in Woods Hole, MA on April 1, 2016. An open meeting for stakeholders was held in Falmouth, MA on April 1, 2016.

Table 22. Audit Plan: Key Meetings and Locations

Meeting number	Date	Location	Topic
1	3/31/16	Falmouth, MA	Opening Meeting to brief Client/Industry representatives on assessment to date and receive Client input
2	4/1/16	Woods Hole, MA	Exchange information and clarify issues with MAFMC and NEFSC staff
3	4/1/16	Falmouth, MA	Open meeting for stakeholder input

Table 23. Meeting Attendees by Organization in General Order of Meetings

Name	Organization and Title
Joseph DeAlteris	DeAlteris Associates (Assessment Team Leader)
Richard Allen	R. B. Allen Associates (Assessment Team)
Thomas Alspach	Counsel, Seawatch International
Mike Kraft (by speakerphone) Steve Veltman Joe Myer David Wallace Thomas Hoff Colin Brannen Jessica Coakley	Bumble Bee Foods, VP Sustainability Bumble Bee Foods Bumble Bee Foods Wallace Associates Wallace Associates Accreditation Services International auditor Mid-Atlantic Fishery Management Council, Surfclam & Ocean Quahog Fishery Management Specialist

Daniel Hennen	NOAA Northeast Fishery Science Center, Stock Assessment Biologist

Consultations

In addition to the meetings and attendees list above (Section 4.4.1), consultations have included telephone and email exchanges with individuals with a known interest in the fishery or who could provide information or data on aspects of the assessment. Over the period March 23, 2016 and continuing, telephone and email exchanges were made with Jeffrey Ray, Special Agent, NMFS Office of Law Enforcement, Leta Etheridge, Office of Law Enforcement, Arlyn Penaranda, Office of Law Enforcement, and Lorna Martin-Gross, Office of Law Enforcement. The Office of Law Enforcement indicated that documents would be provided containing data on enforcement activities related to the surfclam and ocean quahog fisheries and insights into the data. Enforcement documentation from NOAA OLE was eventually obtained via a Freedom of Information Act (FOIA) request. See the Documentation section and Appendix 6 Records Pertaining to the FOIA Request with NOAA OLE below for more detail.

One lobster fisherman who was known by the P3 Expert to have previously expressed concerns regarding the impact of ocean quahog dredging on the lobster fishery was contacted by the assessment team. Upon review of his catch records, that lobsterman determined that the ocean quahog fishery had not had any long-term impact on his catches.

Prior to the onsite meeting, no written stakeholder comments were received. Following the onsite meeting, no written stakeholder comments were received.

Evaluation Techniques, Media Announcements

In addition to the announcement of the fishery assessment via the MSC website “Track a fishery” page and direct email outreach from SCS, MSC published a dedicated press release to coincide with the announcement of the fishery full assessment on December 22. 2015: https://www.msc.org/newsroom/news/first-u.s.-clam-fishery-embarks-on-sustainable-fishing-assessment

Documentation

One of the most significant, and difficult, 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, this is no easy task as the assessment team typically needs information that is fully supported by 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.

The CAB invited stakeholders to provide information and comments for the assessed fishery prior to the onsite visit and after via direct emails sent to a compiled stakeholder list prior to the on-site, and via targeted information requests thereafter. The stakeholder list includes over 30 prospective stakeholders including representatives of eNGOs, industry, and government.

The MAFMC and NEFSC were key in providing many of the scientific analyses. There are two sources of information insufficiency, which have resulted in the conditions placed on the fishery. One of these pertains to observer information regarding non-target catch, which is expected to be addressed via the reinstated observer program beginning in 2015. The other information deficiency pertains to fishery specific enforcement records to demonstrate that sanctions to deal with noncompliance are consistently applied and thought to provide effective deterrence. In pursuit of this information the assessment team and client group were told to submit a Freedom of Information Act (FOIA) request through NOAA. This process began in April of 2016, with records released in July of 2016, and reviewed by the assessment team in August of 2016. This documentation request process, and a summary of the records provided, has been documented in Appendix 6. The client group was very active in pursuing this request, and has committed to continue pursuing further information regarding compliance and enforcement systems to meet the condition remaining to be closed at the Year 1 surveillance audit.

Scoring Process

Scoring was initiated prior to the site visit to illuminate areas where additional information was needed. During the onsite visit, the team compiled a list of questions and requested documents that were offered by the agency representatives that related to those questions. These materials were sent to the team leader and then disseminated to the team by the leader.

Scoring was completed in accordance with MSC FCRV2.0 7.10.

Scoring was continued iteratively through phone calls and emails during April and June 2016 and the final scoring phone call took place on July 12, 2016. Rationales were cross read by team members for production of the client draft report. In response to review of the client draft, the client group representatives provided feedback pertaining to a small number of errors of fact, as well as provided a Client Action Plan (CAP). The report was provided to Peer Reviewers on August 19, 2016, with both peer reviewers providing responses in the first week of September. In the meantime, the FOIA records were received and evaluated by the team, resulting in no change to score, but a revision to the CAP was made to account for the updated information and appropriate next steps.

As a result of the peer reviewer comments several rationales and background text was revised, and some scoring issue scores were likewise revised, adjusting PI level scores slightly, but not resulting in any new conditions on the fishery. Peer reviewer comments and assessment team responses can be found in Appendix 2 of this report.

Decision rules for final outcome

The decision rule for MSC certification is as follows:

- No PIs score below 60 (cannot receive certification)
- The aggregate score for each Principle, rounded to the nearest whole number, is 80 or above

- The aggregate score for each Principle is calculated by taking the average score for each section followed by the average of all the section scores (See Evaluation Results Section 6).

Table 24. Scoring elements. Main components only listed (See Table 16 and Table 17 for detail of all minor species).

Component	Scoring elements	Main/Not main	Data-deficient or not
P1	Surfclam	NA	No
P1	Ocean Quahog	NA	No
P2- Surfclam Primary	Minor (Group)	Not Main	No
P2- Ocean Quahog Primary	Minor (Group)	Not Main	No
P2- Surfclam Secondary	Minor (Group)	Not Main	No
P2- Ocean Quahog Secondary	Minor (Group)	Not Main	No
P2-Both Surfclam and Ocean Quahog: ETP	Group- marine mammals, seabirds, turtles	NA	No
P2- Both Surfclam and Ocean Quahog: Habitat	Commonly Encountered	Main	No
P2- Both Surfclam and Ocean Quahog: Habitat	VME	Main	No
P2- Both Surfclam and Ocean Quahog: Ecosystem	Key Elements (Group)	Main	No

5. Traceability

5.1 Eligibility Date

The actual eligibility date is the date of certification, December 13, 2016, or as reflected on the fishery certificate. 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. This complies with MSC FCRV2.0 (7.6).

5.2 Traceability within the Fishery

ITQ Program Traceability Requirements

Traceability in the surfclam and ocean quahog fishery is enhanced by the requirements of the ITQ system. Vessels must have a federal fishery permit, vessel operators must have a vessel operator permit, vessel operators must own or lease quota, vessels must sell to licensed dealers, and surfclams and ocean quahogs must be landed in standardized cages, each marked with a cage tag (USOFR 2016). Official, numbered tags must be fixed near the top of standardized cages and must not be removed until the cage is emptied by the processor, at which time the processor must promptly remove the tag and retain the tags for 60 days beyond the end of the calendar year, unless otherwise directed by authorized law enforcement agents (USOFR 2016).

Vessels participating in the surfclam or ocean quahog fisheries must have an operational vessel monitoring system (VMS) (USOFR 2016). The VMS must transmit the vessel's position to the VMS provider at least once every hour, 24 hours per day, throughout the year. Vessel operators must use VMS to declare whether they are departing on a surfclam, ocean quahog, or Maine mahogany quahog

trip. Vessels can't fish for or land surfclams and ocean quahogs on the same trip, as processors will not accept mixed loads (Chute et al 2013).

Vessel owners and operators are responsible for maintaining a daily fishing log on board the vessel that must be filled out before landing and submitted or post-marked with three days of the end of each reporting week. The daily log books required for surfclam and ocean quahog vessels differ from the vessel trip reports (VTRs) required of other vessels with federal fishery permits in that they do not require information on other species caught.

The owner or operator of any vessel conducting any surfclam and ocean quahog fishing operations, except those conducted exclusively in waters of a state that requires cage tags or when he/she has surrendered the surfclam and ocean quahog fishing vessel permit, shall maintain, on board the vessel, an accurate daily fishing log for each fishing trip, on forms supplied by the Regional Administrator, showing at least: Name and permit number of the vessel, total amount in bushels of each species taken, date(s) caught, time at sea, duration of fishing time, locality fished, crew size, crew share by percentage, landing port, date sold, price per bushel, buyer, tag numbers from cages used, quantity of surfclams and ocean quahogs discarded, and allocation permit number (USOFR 2016).

Dealers that buy and sell surfclams and ocean quahogs and processors of Atlantic surfclams and ocean quahogs must have a federal permit issued by NOAA Fisheries. Dealers and processors 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/scoqinfosheet.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.*

National Shellfish Sanitation Program (NSSP) Traceability Requirements

In addition to the quota tracking system required by the ITQ system, the surfclam and ocean quahog fisheries have a well-established traceability system that is required by the National Shellfish Sanitation Program (NSSP). The NSSP is a state-federal partnership through which the U.S. Food and Drug

Administration provides guidance to the states on regulations needed for the safe and sanitary control of the trade in molluscan shellfish. Under this program, landing sites and dealers must be certified and must maintain accurate source identity records. Harvesters must provide information necessary to create a record of the origin, quantity, and date of harvest that can be used to trace lots of shellstock back to the source (U.S. Food and Drug Administration 2011).

The NSSP required tags are separate and distinct from the ITQ cage tags required for federal reporting. The NSSP compliant tags are "shippers' tags" and these are attached before the containers are sent into the stream of commerce. The tags provide pertinent information concerning harvest location, shucking date, shipping date and quantity. NSSP requirements are enforced through the applicable state agencies, on delegation from the federal government. Thus, for example, in Massachusetts it is the Massachusetts Department of Health that monitors and enforces NSSP requirements, and in Delaware it is Delaware's Department of Health that monitors NSSP compliance.

Because of the potential for paralytic shellfish poisoning (PSP), NMFS has put in place additional requirements for vessels fishing for surfclams or ocean quahogs in the reopened portion of the Georges Bank closed area. Vessels fishing in this area must have a letter of authorization and use a distinct vessel monitoring system (VMS) code.

Geographic Risk of Mixing

There is considered to be minimal risk of fishing taking place outside the unit of certification. Surfclams and ocean quahogs are found in depths that preclude fishing beyond the U.S. EEZ except along the U.S.-Canadian offshore boundary. The requirement for all vessels to carry a vessel monitoring system (VMS), combined with other monitoring and enforcement activities along the international boundary, minimizes the likelihood that vessels will fish for ocean quahogs in Canadian waters. VMS also assures that vessels will not harvest surfclams and ocean quahogs from state waters and label them as being caught in federal waters. Vessels are not allowed to fish in both state and federal waters on the same trip.

Non-UoA Gear Risk

Surfclam and ocean quahog vessels are highly specialized for fishing with hydraulic dredges. Other than the dry dredges used in the Maine Mahogany Quahog fishery, it would be virtually impossible for any vessel to harvest appreciable quantities of surfclams or ocean quahogs using a fishing gear that has not been assessed as part of this unit of certification. Although there is no regulatory prohibition on the use of dry dredges to harvest surfclams or ocean quahogs in areas other than the Maine Mahogany Quahog Zone, it would likely be uneconomical to do so and the alternate gear would be readily recognizable by members of the client group who are responsible for producing product that conforms to the certification. Cage tags identify the vessel that harvested the product and NSSP tags identify where the product was caught.

Traceability in Processing

Because the product is landed as shellstock and all shellstock must be shucked and processed into the final product, the product flow is easily monitored and traced compared to other seafood products. In most cases, shellstock is unloaded from the boat onto a truck at a certified landing dock. ITQ system cage tags are attached to the cages as they are unloaded. Ownership of the product transfers from the boat to the processor when the product is unloaded from the boat. The truck delivers the shellstock to

a contract shucking facility. The shucked product is put into tubs that are tagged or otherwise marked to make them traceable to the cage or cages from which they came. The tubs of shucked product are trucked to a processing facility where they are further processed. The final product code maintains information that can trace the product back to the vessel that landed the shellstock. All of these transactions are recorded on paper or electronically. (Alspach personal communication)

In cases where the processing facility is located at the dock, shellstock is unloaded from the boat directly to a cooler at the plant. Once the shellstock is shucked, outgoing tubs are tagged in a way that makes the shucked product traceable back to the cage or cages from which it came.
In addition to the regulatory requirements of the NSSP and the FMP, surfclam and ocean quahog processors generally maintain their own internal monitoring and auditing systems. Processors want to ensure that the yield of finished product corresponds with an appropriate volume of landed shellstock. This is accomplished through regular yield reports and production reports that allow the processor to monitor the yield of product from a given volume of shellstock. Processors use this information for a variety of reasons, including directing vessels to explore better yielding clam beds, and to safeguard against loss of yield for reasons that can be corrected during the shucking/processing procedures. (Alspach personal communication)

Processors also use non-regulatory documentation/processes to improve/monitor traceability. For example, "product cooler reports" record in and out times for tubs and include vessel identification, location of harvesting, etc. These are used in connection with non-regulatory internal "mock recalls" that are performed several times a year to ensure continuing forward and backward traceability.

Table 25. 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	Very low- no other commercially viable gear types in use.
Potential for vessels from the UoC to fish outside the UoC or in different geographical areas (on the same trips or different trips)	Low - UoA encompasses the entire ITQ fishery, but there are also state-managed fisheries that are not included in the UoA and are therefore ineligible to be part of the UoC. It is not possible to fish on both permits in the same trip/on consecutive trips, and therefore there is low risk that vessels from the UoC could fish outside the UoA (in state waters), as this would be apparent in VMS records and at landing. Maine mohagony ocean quahogs are different in appearance and market, and are caught under a distinct permit. State fisheries have historically existed, but would be prosecuted and landed under a different permit.

Potential for vessels outside of the UoC or client group fishing the same stock	Vessels fishing in the state fishery fish on the same biological stock as the commercial ITQ fishery.
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)	Minimal- see above description of the ITQ and NSSP traceability systems, and traceability of product into processing. In addition, the product is transferred as shellstock and is not processed before landing and entering further chains of custody. Product remains identifiable via cage and tub tags as described above. Natural industry incentives exist (described above) to maintain tight chain of that connect lots to fishing grounds.
Risks of mixing between certified and non-certified catch during processing activities (at-sea and/or before subsequent Chain of Custody)	The UoC is defined to only include UoA product landed at processors in the client group, at which point the product will enter chain of custody, which will require MSC CoC certification in order for the landed product to be considered eligible for the eco-label. While the ITQ fishery is the primary fishery for surfclam and ocean quahog, there could remain risk that non-eligible product from the state fishery would be landed and processed at a member of the client group. The tag system associated with VMS tracks and permits has the capacity to account for this potential incentive to introduce state catch into processing for product from the UoA/UoC, which can only be from federal waters. No permits for at-sea processing have been issued. If a vessel were to apply for and receive a permit for at-sea processing, all of the safeguards to prevent mixing of certified and non-certified catch would remain in place. It is illegal to fish in state and federal waters on the same trip and vessels must carry vessel monitoring systems that record their fishing location.
Risks of mixing between certified and non-certified catch during transhipment	There is no transshipment at sea. Upon landing, cage tags are affixed to the product and remain on the cages until the clams are processed.
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	Shucking at sea is allowed under the FMP but requires a special application to the Regional Administrator of NMFS, who decides under what conditions the shucking at sea will be allowed, including the conversion factor that would allow accounting for quota usage in bushels of live product. There is currently no processing onboard.

Eligibility to Enter Further Chains of Custody

Traceability systems are in place within the fishery and from the point of landing of surfclams and ocean quahogs throughout the processing system. Only permitted vessels and vessel operators can participate in the fishery. Daily log sheets must be filled out before product is unloaded. Surfclams and ocean quahogs are landed in standardized cages, each cage holding 32 bushels of product. Official, numbered cage tags must be affixed to upon offloading, and mixed federal and state trips are

prohibited. Tags must be attached to cages from the time of unloading until emptied by the processor. The processor takes ownership of the product when it is unloaded from the vessel. The surfclam and ocean quahog industry must also comply with the requirements of the National Shellfish Sanitation Program, which likewise requires a tagging system to ensure traceability of molluscan shellfish back to the source.

The fishery is subject to random landing inspections by state conservation officers and/or NMFS OLE where declared landings are cross-checked with actual landings; Vessel operators, dealers, and processors must submit weekly reports on transactions. Vessel trip reports and dealer reports are cross-checked during every stock assessment (*Hennen personal communication*).

A vessel monitoring system (VMS) ensures that fishing does not take place outside the unit of assessment; and all landings must be announced via the VMS system. Based on this information, the risk of non-assessed product entering the chain of custody is minimal.

Any certified products from the fishery are identifiable and would be eligible to enter further certified chains of custody. The fishery certification will end, and chain of custody begin, at the point at which UoA product is landed from fishing vessels to an eligible buyer or processor: only buyers or processors named on the fishery certificate are eligible for use of the ecolabel. Currently, this includes only the processors listed as members of the client group (see pg14). The client group is open to certificate sharing, as stated on page 16, and should certificate sharing be granted, eligibility to use the MSC ecolabel will be identified via addition to the fishery certificate. To continue a chain of custody, entities taking ownership of the product at downstream points must be certified against MSC's Chain of Custody Standard. Downstream will need to ensure separation of any certified and uncertified material of the same species.

6 Evaluation Results

6.1 Principle Level Scores

Table 26. Final Principle Scores

Final Principle Scores		
Principle	**Surfclam Score**	**Ocean Quahog Score**
Principle 1 – Target Species	96.7	96.7
Principle 2 – Ecosystem	86.0	86.0
Principle 3 – Management System	95.6	95.6

6.2 Summary of PI Level Scores

Principle	Component	PI No.	Performance Indicator (PI)	Unit of Assessment
One (surfclam)	Outcome	1.1.1	Stock status	100
		1.1.2	Stock rebuilding	NA
	Management	1.2.1	Harvest strategy	95
		1.2.2	Harvest control rules & tools	85
		1.2.3	Information & monitoring	100
		1.2.4	Assessment of stock status	100
One (ocean quahog)	Outcome	1.1.1	Stock status	100
		1.1.2	Stock rebuilding	NA
	Management	1.2.1	Harvest strategy	95
		1.2.2	Harvest control rules & tools	85
		1.2.3	Information & monitoring	100
		1.2.4	Assessment of stock status	100
Two (surfclam)	Primary species	2.1.1	Outcome	100
		2.1.2	Management	90
		2.1.3	Information	70
	Secondary species	2.2.1	Outcome	90
		2.2.2	Management	90
		2.2.3	Information	70
Two (ocean quahog)	Primary species	2.1.1	Outcome	100
		2.1.2	Management	90
		2.1.3	Information	70
	Secondary species	2.2.1	Outcome	90
		2.2.2	Management	90
		2.2.3	Information	70
(both fisheries)	ETP species	2.3.1	Outcome	90
		2.3.2	Management	100
		2.3.3	Information	80
(both fisheries)	Habitats	2.4.1	Outcome	95
		2.4.2	Management	90
		2.4.3	Information	80
(both fisheries)	Ecosystem	2.5.1	Outcome	80
		2.5.2	Management	80
		2.5.3	Information	85
Three (both fisheries)	Governance & policy	3.1.1	Legal & customary framework	100
		3.1.2	Consultation, roles & responsibility	100
		3.1.3	Long term objectives	100
	Fishery specific mgt.	3.2.1	Fishery specific objectives	100
		3.2.2	Decision making processes	100
		3.2.3	Compliance & enforcement	75
		3.2.4	Research plan	90

6.3 Summary of Conditions

Table 27. Summary of Conditions

Condition number	Condition	Performance Indicator
1a	By the 3rd surveillance audit, provide evidence that information is adequate to support a partial strategy to manage main Primary species.	**2.1.3 (surfclam)**
1b	By the 3rd surveillance audit, provide evidence that information is adequate to support a partial strategy to manage main Primary species.	**2.1.3 (ocean quahog)**
2a	By the 3rd surveillance audit, provide evidence that information is adequate to support a partial strategy to manage main Secondary species.	**2.2.3 (surfclam)**
2b	By the 3rd surveillance audit, provide evidence that information is adequate to support a partial strategy to manage main Secondary species.	**2.2.3 (ocean quahog)**
3	By the 1st annual surveillance, provide evidence via fishery-specific enforcement records that sanctions to deal with noncompliance are consistently applied and thought to provide effective deterrence.	**3.2.3**

6.4 Recommendations

NA

6.5 Determination, Formal Conclusion and Agreement

With the information available, the U.S. Atlantic Surfclam and Ocean Quahg Fishery meets the minimum requirements for being awarded certification which includes meeting the SG60 for all Performance Indicators and an average score of 80 or greater for all three Principle scores. The team discussed the merits and shortfalls of the fishery and by consensus recommended certification for the fishery.

In accordance with MSC Certification Requirements, the findings were made open to objection by interested parties for a period of 15 working days from publication of the Final Report with the Certification Determination. The objection period ended on December 1, 2016, with no objections received. The SCS Certification Board reviewed the report, Performance Indicator rationales, peer reviews and stakeholder comments and agreed with the Assessment Team's recommendation to certify the fishery. The certificate will be awarded after the Public Certification Report is posted to the MSC website.

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Appendices

Appendix 1 Scoring and Rationales

Appendix 1.1 Performance Indicator Scores and Rationale

Principle 1: Surfclam

Evaluation Table for PI 1.1.1 – Stock status: surfclam fishery

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 (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.
	Met?	Yes	Yes	Yes
	Justification	Based on the 2013 assessment report, the stock has been fished down since the beginning of the fishery, but the biomass has not yet reached Bmsy. The lower confidence interval of the biomass (802 thousand mt meats) is above the $B_{threshold}$ (486 thousand mt meats), so the stock is highly likely above the point of recruitment impairment. However, based on the onsite meeting and reported 2016 preliminary assessment results, the stock is at near virgin biomass levels. The stock is considered lightly fished, thus surplus production has been contributing to stock rebuilding, so now it is approaching the virgin biomass proxy level of B_{1999} (Dan Hennan, pers comm). See the background section on stock assessment for a more detailed discussion. Therefore the stock meets the requirements of the SG 60, 80 and 100 levels for SIa.		
b	Stock status in relation to achievement of MSY			
	Guidepost		The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.
	Met?		Yes	Yes
	Justification	According to the NMFS NEFSC 2013 stock assessment report, the biomass has not fallen below Bmsy since the fishery began, so the biomass has remained above the target reference point, and there is a high degree of certainty that the stock has been fluctuating around a level at least consistent with MSY over the recent years. Therefore the stock meets the requirements of the SG 80 and 100 levels for SIb.		
References		NMFS, Northeast Fisheries Science Center. 2013. 56th Northeast Regional Stock Assessment Workshop (56th SAW) Assessment Summary Report. U.S. Dept Commerce, Northeast Fish Sci Cent Ref Doc. 13-04; 42 p. http://nefsc.noaa.gov/publications/) Dan Hennan, NMFS, NEFSC, personal communication 2016		
Stock Status relative to Reference Points				

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

	Type of reference point	Value of reference point	Current stock status relative to reference point
Reference point used in scoring stock relative to PRI (SIa)	$B_{threshold}$	486 thousand mt meats	1060 thousand mt meats based on 2013 stock assessment, using data through 2011
Reference point used in scoring stock relative to MSY (SIb)	B_{MSY}	972 thousand mt meats	1060 thousand mt meats based on 2013 stock assessment, using data through 2011

OVERALL PERFORMANCE INDICATOR SCORE:	**100**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 1.1.2 – Stock rebuilding (not needed)

PI 1.1.2		Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe		
Scoring Issue		SG 60	SG 80	SG 100
a	**Rebuilding timeframes**			
	Guidepost	A rebuilding timeframe is specified for the 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 stock.
	Met?	(Y/N)		(Y/N)
	Justification	N/A		
b	Rebuilding evaluation			
	Guidepost	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe.	There is evidence that the rebuilding strategies are rebuilding stocks, **or it is likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.	There is **strong** evidence that the rebuilding strategies are rebuilding stocks, **or it is highly likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.
	Met?	(Y/N)	(Y/N)	(Y/N)
	Justification	N/A		
References		[List any references here]		
OVERALL PERFORMANCE INDICATOR SCORE:				
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 1.2.1 – Harvest strategy: surfclam fishery

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	Harvest strategy design			
	Guidepost	The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.
	Met?	Yes	Yes	Yes
	Justification	For the surfclam resources in the federally managed fishing areas, the Council's SSC sets the ABC each year, based on NMFS NESC peer reviewed stock assessments, and under the FMP the ABC equals the ACL ("annual catch limit"). It is illegal under the MSA for the ACL to exceed the SSC's ABC level. The ACL then may be reduced by the Council if there is management uncertainty when it sets the annual catch target (annual quota). Under the MAFMC risk policy, the level of ABC cannot permit a probability of more than 35% that overfishing will occur if the actual harvest is at that ABC level. There is a control rule in place, and there is pre-existing evidence via the advent of the ITQ system of the ability of the management system to control effort, taking into account issues such as overcapacity and its causes. There is a strong information base and monitoring of stock status and the responsiveness of the management system and fleet to stock status. The harvest control rule, the "ABC control rule" (see PI 1.2.2), is responsive to the state of the stock. There is some uncertainty regarding precisely how the rule as described will work as limit reference points are approached to ensure limits are not surpassed, but this is taken up under PI 1.2.2. As this PI is focused in the strategy's ability to be responsive to the state of the stock and to achieve stock management objectives (for the target species) the fishery meets the requirements of the SG60, 80 and 100 levels for SIa.		
b	Harvest strategy evaluation			
	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?	Yes	Yes	No
	Justification	Evidence exists that the harvest strategy is meeting its objectives (SG 80 scoring issue (b)) in that both the ocean quahog and surfclam resources have never been overfished, and exploitation levels for both species and fishing mortality levels are well below target levels and above biomass-based limits. The harvest control rule, the "ABC control rule" (see PI 1.2.2), is designed to be responsive to the state of the stock. There is some uncertainty regarding precisely how the rule as described will work as limit reference points are approached to ensure limits are not surpassed, but this is taken up under PI 1.2.2. Current evidence suggests that regardless, the fishery is currently meeting its objectives. Therefore the fishery meets the requirements of the SG 60 and 80 levels for SIb, but not the requirements of SG100 level.		

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
c	Harvest strategy monitoring			
	Guidepost	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	Yes		
	Justification	As noted for SIa, the Council's SSC sets the ABC each year, based on NMFS NESC peer reviewed stock assessments conducted every 3 years, and under the FMP the ABC equals the ACL ("annual catch limit"). Therefore the fishery meets the requirements of SIc at the SG 60 level.		
d	Harvest strategy review			
	Guidepost			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			Yes
	Justification	As noted for SIa, the Council's SSC sets the ABC each year, based on NMFS NEFSC peer reviewed stock assessments, and under the FMP the ABC equals the ACL ("annual catch limit"). It is illegal under the MSFCMA for the ACL to exceed the SSC's ABC level. The ACL then may be reduced by the Council if there is management uncertainty when it sets the annual catch target (annual quota). Under the MAFMC risk policy, the level of ABC cannot permit a probability of more than 35% that overfishing will occur if the actual harvest is at that ABC level. Given this annual consideration of the ABC and ACL, which forms the basis of the harvest strategy, the fishery meets the requirements of SId at the SG 100 level.		
e	Shark finning			
	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?	Not relevant	Not relevant	Not relevant
	Justification	Sharks are not a target species in this fishery.		
f	**Review of alternative measures**			
	Guidepost	There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biannual** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.
	Met?	Yes	Yes	Yes
	Justification	Based on the observed catch composition data in P2 and NEFSC (2013), there is no discarding of target species, as there is no active federal minimum size requirement in place (see Fisheries Regulations to Meet Objectives). The dredge is highly selective to capture surfclams and ocean quahogs that are commercially valuable, catching 80-95% of		

PI 1.2.1		There is a robust and precautionary harvest strategy in place
		clams of suitable size in their path (Wallace & Hoff 2005, Meyer et al 1981, Thorarinsdottir et al 2010). The 56th Stock Assessment Workshop Assessment Report states that the commercial clam dredge has "relatively well understood selectivity" (NEFSC 2013). This size-selectivity is considered one manner in which the resource is protected from the effects of fishing for surfclams in particular as they reproduce at small sizes and are sexually mature for several years before becoming available to the fishing gear (NEFSC 2013a). See background section on Fishing Practices for more detail regarding gear selectivity. Therefore, there is minimal mortality of unwanted catch of the target stock, and this incidental mortality is accounted for in stock assessments (estimated at 12% for surfclam). There is a national bycatch reduction program that collects and evaluates data on bycatch, discarding and un-intended mortality of fishing operations (NMFS 2013; SBRM 2016). Therefore, it is expected that should alternative measures to minimize mortality of unwanted catch be merited, there is a program in place capable of doing so. With this, the harvest strategy meets the requirements of the SG 60, 80 and 100 levels for SIf.
References		The FMP, including subsequent Amendments and Frameworks, is available on the Council website at: http://www.mafmc.org. Chute. T. 2013. summary of surfclam and ocean quahog observer bycatch data. NMFS, NEFSC, unpublished data provided by Dan Hennan. National Marine Fisheries Service. 2013. U.S. National Bycatch Report First Edition Update 1 [L. R. Benaka, C. Rilling, E. E. Seney, and H. Winarsoo, Editors]. U.S. Dep. Commer., 57 p. Online edition: http://www.st.nmfs.noaa.gov/observer-home/first-edition-update-1 [NEFSC] Northeast Fisheries Science Center. 2013. 56th Northeast Regional Stock Assessment Workshop (56th SAW) Assessment Report. U.S. Dept Commer, Northeast Fish Sci Cent Ref Doc. 13-10; 868 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at http://www.nefsc.noaa.gov/nefsc/publications/ [NEFSC] Northeast Fisheries Science Center. 2013(a). 56th Northeast Regional Stock Assessment Workshop (56th SAW) Assessment Summary Report. U.S. Dept Commer, Northeast Fish Sci Cent Ref Doc. 13-10; 868 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at http://www.nefsc.noaa.gov/nefsc/publications/ (SBRM) Standardized Bycatch Reporting Methodology Program 2016: http://www.nefsc.noaa.gov/fsb/SBRM/
OVERALL PERFORMANCE INDICATOR SCORE:		**95**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 1.2.2 – Harvest control rules: surfclam fishery

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	**Generally understood** HCRs are in place **or available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, **most** of the time.
	Met?	Yes	Yes	Yes
	Justification	There is a well-defined harvest control rule in place (since 2012) that is consistent with the harvest strategy and ensures that the exploitation rate is reduced as limit reference points are approached for the surfclam fishery. This new rule takes into account main uncertainties as follows: For stocks with a ratio of B to BMSY of 1.0 or higher (i.e., the stock is at BMSY or higher), the maximum probability of overfishing (based upon peer reviewed assessments) may not exceed 35%. As the ratio of B/ BMSY becomes less than 1.0 and continues to decline, the allowable maximum probability of overfishing declines commensurately, in a linear fashion, until the maximum allowable probability of overfishing becomes zero at a B/BMSY ratio of 0.10. So in a scenario where the biomass is diminishing, falling below BMSY and approaching the threshold, in order to conform with the allowable probability of overfishing, the quota must be commensurately reduced. Therefore the fishery meets the requirements of the SG 60, 80 and 100 levels for SIa.		
b	HCRs robustness to uncertainty			
	Guidepost		The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.
	Met?		Yes	No
	Justification	There is a well-defined harvest control rule in place (since 2012) that is consistent with the harvest strategy and ensures that the exploitation rate is reduced as limit reference points are approached for the surfclam fishery, but it does not account for a wide range of uncertainties. However it is likely that the HCR is robust to the main uncertainties because the analysis of the stock abundance is probabilistic and therefore incorporates uncertainty into the estimation of stock size. Therefore, the fishery certainly meets the requirements of the SG 80 levels for SIb, but does not meet the SG100 level.		
C	**HCRs evaluation**			
	Guidepost	There is **some evidence** that tools used **or available** to implement HCRs 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 HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.
	Met?	Yes	Yes	No

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place	
	Justification	As this is a relatively new HCR that hasn't been tested for these fisheries, evidence may be limited to indicate that the tools are effective in achieving the exploitation levels required under HCR based on the fact that NMFS has been successful at implementing appropriate HCRs in many fisheries, and that these HCRs have been tested and have resulted in both reducing overfishing and rebuilding previously overfished stocks. However, like most successful fisheries management, the available evidence that the tools or measures are appropriate and will be effective cannot be demonstrated until there is a failure in management. Therefore, the fishery certainly meets the requirements of the SG60 and 80 levels for SIc, but does not meet the SG100 level.	
References		The FMP, including subsequent Amendments and Frameworks, is available on the Council website at: http://www.mafmc.org.	
OVERALL PERFORMANCE INDICATOR SCORE:			85
CONDITION NUMBER (if relevant):			

Evaluation Table for PI 1.2.3 – Information and monitoring: surfclam fishery

PI 1.2.3		Relevant information is collected to support the harvest strategy		
Scoring Issue		SG 60	SG 80	SG 100
a	Range of information			
	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 is available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
	Met?	Yes	Yes	Yes
	Justification	A comprehensive range of information related to stock structure, stock productivity, fleet composition, stock abundance UoA removals and other information including environmental information and other data are described and used in stock assessments and therefore available to support the harvest strategy for surfclams (e.g. NEFSC 2013). The combination of regular scientific surveys and complete fishery dependent landings data allows for the development of robust assessment models with few uncertainties. The fishery is ITQ based, and the landed surfclams are tracked from the boat to processing by the National Shellfish Sanitiation Program. There is no opportunity for unreported landings. See the background on stock assessment for further detail. Therefore the fishery meets the requirements of the SG 60, 80 and 100 levels for SIa.		
b	Monitoring			
	Guidepost	Stock abundance and UoA removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA 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?	Yes	Yes	Yes
	Justification	Peer-reviewed age-structured stock assessments are undertaken regularly (every 3 years) in order to determine stock status, and fishery removals are monitored through mandatory reporting requirements to a fine spatial scale supported by VMS data. This is considered to be a level of coverage sufficient to support the harvest control rule. There are no recreational or other fishery removals of either species outside of the ITQ holders. There is also a demonstrated good understanding of inherent uncertainties in stock assessment reports. For example, the 2013 stock assessment report (NEFSC 2013) begins with a description of the assessment Terms of Reference (TORs), explicity noting characterization of uncertainty and bias in sources of data and estimations, the use of sensitivity analyses, and identification of research recommendations. Based on these TORs,		

PI 1.2.3		Relevant information is collected to support the harvest strategy		
		uncertainties are discussed throughout the stock assessment report, including progress relative to uncertainties in past models (NEFSC 2013). Main uncertainties from the 2013 stock assessment report are summarized in the background of this report in the Stock Assessment section for surfclam. Therefore the fishery meets the SG 60, 80 and 100 levels.		
c	Comprehensiveness of information			
	Guidepost		There is good information on all other fishery removals from the stock.	
	Met?		Yes	
	Justification	Surfclams are only captured by dredges, and generally are not a bycatch of other gears in other fisheries, as is evidenced by the bycatch data for other fisheries. Therefore, the fishery meets the SG80 level for SIc.		
References		The FMP, including subsequent Amendments and Frameworks, is available on the Council website at: http://www.mafmc.org. [NEFSC] Northeast Fisheries Science Center. 2013. 56th Northeast Regional Stock Assessment Workshop (56th SAW) Assessment Report. U.S. Dept Commer, Northeast Fish Sci Cent Ref Doc. 13-10; 868 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at http://www.nefsc.noaa.gov/nefsc/publications/		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 1.2.4 – Assessment of stock status: surfclam fishery

PI 1.2.4		There is an adequate assessment of the stock status		
Scoring Issue		SG 60	SG 80	SG 100
a	Appropriateness of assessment to stock under consideration			
	Guidepost		The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.
	Met?		Yes	Yes
	Justification	Information on the status of Atlantic surfclam resource in the U.S. EEZ is summarized in the Assessment Summary Report from the 56th Northeast Regional Stock Assessment Workshop (NEFSC 2013). Regular, peer reviewed (internally prior to a stock assessment workshop and externally at the workshop) age-structured stock assessments are undertaken for surfclams. These assessments take uncertainty into account and are thought to be appropriate for the biology of the species, the stocks and harvest control rule, therefore the fishery meets the SG 80 and 100 requirements for SIa.		
b	Assessment approach			
	Guidepost	The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	
	Met?	Yes	Yes	
	Justification	Being a highly localized fishery, stock conditions are often described for regions rather than for the whole stock area (NEFSC 2013). The surfclam EEZ resource is summarized by six regions and two stock assessment areas. From north to south, the regions are: Georges Bank (GBK), Southern New England (SNE), Long Island (LI), New Jersey (NJ), Delmarva (DMV) and southern Virginia (SVA) and the two stock assessment areas are northern (GBK) and southern (remaining regions). Stock assessment results from the two areas were combined to evaluate the status of the stock for the entire EEZ resource. The resource is defined as a single stock, although there are differences between regions in biological characteristics and fishing activity. The 56th SAW in 2013 conducted a stock assessment on the 2011 Atlantic surfclam resource in the U.S. EEZ. Surfclams and fisheries in state waters are assessed separately. The 2013 assessment used a statistical catch-at-age and length model (SS3) replacing the biomass dynamic model (KLAMZ) used previously. The new model incorporated age and length structure. Age composition data from the 1982 to 2011 NEFSC clam surveys, and commercial length composition from port samples (when available) were utilized in the assessment for the first time. Stock assessment results from the northern and southern areas were combined to evaluate the status of the stock for the entire EEZ. New reference point were estimated that are believed to be more appropriate for the stock. The SARC could not decide whether to recommend changing from the current single stock definition. The SARC noted that this should not prevent conducting stock assessments by subareas, nor should it preclude area-based management, if appropriate. Therefore, the assessment meets the requirements of the SG 60 and 80 levels for SIb.		
c	Uncertainty in the assessment			
	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

PI 1.2.4		There is an adequate assessment of the stock status		
				relative to reference points in a **probabilistic** way.
	Met?	Yes	Yes	Yes
	Justification	The stock assessment as described above in the body of this report (see Stock Assessment) takes uncertainty into account and estimates stock status relative to reference points in a probabilistic way. Therefore the fishery meets the SG 60, 80 and 100 levels for SIc.		
d	Evaluation of assessment			
	Guidepost			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?			Yes
	Justification	As noted previously, the assessment process is robust, and explores alternative assessment approaches. Therefore the fishery meets the SG 100 level for SId		
e	Peer review of assessment			
	Guidepost		The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.
	Met?		Yes	Yes
	Justification	As noted in SIa, the NMFS NEFSC stock assessment for surfclams is peer reviewed internally and externally. Therefore the assessment meets the requirements for SG 80 and 100 for SIe.		
References		NMFS, Northeast Fisheries Science Center. 2013. 56th Northeast Regional Stock Assessment Workshop (56th SAW) Assessment Summary Report. U.S. Dept Commerce, Northeast Fish Sci Cent Ref Doc. 13-04; 42 p. http://nefsc.noaa.gov/publications/)		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

Principle 1: Ocean Quahog

Evaluation Table for PI 1.1.1 – Stock status: ocean quahog fishery

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 (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.
	Met?	Yes	Yes	Yes
	Justification	The stock has undergone fishing down since the beginning of the fishery, and the biomass has not yet reached B_{target} (formally considered equivalent to B_{msy}, but now revised as a non-MSY BRP, considered more appropriate for the nature of the stock and economics of the fishery based on the latest scientific information (see background on Stock Assessment for more detail)). Ocean quahogs have never been overfished since the inception of the fishery in the late 1970s. Whole stock fishable biomass during 2011 was 2.96 million mt meats, which was above the B_{target} of 1.73 million mt and the revised $B_{threshold}$ of 1.39 million mt. The F45% threshold times the current biomass would yield a catch of 140.5 million pounds of meats (14.0 million bushels). The Council had a specified OY range in the FMP (since the early 1980s) of 40.0 to 60.0 million pounds (4 to 6 million bushels), but this OY range was removed through Amendment 17 in June 2016 to accommodate the best scientific information currently available. The stock is widely distributed with large areas that are not fished. In essence, economics creates refuges for ocean quahogs dispersed in beds with catch rates below the profitable level. The probability of overfishing and overfished status for this stock appears low considering the nature of the stock, the ongoing scientific advice and the requirement for the Scientific and Statistical Committee to set an upper limit on catches through the Allowable Biological Catch. Therefore the stock meets the requirements of the SG 60, 80 and 100 levels for SIa.		
b	Stock status in relation to achievement of MSY			
	Guidepost		The stock is at or fluctuating around a level consistent with MSY.	There is a **high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.
	Met?		Yes	Yes
	Justification	As noted above, the stock has undergone fishing down since the beginning of the fishery, and the biomass has not yet reached Bmsy. Ocean quahogs have never been overfished since the inception of the fishery in the late 1970s. Whole stock fishable biomass during 2011 was 2.96 million mt meats, which was above the Btarget of 1.73 million mt and the revised Bthreshold of 1.39 million mt. The F45% threshold times the current biomass would yield a catch of 140.5 million pounds of meats (14.0 million bushels). The Council had a specified OY range in the FMP (since the early 1980s) of 40.0 to 60.0 million pounds (4 to 6 million bushels). Amendment 17 changed the FMP to assure that the best available science would be used to set catch limits. The OY range was eliminated to avoid any conflict between the FMP and the best science available. New BRPs are being used to maintain favorable stock conditions and to avoid unfavorable stock conditions. The probability of overfishing and overfished status for this stock therefore appears low.		

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
	Therefore the stock meets the requirements of the SG 80 and 100 levels for SIb		
References	Chute A., Hennen D., Russell R. and Jacobson L. 2013. Stock assessment update for ocean quahogs (Arctica islandica) through 2011. U.S. Dept Commerce, Northeast Fish Sci Cent Ref Doc.		

Stock Status relative to Reference Points			
	Type of reference point	**Value of reference point**	**Current stock status relative to reference point**
Reference point used in scoring stock relative to PRI (SIa)	Bthreshold = 40% of 1978 whole stock biomass	1.39 mmt meats	2.96 mmt meats in 2011.
Reference point used in scoring stock relative to MSY (SIb)	$B_{MSY} = B_{target}$	1.73 mmt meats	2.96 mmt meats in 2011.

OVERALL PERFORMANCE INDICATOR SCORE:	**100**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 1.1.2 – Stock rebuilding (not needed)

PI 1.1.2		Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe		
Scoring Issue		SG 60	SG 80	SG 100
a	**Rebuilding timeframes**			
	Guidepost	A rebuilding timeframe is specified for the 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 stock.
	Met?	(Y/N)		(Y/N)
	Justification			
b	Rebuilding evaluation			
	Guidepost	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe.	There is evidence that the rebuilding strategies are rebuilding stocks, **or it is likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.	There is **strong** evidence that the rebuilding strategies are rebuilding stocks, **or it is highly likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.
	Met?	(Y/N)	(Y/N)	(Y/N)
	Justification			
References				
OVERALL PERFORMANCE INDICATOR SCORE:				
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 1.2.1 – Harvest strategy: ocean quahog fishery

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	Harvest strategy design			
	Guidepost	The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.
	Met?	Yes	Yes	Yes
	Justification	For ocean quahog resources in the federally managed fishing areas, the Council's SSC sets the ABC each year, based on NMFS NEFSC peer reviewed stock assessments, and under the FMP the ABC equals the ACL ("annual catch limit"). It is illegal under the MSA for the ACL to exceed the SSC's ABC level. The ACL then may be reduced by the Council if there is management uncertainty when it sets the annual catch target (annual quota). Under the MAFMC risk policy, the level of ABC cannot permit a probability of more than 35% that overfishing will occur if the actual harvest is at that ABC level. There is a control rule in place, and there is pre-existing evidence via the advent of the ITQ system of the ability of the management system to control effort, taking into account issues such as overcapacity and its causes. There is a strong information base and monitoring of stock status and the responsiveness of the management system and fleet to stock status. The new harvest control rule, the "ABC control rule" (see PI 1.2.2), is responsive to the state of the stock. There is some uncertainty regarding precisely how the rule as described will work as limit reference points are approached to ensure limits are not surpassed, but this is taken up under PI 1.2.2. Therefore the fishery meets the requirements of the SG60, 80 and 100 levels for SIa.		
b	Harvest strategy evaluation			
	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?	Yes	Yes	No
	Justification	Evidence exists that the harvest strategy is meeting its objectives in that the ocean quahog resource has never been overfished, and exploitation levels, although approaching them, are still well below target fishing mortality levels, and above biomass-based limits. The harvest control rule, the "ABC control rule" (see PI 1.2.2), is responsive to the state of the stock. There is some uncertainty regarding precisely how the rule as described will work as limit reference points are approached to ensure limits are not surpassed, but this is taken up under PI 1.2.2 Therefore the fishery meets the requirements of the SG 60 and 80 but not the SG 100 levels for SIb.		
	Harvest strategy monitoring			

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
c	**Guidepost**	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	Yes		
	Justification	As noted for SIa, the Council's SSC sets the ABC each year, based on NMFS NESC peer reviewed stock assessments, and under the FMP the ABC equals the ACL ("annual catch limit"). Therefore the fishery meets the requirements of SIc at the SG 60 level		
d	Harvest strategy review			
	Guidepost			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			Yes
	Justification	As noted for SIa, the Council's SSC sets the ABC each year, based on NMFS NESC peer reviewed stock assessments, and under the FMP the ABC equals the ACL ("annual catch limit"). It is illegal under the MSA for the ACL to exceed the SSC's ABC level. The ACL then may be reduced by the Council if there is management uncertainty when it sets the annual catch target (annual quota). Under the MAFMC risk policy, the level of ABC cannot permit a probability of more than 35% that overfishing will occur if the actual harvest is at that ABC level. Therefore, given the annual review of the ABC and ACL, which forms the basis of the harvest strategy, the fishery meets the requirements of SId at the SG 100 level		
e	Shark finning			
	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?	Not relevant	Not relevant	Not relevant
	Justification	Sharks are not a target species in this fishery.		
f	**Review of alternative measures**			
	Guidepost	There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biannual** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.
	Met?	Yes	Yes	Yes
	Justification	Based on the observed catch composition data in P2 and NEFSC (2013), there is no discarding of target species, as there is no active federal minimum size requirement in place (see Fisheries Regulations to Meet Objectives). The dredge is highly selective to capture surfclams and ocean quahogs that are commercially valuable, catching 80-95% of clams of suitable size in their path (Wallace & Hoff 2005, Meyer et al 1981, Thorarinsdottir et al 2010). There is good information on size selectivity for the clam dredge, which is used in stock assessment reports (e.g. Chute et al. 2013). See background section on Fishing Practices for more detail regarding gear selectivity. Therefore, there is minimal mortality of unwanted catch of the target stock, and this incidental mortality is accounted for in stock assessments (estimated at 5% for ocean quahog).		

PI 1.2.1		There is a robust and precautionary harvest strategy in place
		There is a national bycatch reduction program that collects and evaluates bycatch, discarding and un-intended mortality of fishing operations (NMFS 2013, SBRM 2016). Therefore, it is expected that should alternative measures to minimize mortality of unwanted catch be merited, there is a program in place capable of doing so. With this, the harvest strategy meets the requirements of the SG 60, 80 and 100 levels for SIf.
References		The FMP, including subsequent Amendments and Frameworks, is available on the Council website at: http://www.mafmc.org. Chute. T. 2013. summary of surfclam and ocean quahog observer bycatch data. NMFS, NEFSC, unpublished data provided by Dan Hennan. National Marine Fisheries Service. 2013. U.S. National Bycatch Report First Edition Update 1 [L. R. Benaka, C. Rilling, E. E. Seney, and H. Winarsoo, Editors]. U.S. Dep. Commer., 57 p. Online edition: http://www.st.nmfs.noaa.gov/observer-home/first-edition-update-1 (SBRM) Standardized Bycatch Reporting Methodology Program 2016: http://www.nefsc.noaa.gov/fsb/SBRM/
OVERALL PERFORMANCE INDICATOR SCORE:		**95**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 1.2.2 – Harvest control rules and tools: ocean quahog fishery

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
Scoring Issue		SG 60	SG 80	SG 100
a	HCRs design and application			
	Guidepost	**Generally understood** HCRs are in place **or available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, **most** of the time.
	Met?	Yes	Yes	Yes
	Justification	There is a well-defined harvest control rule in place (since 2012) that is consistent with the harvest strategy and ensures that the exploitation rate is reduced as limit reference points are approached for the ocean quahog fisheries. This new rule takes into account main uncertainties as follows: For stocks with a ratio of B to BMSY of 1.0 or higher (i.e., the stock is at BMSY or higher), the maximum probability of overfishing (based upon peer reviewed assessments) may not exceed 35%. As the ratio of B/ BMSY becomes less than 1.0 and continues to decline, the allowable maximum probability of overfishing declines commensurately, in a linear fashion, until the maximum allowable probability of overfishing becomes zero at a B/BMSY ratio of 0.10. So in a scenario where the biomass is diminishing, falling below BMSY and approaching the threshold, in order to conform with the allowable probability of overfishing, the quota must be commensurately reduced. Therefore the fishery meets the requirements of the SG 60, 80 and 100 levels for SIa.		
b	HCRs robustness to uncertainty			
	Guidepost		The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.
	Met?		Yes	No
	Justification	There is a well-defined harvest control rule in place (since 2012) that is consistent with the harvest strategy and ensures that the exploitation rate is reduced as limit reference points are approached for the ocean quahog fisheries, but it does not take account of a wide range of uncertainties including the ecological role of the stock. However it is likely that the HCR is robust to the main uncertainties because the analysis of the stock abundance is probabilistic and therefore incorporates uncertainty into the estimation of stock size. Therefore, the fishery meets the requirements of the SG 80 level for SIb, but not the SG 100 level.		
c	**HCRs evaluation**			
	Guidepost	There is **some evidence** that tools used **or available** to implement HCRs are	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
		appropriate and effective in controlling exploitation.	exploitation levels required under the HCRs.	levels required under the HCRs.
	Met?	Yes	Yes	No
	Justification	As this is a new HCR that hasn't been tested for these fisheries, evidence may be limited to indicate that the tools are effective in achieving the exploitation levels required under HCR. However, like most successful fisheries management, while the available evidence that the tools or measures are appropriate and will be effective cannot be demonstrated until there is a failure in management. Therefore, the fishery certainly meets the requirements of the SG60 and 80 levels for SIc, but does not meet the SG100 level.		
References		The FMP, including subsequent Amendments and Frameworks, is available on the Council website at: http://www.mafmc.org.		
OVERALL PERFORMANCE INDICATOR SCORE:				**85**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 1.2.3 – Information and monitoring: ocean quahog fishery

PI 1.2.3		Relevant information is collected to support the harvest strategy		
Scoring Issue		SG 60	SG 80	SG 100
a	Range of information			
	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 is available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
	Met?	Yes	Yes	Yes
	Justification	A comprehensive range of relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy for ocean quahogs and are described in the stock assessment reports and to conduct the stock assessment (e.g. Chute et al 2013). The combination of regular scientific surveys and complete fishery dependent landings data allows for the development of robust assessment models with few uncertainties. The fishery is ITQ based, and the landed ocean quahogs are tracked from the boat to processing by the National Shellfish Sanitiation Program. There is no opportunity for unreported landings. Therefore the fishery meets the requirements of the SG 60, 80 and 100 levels for SI a.		
b	Monitoring			
	Guidepost	Stock abundance and UoA removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA 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?	Yes	Yes	Yes
	Justification	Regular peer-reviewed age-structured stock assessments are undertaken regularly in order to determine stock status, and fishery removals are monitored through mandatory reporting requirements to a fine spatial scale supported by VMS data. This is considered to be a level of coverage sufficient to support the harvest control rule. There are no recreational or other fishery removals of either species outside of the ITQ holders. Stock assessment reports, including the 2013 update to the ocean quahog stock assessment, discuss uncertainties in data sources and model estimations throughout, and provide recommendations for future research and assessments (e.g. Chute et al 2013). Therefore the fishery meets the SG 60, 80 and 100 levels for SIb.		
	Comprehensiveness of information			

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?		Yes	
	Justification	Ocean quahogs are only captured by dredges, and generally are not a bycatch of other gears in other fisheries, as is evidenced by the bycatch data for other fisheries. Therefore, the fishery meets the SG80 level for SIc.		
References		The FMP, including subsequent Amendments and Frameworks, is available on the Council website at: http://www.mafmc.org. Chute A., Hennen D., Russell R. and Jacobson L. 2013. Stock assessment update for ocean quahogs (Arctica islandica) through 2011. U.S. Dept Commerce, Northeast Fish Sci Cent Ref Doc.		
OVERALL PERFORMANCE INDICATOR SCORE:				100
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 1.2.4 – Assessment of stock status: ocean quahog fishery

PI 1.2.4		There is an adequate assessment of the stock status		
Scoring Issue		SG 60	SG 80	SG 100
a	Appropriateness of assessment to stock under consideration			
	Guidepost		The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.
	Met?		Yes	Yes
	Justification	Regular, peer reviewed age-structured stock assessments are undertaken for ocean quahogs. These assessments take uncertainty into account and are believed to be appropriate for the stocks and harvest control rule, therefore they are likely to meet the SG 80 and 100 requirements for SIa.		
b	Assessment approach			
	Guidepost	The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	
	Met?	Yes	Yes	
	Justification	Stock assessments for ocean quahog in the EEZ were completed by the NEFSC in 1995, 1998, 2000, 2004, 2007 and 2009. The assessment before the most recent (NEFSC 2009) concluded that the EEZ ocean quahog resource was not overfished and that overfishing was not occurring. The most recent ocean quahog assessment update (Chute et al. 2013) used data from 1978 through 2011 in a forward projecting stock assessment model, based on the Deriso-Schnute delay-difference equation, implemented in a program called KLAMZ. This was the same peer-reviewed and approved method developed at the NMFS Stock Assessment Workshop 48 (NEFC 2009). The KLAMZ model was run for the whole stock, the exploited part of the stock only, and each individual assessment region except for SVA. For both the exploited part of the stock (SVA, DMV, NJ, LI and SNE combined) and the whole stock (exploited regions plus GBK), fishable biomass continued to trend downward. Fishing mortality trended upward from 1978 through 1990 in the exploited region, but has been fairly stable since catches and biomass have both fallen. Estimates of fishable biomass are decreasing in all regions. KLAMZ biomass estimates for GBK in the last assessment showed a slight upward trend, but a smaller estimated survey swept-area biomass in 2011 affected the model trends in biomass and surplus production negatively. Reference points have been estimated, that are appropriate for the stock characteristics (see section: Stock Assessment). Therefore the assessment meets the requirements of the SG 60 and 80 levels for SIb.		
c	Uncertainty in the assessment			
	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?	Yes	Yes	Yes

PI 1.2.4		**There is an adequate assessment of the stock status**		
	Justification	The stock assessment described in the body of this report takes uncertainty into account and estimates stock status relative to reference points in a probabilistic way. Therefore the assessment meets the requirements of the SG 60, 80 and 100 levels for SIc.		
d	Evaluation of assessment			
	Guidepost			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?			Yes
	Justification	As noted previously, the assessment process is robust and explores alternative assessment approaches. Therefore the fishery meets the SG 100 level requirements for SId.		
e	Peer review of assessment			
	Guidepost		The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.
	Met?		Yes	Yes
	Justification	As noted in the justification for SIa, the NMFS NEFSC stock assessment for ocean quahogs is peer reviewed both internally and externally. Therefore, the assessment meets the requirements of SG 80 and 100 levels for SIe.		
References		Chute A., Hennen D., Russell R. and Jacobson L. 2013. Stock assessment update for ocean quahogs (Arctica islandica) through 2011. U.S. Dept Commer, Northeast Fish Sci Cent Ref Doc.)		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

Principle 2:

Primary and Secondary Species: Surfclam

Evaluation Table for PI 2.1.1 – Primary species outcome: Surfclam fishery

PI 2.1.1		The UoA aims to maintain primary species above the PRI and does not hinder recovery of primary species if they are below the PRI.		
Scoring Issue		SG 60	SG 80	SG 100
a	Main primary species stock status			
	Guidepost	Main primary species are **likely** to be above the PRI OR If the species is below the PRI, the UoA has measures in place that are **expected** to ensure that the UoA does not hinder recovery and rebuilding.	Main primary species are **highly likely** to be above the PRI OR If the species is below the PRI, there is either **evidence of recovery** or a demonstrably effective strategy in place **between all MSC UoAs which categorise this species as main**, to ensure that they collectively do not hinder recovery and rebuilding.	There is a **high degree of certainty** that main primary species are above the PRI **and are** fluctuating around a level consistent with MSY.
	Met?	Yes	Yes	Yes
	Justification	Based on the information available to the assessment team, there are no main primary species in the surfclam fishery. Therefore, the surfclam fishery meets the requirements of the SG 60, 80 and 100 levels for SIa.		
b	Minor primary species stock status			
	Guidepost			For minor species that are below the PRI, there is evidence that the UoA does not hinder the recovery and rebuilding of minor primary species
	Met?			Yes
	Justification	Primary minor species are considered under the SG100 scoring issues and these include: sea scallop, little skate, unclassified skate, monkfish, spiny dogfish, and winter skate. There are no Primary, minor species that fall close to, but below, either the 5% inclusion level for resilient species or the 2% inclusion level for less resilient species. Sea scallop and spiny dogfish are MSC certified fisheries, and the stocks of these species are neither overfished nor experiencing overfishing, relative to their reference points. Monkfish is also managed species, and it is not overfished, nor experiencing overfishing, relative to its reference points. Finally, winter skate is managed under the Northeast Skate Complex FMP, and while it is considered to be experiencing overfishing, it is it not considered to be overfished. Given the very small amount of bycatch of winter skate in the surfclam fishery, 0.01% of the catch of surfclams, it is believed that the surfclam fishery is not an issue for winter skate, relative to other fisheries (otter trawls) that capture large numbers of winter skate as bycatch. Therefore, the surfclam fishery meets the requirements of the SG 100 level for SIb.		

PI 2.1.1	**The UoA aims to maintain primary species above the PRI and does not hinder recovery of primary species if they are below the PRI.**
References	Chute, NMFS data on discarding in the surfclam-ocean quahog fishery NEFMC various stock status reports online
OVERALL PERFORMANCE INDICATOR SCORE:	**100**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.1.2 – Primary species management strategy: Surfclam fishery

PI 2.1.2		There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guidepost	There are **measures** in place for the UoA, if necessary, that are expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are likely to above the point where recruitment would be impaired.	There is a **partial strategy** in place for the UoA, if necessary, that is expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are highly likely to be above the point where recruitment would be impaired.	There is a **strategy** in place for the UoA for managing main and minor primary species.
	Met?	Yes	Yes	Yes
	Justification	There are no main primary species, and there are a number of measures in place to contribute to the management of all primary species in the UoA, in alignment with the national strategy for bycatch management in US fisheries. The Surfclam and Ocean Quahog Fishery Management Plan (FMP) contemplates bycatch effects of existing and planned conservation and management measures, meeting the U.S. National Standard Guidelines requirements for FMP to include considerations to reduce bycatch. The primary tool employed in the surfclam fishery is the design of a highly selective gear, which is considered to result in very low levels of bycatch (and no main primary species). Progressive improvements in gear efficiency and harvesting practices have reduced fishing effort, limited harvest area and reduced bycatch. Data collection and evaluations on the effects of dredges that have been conducted confirm there is minimal bycatch in this fishery. The Northeast Fisheries Observer Program directed trips for surfclam to collect information on discards from 2004-2006. With the New England Fishery Management Council's approval of the standardized bycatch reporting methodology (SBRM) Amendment in 2015, the onboard observer program was reinstituted. Onboard observers are required to document catch composition and present annual discard reports to the Fishery Management Councils. Bycatch reports allow Councils to review the effectiveness of the SBRM and also serve to inform management issues or actions via the various FMPs in place for surclam and for the other bycatch species designated as primary for this UoA. The several FMPs, the use of selective gear and bycatch reporting are considered measures working cohesively within the Greater Atlantic Region Council system to ensure FMPs meet the U.S. National Standard Guidelines for sustainable and responsible management of the designated primary species. Therefore, the surfclam fishery meets the requirements of the SG 60, 80 and 100 levels for SIa.		
b	Management strategy evaluation			
	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 measures/partial strategy will work, based on some information directly about the fishery and/or species involved.	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on information directly about the fishery and/or species involved.

PI 2.1.2		There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.		
	Met?	Yes	Yes	No
	Justification	NMFS, NEFMC and the MAFMC all work together to develop, implement, and evaluate strategies to rebuild all managed species that require that action. Given past performance of these agencies, there is objective basis for confidence that their measures and strategies will work. In the surfclam fishery, there are no minor primary species that require rebuilding at this time, as winter skate is not overfished, but is only experiencing overfishing. Therefore, the surfclam fishery meets the requirements of the SG 60 and 80 levels for SIb, but does not meet the requirements of the SG100 level because these systems have not been tested.		
c	Management strategy implementation			
	Guidepost		There is **some evidence** that the measures/partial strategy is being **implemented successfully**.	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its overall objective as set out in scoring issue (a).
	Met?		Yes	Yes
	Justification	There are no main primary species, and there are strategies being implemented for managing minor primary species as mentioned for SIa. Evidence of implementation of the strategy mentioned in SIa includes use of selective fishing gear. The publication of the "2016 SBRM Annual Discard Report" and the "2016 Discard Estimation, Precision, and Sample Size Analyses" indicated that the onboard observer program is being successfully implemented. Furthermore, the action to reinstate the surfclam and ocean quahog observer program testifies to the ongoing achievements of management actions addressing bycatch. Therefore, the surfclam fishery meets the requirements of the SG 80 and 100 levels for SIc.		
d	Shark finning			
	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?	Not relevant	Not relevant	Not relevant
	Justification	No sharks, other than spingy dogfish that comprise 0.1% if the catch, are captured by the hydraulic clam dredge in the surfclam fishery.		
e	Review of alternative measures			
	Guidepost	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all primary species, and they are implemented, as appropriate.
	Met?	Yes	Yes	No
	Justification	There are no main primary species, and there is minimal catch of minor primary species. The surfclam fishery has over time developed a gear that is highly selective at capturing only surfclams of marketable size, and minimizing the bycatch of other species. There are regular annual reports of bycatch and discards in all fisheries managed by NMFS (NMFS		

PI 2.1.2		**There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.**
		2013, SBRM 2016), in addition to bycatch and EFH considerations in all FMPs. As referenced in SIa, National Standard (9) Guidelines require that proposed conservation and management measures prioritize minimization of bycatch to the extent practicable (based on net benefit). However, these is no formal biennial review that directly *evaluates the practicality of alternative measures* to minimize UoA-related mortality of unwanted catch, and there is a need for updated observer information on non-target species (see 2.1.3). Therefore, the surfclam fishery meets the requirements of the SG 60 and 80, but not the 100 levels for SIe.
References		Chute. T. 2013. summary of surfclam and ocean quahog observer bycatch data. NMFS, NEFSC, unpublished data provided by Dan Hennan. (SBRM) Standardized Bycatch Reporting Methodology Program 2016: http://www.nefsc.noaa.gov/fsb/SBRM/ (NMFS) National Marine Fisheries Service. 2013. U.S. National Bycatch Report First Edition Update 1 [L. R. Benaka, C. Rilling, E. E. Seney, and H. Winarsoo, Editors]. U.S. Dep. Commer., 57 p. Online edition: http://www.st.nmfs.noaa.gov/observer-home/first-edition-update-1 Wallace, D.H. and T.B. Hoff. 2004. Minimal bycatch in the Northeast Atlantic surfclam and ocean quahog fishery. In: Bycatch in Northeast Fisheries: Moving Forwards. National Marine Fisheries Service, Gloucester, MA. Page 83.
OVERALL PERFORMANCE INDICATOR SCORE:		**90**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 2.1.3 – Primary species information: Surfclam fishery

PI 2.1.3		Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impact on main species			
	Guidepost	Qualitative information is **adequate to estimate** the impact of the UoA on the main primary species with respect to status. OR If RBF is used to score PI 2.1.1 for the UoA: Qualitative information is adequate to estimate productivity and susceptibility attributes for main primary species.	Some quantitative information is available and is **adequate to assess** the impact of the UoA on the main primary species with respect to status. OR If RBF is used to score PI 2.1.1 for the UoA: Some quantitative information is adequate to assess productivity and susceptibility attributes for main primary species.	Quantitative information is available and is **adequate to assess with a high degree of certainty** the impact of the UoA on main primary species with respect to status.
	Met?	Yes	Yes	No
	Justification	There are no main primary species in the surfclam fishery catch based on the data available. The database used to assess catch characteristics and discarding is the NMFS Observer Program database, which includes data from trips that had trained observers onboard to document discards. The quantitative data used in this analysis was provided by Toni Chute of the NMFS NEFSC for the surfclam and ocean quahog, hydraulic clam dredge fisheries. Unfortunately, there are only a limited number of observations, 16 trips in the surfclam fishery. The observations are about one decade old, however the gear has not changed in the last decade, and the fishery being prosecuted in essentially the same manner and over the same general range (with some annual shifts in focal areas which appear to be increasingly found towards northern regions), so the data are believed to be generally representative of the current fishery. This was verified qualitatively at the onsite meeting with NMFS NEFSC and MAFMC staff. In this case, the team felt that whether the data available were sufficient to assess (SG 80) the impact of the UoA on main species (as per MSC guidance for scoring this SI) was influenced by status of any species potentially impacted by the UoA. Based on the existing data, there are no main primary species, and the only species that is likely to be a main primary species when new data is available, is sea scallop. In this case, sea scallop is a well-managed resource that is neither overfished nor is overfishing occurring, and all bycatches of sea scallops in other fisheries are considered in the sea scallop management plan. The available information indicates that it is unlikely that further information is likely to indicate outcomes impacts with serious or irreversible harm to non-target species. Based on this, it can be said that quantitative and qualitative information is adequate to assess the impact of the UoA on main primary species, though not with a high degree of certainty. However, there does remain the need for more recent data on non-target catch in theses fisheries in order to a) assure proper classification of main and minor species for scoring, b) have the ability to determine outcome impacts to main and minor species, if any, and c)		

PI 2.1.3		Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species		
		detect how these may be changing through time based on either the behavior of the fishery or trophic/ecosystem shifts. (FCRV2.0 SA3.6.3) Therefore, the team decided to score this SI at the SG80 level, because the existing quantitative information assessed shows a clean fishery, without known or suspected outcome issues. The team simultaneously acknowledges that further information is needed for accurate classification of main and minor species, and to address issues a)-c) listed in the rationale above, which are scored as part of the partial strategy in SI c.		
b	Information adequacy for assessment of impact on minor species			
	Guidepost			Some quantitative information is adequate to estimate the impact of the UoA on minor primary species with respect to status.
	Met?			No
	Justification	There are minor primary species in the surfclam fishery catch based on the data available, however, for the reasons stated in SIa this data is not considered adequate to designate with certainty main/minor species, nor estimate impacts. Therefore, the surfclam fishery does not currently meet the SG100 requirements.		
c	Information adequacy for management strategy			
	Guidepost	Information is adequate to support **measures** to manage **main** primary species.	Information is adequate to support a **partial strategy** to manage **main** Primary species.	Information is adequate to support a **strategy** to manage **all** primary species, and evaluate with a **high degree of certainty** whether the strategy is achieving its objective.
	Met?	Yes	No	No
	Justification	The dated observer information and other scientific surveys using the hydraulic clam dredge are adequate to support measures as necessary to manage the target species. However, updated observer data is necessary in order for information to be considered adequate to support a partial strategy capable of a) assuring proper classification of main and minor species for scoring, b) detecting outcome impacts to main and minor species, if any, and c) detecting changes through time based on either the behavior of the fishery or trophic/ecosystem shifts (FCR SA 3.6.4). Therefore, the surfclam fishery meets the requirements of SG 60, but not the SG 80 level. The client has reported that more intensive observer coverage was initiated in these fisheries starting in 2015. It is expected that this information will provide adequate information to inform the partial strategy. However, as these data were not available at the time of scoring, records from the new observer coverage will be examined at annual surveillance audits.		
References		Chute. T. 2013. Summary of surfclam and ocean quahog observer bycatch data. NMFS, NEFSC, unpublished data provided by Dan Hennan. National Marine Fisheries Service. 2013. U.S. National Bycatch Report First Edition Update 1 [L. R. Benaka, C. Rilling, E. E. Seney, and H. Winarsoo, Editors]. U.S. Dep. Commer., 57 p. Online edition: http://www.st.nmfs.noaa.gov/observer-home/first-edition-update-1		

PI 2.1.3	Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species
OVERALL PERFORMANCE INDICATOR SCORE:	**70**
CONDITION NUMBER (if relevant):	**1a**

Evaluation Table for PI 2.2.1 – Secondary species outcome: Surfclam fishery

PI 2.2.1		The UoA aims to maintain secondary species above a biological based limit and does not hinder recovery of secondary species if they are below a biological based limit.		
Scoring Issue		SG 60	SG 80	SG 100
a	Main secondary species stock status			
	Guidepost	Main Secondary species are **likely** to be within biologically based limits. OR If below biologically based limits, there are measures in place expected to ensure that the UoA does not hinder recovery and rebuilding.	Main secondary species are **highly likely** to be above biologically based limits OR If below biologically based limits, there is either **evidence of recovery** or a **demonstrably effective partial strategy** in place such that the UoA does not hinder recovery and rebuilding. AND Where catches of a main secondary species outside of biological limits are considerable, there is either evidence of recovery or a, demonstrably effective strategy in place between those MSC UoAs that also have considerable catches of the species, to ensure that they collectively do not hinder recovery and rebuilding.	There is a **high degree of certainty** that main secondary species are within biologically based limits.
	Met?	Yes	Yes	No
	Justification	Based on existing data, there are no "Main" Secondary species for evaluation in the surfclam fishery, to be evaluated under performance indicators 2.2.1, 2.2.2, and 2.2.3, as the catch of no species other than the target species exceed 5%. Secondary minor species that are managed, but for which there are no reference points but are considered under the SG100 scoring issues include only horseshoe crab. There are no minor species close to the 5% inclusion level for resilient species, and no “less-resilient” species were close to the 2% threshold. Other secondary minor species include creatures that are not part of any regular fishery. However, the data are more than a decade old. Therefore, the surfclam fishery meets or exceeds the requirements of the SG 60 and 80 levels for SIa, but not the SG 100 level due to the age of the information.		
b	**Minor secondary species stock status**			
	Guidepost			For minor species that are below biologically based limits’, there is evidence that the UoA does not hinder the recovery and rebuilding of secondary species

PI 2.2.1		The UoA aims to maintain secondary species above a biological based limit and does not hinder recovery of secondary species if they are below a biological based limit.		
	Met?			Yes
	Justification	Based on existing data, there are no minor secondary species below biologically based limits. The horseshoe crab is a managed species (at 0.03% of the total catch), for which there is no stock status determination. The horseshoe crab fishery is managed by ASMFC, and while there is no stock status determination, and no reference points, landings have been consistent with quotas and state allocations since the early 2000s when quotas were instituted by ASMFC. Therefore the surfclam fishery meets the requirements of the SG100 for SIb.		
References		Chute. T. 2013. Summary of surfclam and ocean quahog observer bycatch data. NMFS, NEFSC, unpublished data provided by Dan Hennan. National Marine Fisheries Service. 2013. U.S. National Bycatch Report First Edition Update 1 [L. R. Benaka, C. Rilling, E. E. Seney, and H. Winarsoo, Editors]. U.S. Dep. Commer., 57 p. Online edition: http://www.st.nmfs.noaa.gov/observer-home/first-edition-update-1 Various stock status assessments from ASMFC and NMFS/GARFO.		
OVERALL PERFORMANCE INDICATOR SCORE:				**90**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.2.2 – Secondary species management strategy: Surfclam fishery

PI 2.2.2		There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.		
Scoring Issue		SG 60	SG 80	SG 100
a	**Management strategy in place**			
	Guidepost	There are **measures** in place, if necessary, which are expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be within biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a **partial strategy** in place, if necessary, for the UoA that is expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be within biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a **strategy** in place for the UoA for managing main and minor secondary species.
	Met?	Yes	Yes	Yes
	Justification	There are no main secondary species, and there are a number of measures in place to contribute to the management of all nontarget species in the UoA, in alignment with the national strategy for bycatch management in US fisheries. The surfclam and ocean quahog Fishery Management Plan (FMP) contemplates bycatch effects of existing and planned conservation and management measures, meeting the U.S. National Standard Guidelines requirements for FMP to include considerations to reduce bycatch. The primary tool employed in the surfclam fishery is the design of a highly selective gear, which is considered to result in very low levels of bycatch (and no main primary species). Progressive improvements in gear efficiency and harvesting practices have reduced fishing effort, limited harvest area and reduced bycatch. Data collection and evaluations on the effects of dredges have been conducted confirm there is minimal bycatch in this fishery. The Northeast Fisheries Observer Program directed trips for surfclam to collect information on discards from 2004-2006. With the New England Fishery Management Council's approval of the standardized bycatch reporting methodology (SBRM) Amendment in 2015, the onboard observer program was reinstituted. Onboard observers are required to document catch composition and present annual discard reports to the Fishery Management Councils. Bycatch reports allow Councils to review the effectiveness of the SBRM and also serve to inform management issues or actions via the FMPs in place. The use of selective gear and bycatch reporting are considered measures working cohesively within the Greater Atlantic Region Council system to ensure the surfclam and ocean quahog FMP meets the U.S. National Standard Guidelines for sustainable and responsible management of the designated secondary species. Therefore, the surfclam fishery meets the requirements of the SG 60, 80 and 100 levels for SIa.		
b	Management strategy evaluation			
	Guidepost	The measures are considered **likely** to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/species).	There is **some objective basis for confidence** that the measures/partial strategy will work, based on some information directly about the UoA and/or species involved.	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on information directly about the UoA and/or species involved.

PI 2.2.2		There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.		
	Met?	Yes	Yes	No
	Justification	As noted previously the bycatch in the surfclam fishery is minimal to negligible based on the available data. However that data is more than a decade old. Therefore there is not a high degree of confidence that the strategy is working at this time. The NMFS, NEFMC and the MAFMC all work together to develop, implement, and evaluate strategies to rebuild all managed species that require that action. Given past performance of these agencies, there is objective basis for confidence that their measures and strategies will work. In the surfclam fishery, there are no minor secondary species that require rebuilding at this time. Therefore, the surfclam fishery meets the requirements of the SG 60 and 80 levels for SIb, but does not meet the requirements of the SG100 level becuase there has been no testing that supports high conficence that the strategy will work.		
c	Management strategy implementation			
	Guidepost		There is **some evidence** that the measures/partial strategy is being **implemented successfully**.	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a).
	Met?		Yes	Yes
	Justification	Evidence of implementation of the strategy mentioned in SIa includes use of selective fishing gear. The publication of the "2016 SBRM Annual Discard Report" and the "2016 Discard Estimation, Precision, and Sample Size Analyses" indicated that the onboard observer program is being successfully implemented. Furthermore, the action to reinstate the surfclam and ocean quahog observer program testify to the ongoing achievements of management actions addressing bycatch considerations. Therefore, the surfclam fishery meets the requirements of the SG 80 and 100 levels for SIc.		
d	Shark finning			
	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?	Not relevant	Not relevant	Not relevant
	Justification	No sharks, other than spiny dogfish, are captured by the hydraulic calm dredge.		
e	Review of alternative measures to minimise mortality of unwanted catch			
	Justification	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of main secondary species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of main secondary species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of all secondary species, and they are implemented, as appropriate.
	Met?	Yes	Yes	No
	Guidepost	As noted previuosly, the surfclam fishery has developed a harvesting gear that selects only marketable sizes of the target species, and minimizes the bycatch of all non-target species.		

PI 2.2.2		**There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.**
		There are no catches of main secondary species (wanted or unwanted), and there is minimal catch of minor secondary species. There are regular annual reports of bycatch and discards in all fisheries managed by NMFS (NMFS 2013, SBRM 2016). As referenced in SIa, National Standard (9) Guidelines require that proposed conservation and management measures prioritize minimization of bycatch to the extent practicable (based on net benefit). However, these is no formal biennial review that *directly evaluates the practicality of alternative measures* to minimize UoA-related mortality of unwanted catch. Therefore, the surfclam fishery meets the requirements of the SG 60 and 80, but not the 100 levels for SIe.
References		Chute. T. 2013. Summary of surfclam and ocean quahog observer bycatch data. NMFS, NEFSC, unpublished data provided by Dan Hennan. Various stock status reports from ASMFC and NMFS/GARFO. National Marine Fisheries Service. 2013. U.S. National Bycatch Report First Edition Update 1 [L. R. Benaka, C. Rilling, E. E. Seney, and H. Winarsoo, Editors]. U.S. Dep. Commer., 57 p. Online edition: http://www.st.nmfs.noaa.gov/observer-home/first-edition-update-1
OVERALL PERFORMANCE INDICATOR SCORE:		**90**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 2.2.3 – Secondary species information: Surfclam fishery

PI 2.2.3		Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species.		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impacts on main secondary species			
	Guidepost	Qualitative information is **adequate to estimate** the impact of the UoA on the main secondary species with respect to status. OR **If RBF is used to score PI 2.2.1 for the UoA:** Qualitative information is adequate to estimate productivity and susceptibility attributes for main secondary species.	Some quantitative information is available and **adequate to assess** the impact of the UoA on main secondary species with respect to status. OR **If RBF is used to score PI 2.2.1 for the UoA:** Some quantitative information is adequate to assess productivity and susceptibility attributes for main secondary species.	Quantitative information is available and **adequate to assess with a high degree of certainty** the impact of the UoA on main secondary species with respect to status.
	Met?	Yes	Yes	No
	Justification	There are no main secondary species in the surfclam fishery catch based on the data available. The database used to assess catch characteristics and discarding is the NMFS Observer Program database, which includes data from trips that had trained observers onboard to document discards. The quantitative data used in this analysis was provided by Toni Chute of the NMFS NEFSC for the surfclam and ocean quahog, hydraulic clam dredge fisheries. Unfortunately, there are only a limited number of observations, 16 trips in the surfclam fishery. The observations are about one decade old, however the gear has not changed in the last decade, and the fishery being prosecuted in essentially the same manner and over the same general range (with focal areas differing by year) for the last several decades, so the data are believed to be generally representative of the current fishery. This was verified qualitatively at the onsite meeting with NMFS NEFSC and MAFMC staff. Based on this, it can be said that quantitative and qualitative information is adequate to assess the impact of the UoA on main secondary species, though not with a high degree of certainty. The available information indicates that it is unlikely that further information is likely to indicate outcomes impacts with serious or irreversible harm to non-target species. However, there does remain the need for more recent data on non-target catch in these fisheries in order to a) assure proper classification of main and minor species for scoring, b) have the ability to determine outcome impacts to main and minor species, if any, and c) detect how these may be changing through time based on either the behavior of the fishery or trophic/ecosystem shifts. (FCRV2.0 SA3.6.3) Therefore, the team decided to score this SI at the SG80 level, because the existing quantitative information assessed shows a clean fishery, without known or suspected outcome issues. The team simultaneously feels that further information is needed for accurate classification of main and minor species, and to address issues a)-c) above, which are scored as part of the partial strategy in SI c.		

PI 2.2.3		**Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species.**		
b	**Information adequacy for assessment of impacts on minor secondary species**			
	Guidepost			Some quantitative information is adequate to estimate the impact of the UoA on minor secondary species with respect to status.
	Met?			No
	Justification	There are minor secondary species in the surfclam fishery catch based on the data available, however, for the reasons stated in SIa this data is not considered adequate to designate with certainty main/minor species, nor estimate impacts. Therefore, the surfclam fishery does not currently meet the SG100 requirements.		
c	Information adequacy for management strategy			
	Guidepost	Information is adequate to support **measures** to manage **main** secondary species.	Information is adequate to support a **partial strategy** to manage **main** secondary species.	Information is adequate to support a **strategy** to manage **all** secondary species, and **evaluate** with a **high degree of certainty** whether the strategy is **achieving its objective**.
	Met?	Yes	No	No
	Justification	The dated observer information and other scientific surveys using the hydraulic clam dredge are adequate to support measures as necessary to manage the target species. However, updated observer data is necessary in order for information to be considered adequate to support a partial strategy capable of a) assuring proper classification of main and minor species for scoring, b) detecting outcome impacts to main and minor species, if any, and c) detecting changes through time based on either the behavior of the fishery or trophic/ecosystem shifts (FCR SA 3.6.4). Therefore, the surfclam fishery meets the requirements of SG 60, but not the SG 80 level. The client has reported that more intensive observer coverage was initiated in these fisheries starting in 2015. It is expected that this information will provide adequate information to inform the partial strategy. However, as these data were not available at the time of scoring, records from the new observer coverage will be examined at the next first annual surveillance.		
References		Chute. T. 2013. summary of surfclam and ocean quahog observer bycatch data. NMFS, NEFSC, unpublished data provided by Dan Hennan. National Marine Fisheries Service. 2013. U.S. National Bycatch Report First Edition Update 1 [L. R. Benaka, C. Rilling, E. E. Seney, and H. Winarsoo, Editors]. U.S. Dep. Commer., 57 p. Online edition: http://www.st.nmfs.noaa.gov/observer-home/first-edition-update-1		
OVERALL PERFORMANCE INDICATOR SCORE:				**70**
CONDITION NUMBER (if relevant):				**2a**

Primary and Secondary Species: Ocean Quahog

Evaluation Table for PI 2.1.1 – Primary species outcome: Ocean quahog fishery

PI 2.1.1		The UoA aims to maintain primary species above the PRI and does not hinder recovery of primary species if they are below the PRI.		
Scoring Issue		SG 60	SG 80	SG 100
a	Main primary species stock status			
	Guidepost	Main primary species are **likely** to be above the PRI OR If the species is below the PRI, the UoA has measures in place that are **expected** to ensure that the UoA does not hinder recovery and rebuilding.	Main primary species are **highly likely** to be above the PRI OR If the species is below the PRI, there is either **evidence of recovery** or a demonstrably effective strategy in place **between all MSC UoAs which categorise this species as main**, to ensure that they collectively do not hinder recovery and rebuilding.	There is a **high degree of certainty** that main primary species are above the PRI **and are** fluctuating around a level consistent with MSY.
	Met?	Yes	Yes	Yes
	Justification	There are no main primary species in the ocean quahog fishery. Therefore, the fishery ocean quahog meets the requirements of the SG 60, 80 and 100 levels for SIa.		
b	Minor primary species stock status			
	Guidepost			For minor species that are below the PRI, there is evidence that the UoA does not hinder the recovery and rebuilding of minor primary species
	Met?			Yes
	Justification	Primary minor species are considered under the SG100 scoring issues and these include: sea scallop, little skate. monkfish, spiny dogfish, summer flounder and winter skate. There are no important Primary, minor species that fall close to, but below, either the 5.0% inclusion level for resilient species other than sea scallop which comprises 4.5% of the catch. There are no “less-resilient” species that were close to the 2.0% inclusion level,. Sea scallop and spiny dogfish are MSC certified fisheries, and the stocks of these species are neither overfished nor experiencing overfishing, relative to their reference points. Monkfish is also managed species, and it is not overfished nor experiencing overfishing, relative to its reference points. Summer flounder is managed species, and as of the 2014 stock assessment, the summer flounder stock was not overfished but overfishing was occurring in 2014 relative to the biological reference points from the 2013 Stock Assessment. Given the very small amount of bycatch of summer flounder in the ocean quahog fishery, 0.03% of the catch of ocean quahogs, it is believed that the ocean quahog fishery is not an issue for summer flounder, relative to other fisheries that capture large numbers of summer flounder in directed fisheries. Finally, winter skate is managed under the Northeast Skate Complex FMP, and while it is considered to be experiencing overfishing; however is it not considered to be overfished. Given the very small amount of bycatch of winter skate in the ocean quahog fishery, 0.10% of the catch of ocean quahogs,		

PI 2.1.1		**The UoA aims to maintain primary species above the PRI and does not hinder recovery of primary species if they are below the PRI.**
		it is believed that the ocean quahog fishery is not an issue for winter skate, relative to other fisheries (otter trawls) that capture large numbers of winter skate as bycatch. Therefore, the ocean quahog fishery meets the requirements of the SG 100 level for SIb.
References		Chute. T. 2013. Summary of surfclam and ocean quahog observer bycatch data. NMFS, NEFSC, unpublished data provided by Dan Hennan. Various stock status reports from ASMFC and NMFS/GARFO National Marine Fisheries Service. 2013. U.S. National Bycatch Report First Edition Update 1 [L. R. Benaka, C. Rilling, E. E. Seney, and H. Winarsoo, Editors]. U.S. Dep. Commer., 57 p. Online edition: http://www.st.nmfs.noaa.gov/observer-home/first-edition-update-1
OVERALL PERFORMANCE INDICATOR SCORE:		**100**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 2.1.2 – Primary species management strategy: Ocean quahog fishery

PI 2.1.2		There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guidepost	There are **measures** in place for the UoA, if necessary, that are expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are likely to above the point where recruitment would be impaired.	There is a **partial strategy** in place for the UoA, if necessary, that is expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are highly likely to be above the point where recruitment would be impaired.	There is a **strategy** in place for the UoA for managing main and minor primary species.
	Met?	Yes	Yes	Yes
	Justification	There are no main primary species, and there are a number of measures in place to contribute to the management of all primary species, in compliance with the national strategy for bycatch management in US fisheries. The Surfclam and Ocean Quahog Fishery Management Plan (FMP) contemplates bycatch effects of existing and planned conservation and management measures, meeting the U.S. National Standard Guidelines requirements for FMP to include considerations to reduce bycatch. The primary tool employed in the surfclam fishery is the design of a highly selective gear, which is considered to result in very low levels of bycatch (and no main primary species). Progressive improvements in gear efficiency and harvesting practices have reduced fishing effort, limited harvest area and reduced bycatch. Data collection and evaluations on the effects of dredges have been conducted confirm there is minimal bycatch in this fishery. The Northeast Fisheries Observer Program directed trips for surfclam to collect information on discards from 2004-2006. With the New England Fishery Management Council's approval of the standardized bycatch reporting methodology (SBRM) Amendment in 2015, the onboard observer program was reinstituted. Onboard observers are required to document catch composition and present annual discard reports to the Fishery Management Councils. Bycatch reports allow Councils to review the effectiveness of the SBRM and also serve to inform management issues or actions via the various FMPs in place for surclam and for the other bycatch species designated as primary for this UoA. The several FMPs, the use of selective gear and bycatch reporting are considered measures working cohesively within the Greater Atlantic Region Council system to ensure FMPs meet the U.S. National Standard Guidelines for sustainable and responsible management of the designated primary species. Therefore, the ocean quahog fishery meets the requirements of the SG 60, 80 and 100 levels for SIa.		
b	Management strategy evaluation			
	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 measures/partial strategy will work, based on some information directly about the fishery and/or species involved.	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on information directly about the fishery and/or species involved.

PI 2.1.2		There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.		
	Met?	Yes	Yes	No
	Justification	The NMFS, NEFMC and the MAFMC all work together to develop, implement, and evaluate strategies to rebuild all managed species that require that action. Given past performance of these agencies, there is objective basis for confidence that their measures and strategies will work. In the ocean quahog fishery, there are no minor primary species that require rebuilding at this time, as both summer flounder and winter skate are not overfished, but is only experiencing overfishing. Therefore, the ocean quahog fishery meets the requirements of the SG 60 and 80 levels for SIb, but does not meet the requirements of the SG100 level.		
c	Management strategy implementation			
	Guidepost		There is **some evidence** that the measures/partial strategy is being **implemented successfully**.	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its overall objective as set out in scoring issue (a).
	Met?		Yes	Yes
	Justification	Evidence of implementation of the strategy mentioned in SIa includes use of selective fishing gear. The publication of the "2016 SBRM Annual Discard Report" and the "2016 Discard Estimation, Precision, and Sample Size Analyses" indicated that the onboard observer program is being successfully implemented. Furthermore, the action to reinstate the surfclam and ocean quahog observer program testify to the ongoing achievements of management actions addressing bycatch considerations. Therefore, the ocean quahog fishery meets the requirements of the SG 80 and 100 levels for SIc.		
d	Shark finning			
	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?	Not relevant	Not relevant	Not relevant
	Justification	Sharks, other than spiny dogfish, are not captured by the hydraulic clam dredge in the surfclam fishery.		
e	Review of alternative measures			
	Guidepost	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all primary species, and they are implemented, as appropriate.
	Met?	Yes	Yes	No
	Justification	There are no main primary species, and there is minimal catch of minor primary species. The ocean quahog fishery has over time developed a gear that is highly selective at capturing only ocean quahogs of marketable size, and minimizing the bycatch of other species. There are regular annual reports on bycatch and discards in all fisheries managed by the NMFS (NMFS 2013, SBRM 2016), in addition to bycatch and EFH considerations in all FMPs. As referenced in SIa, National Standard (9) Guidelines require that proposed		

PI 2.1.2		**There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.**
		conservation and management measures prioritize minimization of bycatch to the extent practicable (based on net benefit). However, these is no formal biennial review that directly *evaluates the practicality of alternative measures* to minimize UoA-related mortality of unwanted catch, and there is a need for updated observer information on non-target species (see 2.1.3). Therefore, the ocean quahog fishery meets the requirements of the SG 60 and 80, but not the 100 levels for SIe.
References		Chute. T. 2013. Summary of surfclam and ocean quahog observer bycatch data. NMFS, NEFSC, unpublished data provided by Dan Hennan. Various stock status reports form ASMFC and NMFS/GARFO (SBRM) Standardized Bycatch Reporting Methodology Program 2016: http://www.nefsc.noaa.gov/fsb/SBRM/ National Marine Fisheries Service. 2013. U.S. National Bycatch Report First Edition Update 1 [L. R. Benaka, C. Rilling, E. E. Seney, and H. Winarsoo, Editors]. U.S. Dep. Commer., 57 p. Online edition: http://www.st.nmfs.noaa.gov/observer-home/first-edition-update-1
OVERALL PERFORMANCE INDICATOR SCORE:		**90**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 2.1.3 – Primary species information: Ocean quahog fishery

PI 2.1.3		Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impact on main species			
	Guidepost	Qualitative information is **adequate to estimate** the impact of the UoA on the main primary species with respect to status. OR If RBF is used to score PI 2.1.1 for the UoA: Qualitative information is adeqaute to estimate productivity and susceptibility attributes for main primary species.	Some quantitative information is available and is **adequate to assess** the impact of the UoA on the main primary species with respect to status. OR If RBF is used to score PI 2.1.1 for the UoA: Some quantitative information is adequate to assess productivity and susceptiblity attributes for main primary species.	Quantitative information is available and is **adequate to assess with a high degree of certainty** the impact of the UoA on main primary species with respect to status.
	Met?	Yes	Yes	No
	Justification	There are no main primary species in the ocean quahog fishery catch based on the data available. The database used to assess catch characteristics and discarding is the NMFS Observer Program database, which includes data from trips that had trained observers onboard to document discards. The quantitative data used in this analysis was provided by Toni Chute of the NMFS NEFSC for the surfclam and ocean quahog, hydraulic clam dredge fisheries. Unfortunately, there are only a limited number of observations, 30 trips in the ocean quahog fishery. The observations are about one decade old, however the gear has not changed in the last decade, and the fishery being prosecuted in essentially the same manner and over the same general range (with focal areas differing by year) for the last several decades, so the data are believed to be generally representative of the current fishery. This was verified qualitatively at the onsite meeting with NMFS NEFSC and MAFMC staff. In this case, the team felt that whether the data available were sufficient to assess (SG 80) the impact of the UoA on main species (as per MSC guidance for scoring this SI) was influenced by status of any species potentially impacted by the UoA. Based on the existing data, there are no main primary species, and the nontarget species caught in greatest volume is sea scallop. In this case, sea scallop is a well-managed resource that is neither overfished nor is overfishing occurring, and all bycatches of sea scallops in other fisheries are considered in the sea scallop management plan. Based on this, it can be said that quantitative and qualitative information is adequate to assess the impact of the UoA on main primary species. The available information indicates that it is unlikely that further information is likely to indicate outcomes impacts with serious or irreversible harm to non-target species. However, there does remain the need for more recent data on non-target catch in theses fisheries in order to a) assure proper classification of main and minor species for scoring, b) have the ability to determine outcome impacts to main and minor species, if any, and c)		

PI 2.1.3		Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species		
		detect how these may be changing through time based on either the behavior of the fishery or trophic/ecosystem shifts. (FCRV2.0 SA3.6.3) Therefore, the team decided to score this SI at the SG80 level, because the existing quantitative information assessed shows a clean fishery, without known or suspected outcome issues. The team simultaneously feels that further information is needed for accurate classification of main and minor species, and to address issues a)-c) above, which are scored as part of the partial strategy in SI c.		
b	Information adequacy for assessment of impact on minor species			
	Guidepost			Some quantitative information is adequate to estimate the impact of the UoA on minor primary species with respect to status.
	Met?			No
	Justification	There are minor primary species in the ocean quahog fishery catch based on the data available, however, for the reasons stated in SIa this data is not considered adequate to designate with certainty main/minor species, nor estimate impacts. Therefore, the ocean quahog fishery does not currently meet the SG100 requirements.		
c	Information adequacy for management strategy			
	Guidepost	Information is adequate to support **measures** to manage **main** primary species.	Information is adequate to support a **partial strategy** to manage **main** Primary species.	Information is adequate to support a **strategy** to manage **all** primary species, and evaluate with a **high degree of certainty** whether the strategy is achieving its objective.
	Met?	Yes	No	No
	Justification	The dated observer information and other scientific surveys using the hydraulic clam dredge are adequate to support measures as necessary to manage the target species. However, updated observer data is necessary in order for information to be considered adequate to support a partial strategy capable of a) assuring proper classification of main and minor species for scoring, b) detecting outcome impacts to main and minor species, if any, and c) detecting changes through time based on either the behavior of the fishery or trophic/ecosystem shifts (FCR SA 3.6.4). Therefore, the ocean quahog fishery meets the requirements of SG 60, but not the SG 80 level. The client has reported that more intensive observer coverage was initiated in these fisheries starting in 2016. It is expected that this information will provide adequate information to inform the partial strategy. However, as these data were not available at the time of scoring, records from the new observer coverage will be examined at the next first annual surveillance.		
References		Chute. T. 2013. summary of surfclam and ocean quahog observer bycatch data. NMFS, NEFSC, unpublished data provided by Dan Hennan. Various stock status reports form ASMFC and NMFS/GARFO National Marine Fisheries Service. 2013. U.S. National Bycatch Report First Edition Update 1 [L. R. Benaka, C. Rilling, E. E. Seney, and H. Winarsoo, Editors]. U.S. Dep. Commer., 57 p. Online edition: http://www.st.nmfs.noaa.gov/observer-home/first-edition-update-1		

PI 2.1.3	Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species
OVERALL PERFORMANCE INDICATOR SCORE:	**70**
CONDITION NUMBER (if relevant):	**1b**

Evaluation Table for PI 2.2.1 – Secondary species outcome: Ocean quahog fishery

PI 2.2.1		The UoA aims to maintain secondary species above a biological based limit and does not hinder recovery of secondary species if they are below a biological based limit.		
Scoring Issue		SG 60	SG 80	SG 100
a	Main secondary species stock status			
	Guidepost	Main Secondary species are **likely** to be within biologically based limits. OR If below biologically based limits, there are measures in place expected to ensure that the UoA does not hinder recovery and rebuilding.	Main secondary species are **highly likely** to be above biologically based limits OR If below biologically based limits, there is either **evidence of recovery** or a **demonstrably effective partial strategy** in place such that the UoA does not hinder recovery and rebuilding. AND Where catches of a main secondary species outside of biological limits are considerable, there is either evidence of recovery or a, demonstrably effective strategy in place between those MSC UoAs that also have considerable catches of the species, to ensure that they collectively do not hinder recovery and rebuilding.	There is a **high degree of certainty** that main secondary species are within biologically based limits.
	Met?	Yes	Yes	No
	Justification	There are no "Main" Secondary species for evaluation in the ocean quahog fishery, to be evaluated under performance indicators 2.2.1, 2.2.2, and 2.2.3, as the catch of no species other than the target species exceed 5%. There are no minor species close to the 5% inclusion level for resilient species, and no “less-resilient” species were close to the 2% threshold. Other secondary minor species include creatures that are not part of any regular fishery. Therefore, the ocean quahog fishery meets the requirements of the SG 60 and 80 levels, but not the 100 level for SIa becuase of the age of the data and the small sample size.		
b	**Minor secondary species stock status**			
	Guidepost			For minor species that are below biologically based limits’, there is evidence that the UoA does not hinder the recovery and rebuilding of secondary species
	Met?			Yes

PI 2.2.1		**The UoA aims to maintain secondary species above a biological based limit and does not hinder recovery of secondary species if they are below a biological based limit.**
	Justification	There are no minor secondary species below biologically based limits. Therefore the ocean quahog fishery meets the requirements of the SG100 for SIb.
References		Chute. T. 2013. summary of surfclam and ocean quahog observer bycatch data. NMFS, NEFSC, unpublished data provided by Dan Hennan. Various stock status reports form ASMFC and NMFS/GARFO National Marine Fisheries Service. 2013. U.S. National Bycatch Report First Edition Update 1 [L. R. Benaka, C. Rilling, E. E. Seney, and H. Winarsoo, Editors]. U.S. Dep. Commer., 57 p. Online edition: http://www.st.nmfs.noaa.gov/observer-home/first-edition-update-1
OVERALL PERFORMANCE INDICATOR SCORE:		**90**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 2.2.2 – Secondary species management strategy: Ocean quahog fishery

PI 2.2.2		There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.		
Scoring Issue		SG 60	SG 80	SG 100
a	**Management strategy in place**			
	Guidepost	There are **measures** in place, if necessary, which are expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be within biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a **partial strategy** in place, if necessary, for the UoA that is expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be within biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a **strategy** in place for the UoA for managing main and minor secondary species.
	Met?	Yes	Yes	Yes
	Justification	There are no main secondary species, and there are a number of measures in place to contribute to the management of all nontarget species in the UoA, in alignment with the national strategy for bycatch management in US fisheries. The surfclam and ocean quahog Fishery Management Plan (FMP) contemplates bycatch effects of existing and planned conservation and management measures, meeting the U.S. National Standard Guidelines requirements for FMP to include considerations to reduce bycatch. The primary tool employed in the surfclam fishery is the design of a highly selective gear, which is considered to result in very low levels of bycatch (and no main primary species). Progressive improvements in gear efficiency and harvesting practices have reduced fishing effort, limited harvest area and reduced bycatch. Data collection and evaluations on the effects of dredges have been conducted confirm there is minimal bycatch in this fishery. The Northeast Fisheries Observer Program directed trips for surfclam to collect information on discards from 2004-2006. With the New England Fishery Management Council's approval of the standardized bycatch reporting methodology (SBRM) Amendment in 2015, the onboard observer program was reinstituted. Onboard observers are required to document catch composition and present annual discard reports to the Fishery Management Councils. Bycatch reports allow Councils to review the effectiveness of the SBRM and also serve to inform management issues or actions via the FMPs in place. Theuse of selective gear and bycatch reporting are considered measures working cohesively within the Greater Atlantic Region Council system to ensure the surfclam and ocean quahog FMP meets the U.S. National Standard Guidelines for sustainable and responsible management of the designated secondary species. Therefore, the surfclam fishery meets the requirements of the SG 60, 80 and 100 levels for SIa.		
b	Management strategy evaluation			
	Guidepost	The measures are considered **likely** to work, based on plausible argument (e.g. general experience, theory or	There is **some objective basis for confidence** that the measures/partial strategy will work, based on some information directly	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on information directly about the UoA and/or species involved.

PI 2.2.2		There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.		
		comparison with similar UoAs/species).	about the UoA and/or species involved.	
	Met?	Yes	Yes	No
	Justification	Evidence of implementation of the strategy mentioned in SIa includes use of selective fishing gear. The publication of the "2016 SBRM Annual Discard Report" and the "2016 Discard Estimation, Precision, and Sample Size Analyses" indicated that the onboard observer program is being successfully implemented. Furthermore, the action to reinstate the surfclam and ocean quahog observer program testify to the ongoing achievements of management actions addressing bycatch considerations. Therefore, the surfclam fishery meets the requirements of the SG 80 and 100 levels for SIc.		
c	Management strategy implementation			
	Guidepost		There is **some evidence** that the measures/partial strategy is being **implemented successfully**.	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a).
	Met?		Yes	Yes
	Justification	Evidence of implementation of the strategy mentioned in SIa includes primarily the use of harvesting gear that selects only marketable sizes of the target species, and minimizes the bycatch of all non-target species. The publication of the "2016 SBRM Annual Discard Report" and the "2016 Discard Estimation, Precision, and Sample Size Analyses" indicated that the onboard observer program is being successfully implemented. Furthermore, the action to reinstate the surfclam and ocean quahog observer program testify to the ongoing achievements of management actions addressing bycatch considerations. Therefore, the ocean quahog fishery meets or exceeds the requirements of the SG 80 and 100 levels for SIc.		
d	Shark finning			
	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?	Not relevant	Not relevant	Not relevant
	Justification	Sharks, other than spiny dogfish (primary species), are not captured by the hydraulic calm dredge.		
e	Review of alternative measures to minimise mortality of unwanted catch			
	Guidepost	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of main secondary species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of main secondary species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of all secondary species, and they are implemented, as appropriate.
	Met?	Yes	Yes	No

PI 2.2.2		**There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.**
	Justification	As noted previuosly, the ocean quahog fishery has developed a harvesting gear that selects only marketable sizes of the target species, and minimizes the bycatch of all non-target species. There are no unwanted catches of main secondary species, and there is minimal catch of minor secondary species. There are regular annual review bycatch and discards in all fisheries managed by the NMFS (NMFS 2013, SBRM 2016). As referenced in SIa, National Standard (9) Guidelines require that proposed conservation and management measures prioritize minimization of bycatch to the extent practicable (based on net benefit). However, these is no formal biennial review *that directly evaluates the practicality of alternative measures* to minimize UoA-related mortality of unwanted catch. Therefore, the ocean quahog fishery meets the requirements of the SG 60 and80, but not the 100 levels for SIe.
References		Chute. T. 2013. Summary of surfclam and ocean quahog observer bycatch data. NMFS, NEFSC, unpublished data provided by Dan Hennan. Various stock status reports form ASMFC and NMFS/GARFO National Marine Fisheries Service. 2013. U.S. National Bycatch Report First Edition Update 1 [L. R. Benaka, C. Rilling, E. E. Seney, and H. Winarsoo, Editors]. U.S. Dep. Commer., 57 p. Online edition: http://www.st.nmfs.noaa.gov/observer-home/first-edition-update-1
OVERALL PERFORMANCE INDICATOR SCORE:		**90**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 2.2.3 – Secondary species information: Ocean quahog fishery

PI 2.2.3		Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species.		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impacts on main secondary species			
	Guidepost	Qualitative information is **adequate to estimate** the impact of the UoA on the main secondary species with respect to status. OR **If RBF is used to score PI 2.2.1 for the UoA:** Qualitative information is adequate to estimate productivity and susceptibility attributes for main secondary species.	Some quantitative information is available and **adequate to assess** the impact of the UoA on main secondary species with respect to status. OR **If RBF is used to score PI 2.2.1 for the UoA:** Some quantitative information is adequate to assess productivity and susceptibility attributes for main secondary species.	Quantitative information is available and **adequate to assess with a high degree of certainty** the impact of the UoA on main secondary species with respect to status.
	Met?	Yes	Yes	No
	Justification	There are no main secondary species in the ocean quahog fishery catch based on the data available. The database used to assess catch characteristics and discarding is the NMFS Observer Program database, which includes data from trips that had trained observers onboard to document discards. The quantitative data used in this analysis was provided by Toni Chute of the NMFS NEFSC for the surfclam and ocean quahog, hydraulic clam dredge fisheries. Unfortunately, there are only a limited number of observations, 30 trips in the ocean quahog fishery. The observations are about one decade old, however the gear has not changed in the last decade, and the fishery being prosecuted in essentially the same manner and over the same general range (with focal areas differing by year) for the last several decades, so the data are believed to be generally representative of the current fishery. This was verified qualitatively at the onsite meeting with NMFS NEFSC and MAFMC staff. Based on this, it can be said that quantitative and qualitative information is adequate to assess the impact of the UoA on main secondary species, though not with a high degree of certainty. The available information indicates that it is unlikely that further information is likely to indicate outcomes impacts with serious or irreversible harm to non-target species. However, there does remain the need for more recent data on non-target catch in theses fisheries in order to a) assure proper classification of main and minor species for scoring, b) have the ability to determine outcome impacts to main and minor species, if any, and c) detect how these may be changing through time based on either the behavior of the fishery or trophic/ecosystem shifts. (FCRV2.0 SA3.6.3) Therefore, the team decided to score this SI at the SG80 level, because the existing quantitative information assessed shows a clean fishery, without known or suspected outcome issues. The team simultaneously feels that further information is needed for accurate classification of main and minor species, and to address issues a)-c) above, which are scored as part of the partial strategy in SI c.		
	Information adequacy for assessment of impacts on minor secondary species			

PI 2.2.3		**Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species.**		
b	**Guidepost**			Some quantitative information is adequate to estimate the impact of the UoA on minor secondary species with respect to status.
	Met?			No
	Justification	There are minor secondary species in the ocean quahog fishery catch based on the data available, however, for the reasons stated in SIa this data is not considered adequate to designate with certainty main/minor species, nor estimate impacts. Therefore, the ocean quahog fishery does not currently meet the SG100 requirements.		
c	Information adequacy for management strategy			
	Guidepost	Information is adequate to support **measures** to manage **main** secondary species.	Information is adequate to support a **partial strategy** to manage **main** secondary species.	Information is adequate to support a **strategy** to manage **all** secondary species, and **evaluate** with a **high degree of certainty** whether the strategy is **achieving its objective**.
	Met?	Yes	No	No
	Justification	The dated observer information and other scientific surveys using the hydraulic clam dredge are adequate to support measures as necessary to manage the target species. However, updated observer data is necessary in order for information to be considered adequate to support a partial strategy capable of a) assuring proper classification of main and minor species for scoring, b) detecting outcome impacts to main and minor species, if any, and c) detecting changes through time based on either the behavior of the fishery or trophic/ecosystem shifts (FCR SA 3.6.4). Therefore, the ocean quahog fishery meets the requirements of SG 60, but not the SG 80 level. The client has reported that more intensive observer coverage was initiated in these fisheries starting in 2016. It is expected that this information will provide adequate information to inform the partial strategy. However, as these data were not available at the time of scoring, records from the new observer coverage will be examined at the next first annual surveillance.		
References		Chute. T. 2013. Summary of surfclam and ocean quahog observer bycatch data. NMFS, NEFSC, unpublished data provided by Dan Hennan. Various stock status reports form ASMFC and NMFS/GARFO National Marine Fisheries Service. 2013. U.S. National Bycatch Report First Edition Update 1 [L. R. Benaka, C. Rilling, E. E. Seney, and H. Winarsoo, Editors]. U.S. Dep. Commer., 57 p. Online edition: http://www.st.nmfs.noaa.gov/observer-home/first-edition-update-1		
OVERALL PERFORMANCE INDICATOR SCORE:				**70**
CONDITION NUMBER (if relevant):				**2b**

ETP, Habitat, and Ecosystem: Surfclam and Ocean Quahog

Evaluation Table for PI 2.3.1 – ETP species outcome: surfclam and ocean quahog fisheries

PI 2.3.1		The UoA meets national and international requirements for the protection of ETP species The UoA does not hinder recovery of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	Effects of the UoA on population/stock within national or international limits, where applicable			
	Guidepost	Where national and/or international requirements set limits for ETP species, the effects of the UoA on the population/stock are known and **likely** to be within these limits.	Where national and/or international requirements set limits for ETP species, the **combined effects of the MSC UoAs** on the population/stock are known and **highly likely** to be within these limits.	Where national and/or international requirements set limits for ETP species, there is a **high degree of certainty** that the **combined effects of the MSC UoAs** are within these limits.
	Met?	Not Relevant	Not Relevant	Not Relevant
	Justification	There are no quantitative limits applied to the UoA via national or international requirements. There are no ESA-listed species affected by the fishery, and the MMPA does not apply quantitative limits to this fishery: Potential Biological Removal (PBR) Level is defined by the MMPA 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 level 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 really designed as a metric to be used when comparing all estimated annual, anthropogenic mortalities, so as to decide if a marine mammal stock should be considered a strategic stock. A strategic stock is defined by the MMPA *"as a marine mammal stock-- for which the level of direct human-caused mortality exceeds the potential biological removal level; which, based on the best available scientific information, is declining and is likely to be listed as a threatened species under the ESA within the foreseeable future; or which is listed as a threatened or endangered species under the ESA, or is designated as depleted under the MMPA."* So, while there is considerable analysis that goes into estimating PBR, in fact it is not a limit as compared to fishery based limits (target and threshold). The MSC has clarified in the interpretations log that *"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 (as per PBRs), the main element to address is whether the requirements themselves are being met. For example, if a Potential Biological Removal (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)" (*http://msc-info.accreditation-services.com/questions/etp-limits-and-use-of-potential-biological-removal/). Both because no bycatch species in the surf clam and quahog fisheries have been assigned PBRs as strategic stocks, and because the interpretations of the MSC indicate that in this case PBRs would not be defined as clear "national or international limits", and because there are no quantitative limits (http://msc-info.accreditation-services.com/questions/etp-and-limits/), SIa for 2.3.1 is not scored.		
	Direct effects			

PI 2.3.1		The UoA meets national and international requirements for the protection of ETP species The UoA does not hinder recovery of ETP species		
b	Guidepost	Known direct effects of the UoA are likely to not **hinder recovery** of ETP species.	Known direct effects of the UoA are **highly likely** to not **hinder recovery** of ETP species.	There is a high degree of confidence that there are no significant detrimental direct effects of the UoA on ETP species.
	Met?	Yes	Yes	Yes
	Justification	Direct effects have been considered, and the hydraulic dredge is not known to impact marine mammals, turtles, seabirds, or other protected species. The surfclam and ocean quahog fisheries are required to comply with all federal regulations regarding ETP species, which are explicitly designed to ensure fisheries do not hinder recovery of protected species. These fisheries in the Mid-Atlantic are classified as Category III fisheries, meaning there is no known injury or mortality to marine mammals. 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: I. frequent incidental mortality or serious injury of marine mammals; II. occasional incidental mortality or serious injury of marine mammals; and III. remote likelihood of/no known incidental mortality or serious injury of marine mammals. There are also regular scientic surveys of the surf clam and ocean quahog resource that use chartered commercial vessels equipped with hydraulic dredges, and they would also report any gear interactions with ETP species, and this has never occurred. The fishery does not interact with seabird because the gear is deployed the dredge is not capable of capturing them, and there is no discarding of catch.There have been no known interactions between other ETP species such as turtles and hydraulic clam dredges, as evidence by observer data. Therefore, the surfclam and ocean quahog fisheries meet the requirements of the SG 60, 80 and 100 levels for SIb.		
c	Indirect effects			
	Guidepost		Indirect effects have been considered and are thought to be **highly likely** to not 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?		Yes	No
	Justification	Indirect effects on ETP species may include destruction of habitat for ETP species, reductions in prey available for ETP species, and/or increases in predators on ETP species. Indirect effects in the form of seabed disturbance by the dredge and the ecosystem impact of the disturbance have been considered, and based on inference of existing information the hydraulic dredge is not known to indirectly impact marine mammals, turtles, seabirds, or other protected species. Simarly the principal known predators feeding on surfclams and ocean quahogs, do not include ETP species (NOAA, 2012). (Effects of the fishery on habitat and ecosystem more generally are further evaluated in PI 2.41 and 2.5.1, respectively.) The fishery has no known interaction with ETP species, and correspondenly there are also no known indirect impacts. However, as far as the assessment team is aware indirect effects have not been studied directly. Therefore, the surfclam and ocean quahog fisheries meet the requirements of the SG 80, but not the SG100 levels for SIc because indirect effects are not known with a *high degree of certainty*.		
References		NMFS, List of Fisheries NOAA, 2012, Ecosytem Status Report for the Northeas Shelf Large Marine Ecosystem Available at http://www.nefsc.noaa.gov/publications/crd/crd1207/crd1207.pdf.		
OVERALL PERFORMANCE INDICATOR SCORE:				**90**

PI 2.3.1	The UoA meets national and international requirements for the protection of ETP species The UoA does not hinder recovery of ETP species
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.3.2 – ETP species management strategy: surfclam and ocean quahog fisheries

PI 2.3.2		The UoA has in place precautionary management strategies designed to: • **meet national and international requirements;** • **ensure the UoA does not hinder recovery of ETP species.** **Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species.**		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place (national and international requirements)			
	Guidepost	There are **measures** in place that minimise the UoA-related 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 UoA'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 UoA'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?	Yes	Yes	Yes
	Justification	The surfclam and ocean quahog are required to comply with all federal regulations regarding ETP species, thus they are at least highly likely to be operating within the requirements of national legislation. These fisheries in the Mid-Atlantic are classified as Category III fisheries, meaning there is no known injury or mortality to marine mammals. 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: I. frequent incidental mortality or serious injury of marine mammals; II. occasional incidental mortality or serious injury of marine mammals; and III. remote likelihood of/no known incidental mortality or serious injury of marine mammals. Direct and indirect effects have been considered, and the hydraulic dredge is not known to impact marine mammals, turtles, seabirds, or other protected species. Turtles, which have been taken in trawl fishing gear and sea scallop dredges, have not been reportedly taken in clam dredges (MAFMC-NMFS. 2012). 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, gear modifications, fishery closures) and limits are put in place to ensure requirements for protection and rebuilding are met. This meets the MSC definition of 'comprehensive strategy' in that it links monitoring, analysis, and management measures and responses. Therefore, the surfclam and ocean quahog fisheries meet the requirements of the SG 60, 80 and 100 levels for SIa.		
b	Management strategy in place (alternative)			
	Guidepost	There are **measures** in place that are expected to ensure the UoA does not hinder the recovery of ETP species.	There is a **strategy** in place that is expected to ensure the UoA does not hinder the recovery of ETP species.	There is a **comprehensive strategy** in place for managing ETP species, to ensure the UoA does not hinder the recovery of ETP species
	Met?	Not relevant	Not relevant	Not relevant

PI 2.3.2		**The UoA has in place precautionary management strategies designed to:** • **meet national and international requirements;** • **ensure the UoA does not hinder recovery of ETP species.** **Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species.**		
	Justification	Scoring issue need not be scored if <u>there are</u> requirements for protection or rebuilding provided through national ETP legislation or international agreements (FCRV2.0 SA3.11.2).		
c	Management strategy evaluation			
	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 measures/strategy will work, based on **information** directly about the fishery and/or the species involved.	The strategy/comprehensive 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?	Yes	Yes	Yes
	Justification	As there are no reported ETP interactions in the surfclam and ocean quahog hydraulic dredge fisheries, the overall NMFS strategy for addressing ETP interactions in fisheries in general is clearly working to minimize the mortality of ETP species. In the surfclam and ocean quahog fisheries, the measures are likely working, there is objective basis for confidence that they are working, and overall there is a quantitative analysis that supports this conclusion. Therefore, the surfclam and ocean quahog fisheries meet the requirements of the SG 60, 80 and 100 levels for SIc.		
d	Management strategy implementation			
	Guidepost		There is some **evidence** that the measures/strategy is being implemented successfully.	There is **clear evidence** that the strategy/comprehensive strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a) or (b).
	Met?		Yes	Yes
	Justification	As there are no reported ETP interactions in the surfclam and ocean quahog hydraulic dredge fisheries. The evidence that supports this is the combination of a lack of observed fishery interactions with ETP species in the limited at sea observer coverage, the scientific surveys for the resouce, in logbook reports, and finally in stranding observations. The overall NMFS strategy for addressing ETP interactions in fisheries in general is clearly working to minimize the mortality of ETP species. In the surfclam and ocean quahog fisheries, there is clear evidence that the measures/strategy has been successfully implemented, and is achieving its objective. Therefore, the surfclam and ocean quahog fisheries meet the requirements of the SG 80 and 100 levels for SId.		
e	Review of alternative measures to minimize mortality of ETP species			
	Guidepost	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related

PI 2.3.2		**The UoA has in place precautionary management strategies designed to:** • **meet national and international requirements;** • **ensure the UoA does not hinder recovery of ETP species.** **Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species.**		
		related mortality of ETP species.	mortality of ETP species and they are implemented as appropriate.	mortality ETP species, and they are implemented, as appropriate.
	Met?	Yes	Yes	Yes
	Justification	The U.S. Office of Protected Resources List of Fisheries (LOF) is reviewed annually and considers the classification of 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. Therefore, the surfclam and ocean quahog fisheries meet the requirements of the SG 60, 80 and 100 levels for SIc.		
References		NMFS List of Fisheries. Available at https://federalregister.gov/a/2016-08114		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.3.3 – ETP species information: surfclam and ocean quahog fisheries

<table>
<tr><td colspan="2">PI 2.3.3</td><td colspan="3">Relevant information is collected to support the management of UoA 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.</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="4">a</td><td colspan="4">Information adequacy for assessment of impacts</td></tr>
<tr><td>Guidepost</td><td>Qualitative information is adequate to estimate the UoA related mortality on ETP species.

OR

If RBF is used to score PI 2.3.1 for the UoA:

Qualitative information is adequate to estimate productivity and susceptibility attributes for ETP species.</td><td>Some quantitative information is adequate to assess the UoA related mortality and impact and to determine whether the UoA may be a threat to protection and recovery of the ETP species.

OR

If RBF is used to score PI 2.3.1 for the UoA:
Some quantitative information is adequate to assess productivity and susceptibility attributes for ETP species.</td><td>Quantitative information is available to assess with a high degree of certainty the magnitude of UoA-related impacts, mortalities and injuries and the consequences for the status of ETP species.</td></tr>
<tr><td>Met?</td><td>Yes</td><td>Yes</td><td>No</td></tr>
<tr><td>Justification</td><td colspan="3">Information is sufficient to qualitatively estimate the fishery related mortality of ETP species, and this is adequate to broadly understand the impact of the fishery on ETP species and support management measures to manage any impacts to ETP species that might occur. While there is no data from these specific fisheries available in order to allow fishery related mortality and the impact of fishing to be quantitatively estimated (required for SG80), direct and indirect effects have been considered, and the hydraulic dredge is not known to impact marine mammals, turtles, seabirds, or other protected species. Turtles, which have been taken in trawl fishing gear and sea scallop dredges, have not been reportedly taken in clam dredges (MAFMC-NMFS. 2012). Given the above reported lack of interactions between these fisheries and ETP species, information may be sufficient to meet the SG80 requirements, but it would be better if direct evidence could be produced in order to support this assumption. Conditions on PIs 2.1.3 and 2.2.3 in the surfclam fishery and PIs 2.1.3 and 2.2.3 in the ocean quahog fishery suggest the collection and analysis of observer data in the surfclam and ocean quahog fisheries. These data will provide additional evidence to support the SG 80 level scoring and possibly support the rescoring to the SG 100 level.

Therefore, the surfclam and ocean quahog fisheries meet the requirements of the SG 60, and 80 levels for SIa, but not the SG 100 level at this time.</td></tr>
<tr><td rowspan="2">b</td><td colspan="4">Information adequacy for management strategy</td></tr>
<tr><td>Guidepost</td><td>Information is adequate to support measures to manage the impacts on ETP species.</td><td>Information is adequate to measure trends and support a strategy to manage impacts on ETP species.</td><td>Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree</td></tr>
</table>

PI 2.3.3		**Relevant information is collected to support the management of UoA 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.**		
				of certainty whether a strategy is achieving its objectives.
	Met?	Yes	Yes	No
	Justification	Concerning measuring trends and supporting a strategy for ETP impacts management, 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. Given that these fisheries do not appear to interact with ETP species, this overarching work of the OPR should be sufficient to be considered able to support a strategy to manage the impacts of these fisheries on ETP species. Therefore, the surfclam and ocean quahog fisheries meet the requirements of the SG 60, and 80 levels for SIb, but not the SG 100 level. However conditions on PIs 2.1.3 and 2.2.3 in the surfclam fishery and PIs 2.1.3 and 2.2.3 in the ocean quahog fishery suggest the collection and analysis of observer data in the surfclam and ocean quahog fisheries. These data will provide additional evidence to support the rescoring to the SG 100 level.		
References		NMFS List of Fisheries. Available at https://federalregister.gov/a/2016-08114		
OVERALL PERFORMANCE INDICATOR SCORE:				**80**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.4.1 – Habitats outcome: surfclam and ocean quahog fisheries

PI 2.4.1		The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area(s) covered by the governance body(s) responsible for fisheries management.		
Scoring Issue		SG 60	SG 80	SG 100
a	Commonly encountered habitat status			
	Guidepost	The UoA is **unlikely** to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	The UoA is **highly unlikely** to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	There is **evidence** that the UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.
	Met?	Yes	Yes	No
	Justification	The surfclam and ocean quahog fisheries appear at least highly unlikely (no more than 30% probability) to reduce habitat structure and function to a point where there would be serious or irreversible harm, defined in the MSC requirements as "*gross change in habitat types or abundances and disruption of the function of the habitats…* [or] *changes that are expected to take much longer to recover than the dynamics in un-fished situations would imply…*" In order to achieve a SG 80 score, this probability can be no more than 30%. The areas where Atlantic surfclams and ocean quahogs are harvested consist mostly of sandy substrates with no vegetation or benthic structures (Wallace and Hoff 2005). At the depths where surfclams are fished, the seabed sediments are disturbed and re-suspended by storms and by strong bottom currents in some locations. Ocean quahog habitat consists mostly of finer sand and silt/clay substrates which are deeper than the surfclam habitat and less affected by natural physical disturbances. Neither species is found in commercial quantities in gravel or mud habitats or in waters deeper than 250 feet. Surfclam and ocean quahog habitats are considered to be 'high energy' environments in which the recovery times after a dredge passes is relatively short (Wallace and Hoff 2005, MAFMC 2011). Tracks left by mobile gear can endure for 16 hours in hard sand sediments and up to 5 hours in soft sediments (MAFMC 2003), but hydraulic clam dredge tracks probably last longer due to thier deeper depth. That said, it is the small footprint of this fishery that limits its negative impacts on habitat. Surfclams are harvested primarily in shallower waters on the continental shelf off New Jersey and the Delmarva peninsula, southern New England and Georges Bank, while ocean quahogs are harvested further offshore in deeper waters. Areas with higher densities of clams are more likely to be dredged intensively, leading to a higher percentage of the bottom being affected (MAFMC 2003). A high proportion of the area where surfclams are found off of New Jersey is affected by dredging due to the small spatial scale and homogenous bottom. Additionally, surfclams grow more rapidly than ocean quahogs so the areas where they are found are dredged every few years. Areas where ocean quahogs are found are left undredged for many years, and these areas are more likely to be dredged as discrete patches, surrounded by undisturbed areas. A 2001 workshop on the potential habitat impacts of fishing gears used in the Northeast region concluded that there are potentially large, localized impacts of hydraulic clam dredges on the biological and physical structure of sandy benthic habitats (Northeast EFH Committee 2002, MAFMC 2003). As a result, the Mid-Atlantic Fishery Management Council concluded in Amendment 13 that there may be some adverse effects of clam dredging on Essential Fish Habitat (EFH); the effects, however, are of short duration and minimal because the fishery occurs in primarily high energy sand habitats and in a relatively small area when compared to the areas impacted by scallop dredges or bottom trawls and when		

PI 2.4.1		The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area(s) covered by the governance body(s) responsible for fisheries management.
		compared to the overall high energy sand area on the continental shelf. The workshop panel further concluded that biological communities would recover within months to years, depending on the affected species, and physical structure within days in high energy environments to months in low energy environments. This type of impact does not meet the test of "serious or irreversible harm" as defined by MSC. Most of the 40,000 square nautical miles of continental shelf between the Virginia/North Carolina border and Nantucket Island (69° W longitude) is characterized by sandy bottom. In 2000 the spatial area impacted by the hydraulic clam dredge in federal waters was about 110 square nautical miles. In the state waters of New Jersey, New York, and Massachusetts the spatial area impacted by the hydraulic clam dredge was about 15 square nautical miles. The fishery therefore likely operates in a very small proportion of the total area of this habitat type (NEFSC 2002). More recently, the NEFMC, as part of the recent NEFMC development of the Omnibus Essential Fish Habitat Amendment 2, seabed vulnerability to fishing gear impacts was evaluated using the Swept Area Seabed Impact (SASI) approach (NEFMC, 2016). SASI was developed by the Council's Habitat Plan Development Team to assist them in evaluating adverse effects across FMPs, developing measures to minimize those effects, and analyzing the impacts of those measures. The approach was approved by the SSC, as well as by a peer-review panel convened specifically to assess the validity of using the SASI approach for development and analysis of management measures. It was applied to all fishing gears used within the northeast region including hydraulic clam dredges. The SASI approach consists of a vulnerability assessment and a spatial model. The vulnerability assessment reviewed the habitat impacts literature relevant to Northeast U.S. fishing gears and seabed types, and created a framework for organizing and generating susceptibility and recovery values for seabed features based on a scale of relative differences for use in the SASI model. The hydraulic dredge vulnerability assessment (and model) indicated that recovery times in low energy habitats (open bars) are a key driver of the vulnerability results. The results are summarized in Figure 4 (taken from Grabowski et al. 2014), in the background section of this report, and shows the differences in the scale of the various results on the vertical axis, which translates to the magnitude of the vulnerability scores across the gear types (high for hydraulic dredges, low for the fixed gears, moderate for otter trawls and scallop dredges). So, the conclusion from this analysis is that the impact per km^2 swept area of the hydraulic dredge is substantially greater than otter trawls and most other gear types. However, because the fishery therefore likely operates in a very small proportion of the total area of this habitat type, the overall impact is small. This is quantitatively demonstrated in Figure 31 in the background section of this report, and the table below the figure, of the estimated realized adverse effects from the SASI model by gear type and calendar year. Note that from the plot the annual adverse impacts of the hydraulic clam dredge are imperceptible relative to otter trawls and scallop dredges, and from the table below the plot, it is evident that in 2009 the most recent data available, the annual adverse impact of hydraulic clam dredges is about 2% of otter trawls, and 8% of scallop dredges. In summary, while the impacts of the hydraulic calm dredge are substantial, due to the relatively small area swept or fished annually, the overall adverse impacts of the hydraulic clam dredge are relatively small. Therefore, based on the above evidence, the assessment team concludes that the surfclam and ocean quahog fisheries meet the requirements of the SG 60, and 80 levels for SIa, but not the SG 100 level because there is limited direct evidence to support the argument that the UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm at this time.
	VME habitat status	

PI 2.4.1		**The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area(s) covered by the governance body(s) responsible for fisheries management.**		
b	**Guidepost**	The UoA is **unlikely** to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	The UoA is **highly unlikely** to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	There is **evidence** that the UoA is highly unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.
	Met?	Yes	Yes	Yes
	Justification	There are no VMEs within the areas fished by the hydraulic dredges used in the surfclam and ocean quahog fisheries (see Vulnerable Marine Ecosystems (VME) in the Surfclam and Ocean Quahog Fishery). The depth operating range of the surfclam and ocean quahog fisheries is less than 60 m, with the restriction based on hose length and operating pump pressures. The deep water coral protection zone starts at the 450 m depth contour in the New England and mid-Atlantic region. The canyons also identified as VMEs (see Vulnerable Marine Ecosystems (VME) in the Surfclam and Ocean Quahog Fishery) are also at depths beyond the range of the fishery. The footprint of the fishery is well documented and the clearly these fisheries do not impact protected VME habitats or other closed areas on the U.S. continental shelf. Therefore, the surfclam and ocean quahog fisheries meet the requirements of the SG 60, 80 and 100 levels for SIb.		
c	**Minor habitat status**			
	Guidepost			There is **evidence** that the UoA is highly unlikely to reduce structure and function of the minor habitats to a point where there would be serious or irreversible harm.
	Met?			Yes
	Justification	Minor habitat are defined as all other habitats, as compared to vulnerable marine ecosystems or potential vulnerable marine ecosystems, and commonly encountered habitats. As previously for SIa in this PI, the hydraulic clam dredge is highly unlikely to reduce structure and function of both minor habitats and the commonly encountered habitats to a point where there would be serious or irreversible harm, primarily due to the small foot print of the fishery. Therefore, the fishery meets the requirements of the SG 100 level for SIc.		
References		NEFMC 2016. Omnibus EFH Amendment 2		
OVERALL PERFORMANCE INDICATOR SCORE:				**95**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.4.2 – Habitats management strategy: surfclam and ocean quahog fisheries

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats.		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	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 all MSC UoAs/non-MSC fisheries on habitats.
	Met?	Yes	Yes	Yes
	Justification	The overall NMFS strategy to protect essential fish habitat has been encompassed in the Omnibus EFH amendment developed by the NEFMC and applied to all managed fisheries in the region. This amendment was initially enacted in 1998, and was designed to establish and protect EFH for 18 different managed species. More recently, the NEFMC submitted an updated version of the Omnibus Essential Fish Habitat Amendment 2, and it included an assessment of seabed vulnerability to fishing gear impacts using the Swept Area Seabed Impact (SASI) approach (NEFMC, 2016). SASI was developed by the Council's Habitat Plan Development Team to assist them in evaluating adverse effects across FMPs, developing measures to minimize those effects, and analyzing the impacts of those measures. Additionally, the Individual Transferable Quota (ITQ) system implemented in 1990 in the surfclam and ocean quahog fishery lead to a shift in gear usage towards stern rig dredges reducing fishing effort and bottom time. There are some areas where fishing is prohibited due to contamination or deep-sea coral issues, there does not appear to be a specific management strategy designed to mitigate the impact of the surfclam or ocean quahog fishery on habitats (e.g. no "footprint" restrictions). However, the basic functioning of the gear, the habitat type affected, and patchy distribution of target species when taken together as an understanding of measures considered likely to work to ensure the habitat outcome PI meets the SG80 score. Further, in the new Omnibus EFH amendment 2 there is a strategy in place for managing the impact of all MSC UoAs/non-MSC fisheries on habitats, thus meeting the requirements for the SG100. Therefore, the fishery meets the SG 60, 80 and 100 levels for SIa.		
b	Management strategy evaluation			
	Guidepost	The measures are **considered likely** to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/habitats).	There is some **objective basis for confidence** that the measures/partial strategy will work, based on **information directly about the UoA and/or habitats** involved.	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on **information directly about the UoA and/or habitats** involved.
	Met?	Yes	Yes	No
	Justification	The evidence that there is an overall strategy that is in place is designed to ensure that the UoA does not pose a risk of seriuos or irreversible harm to habitats includes the recent completion of the Omnibus Essential Fish Habitat Amendment 2 that addresses all fisheries in the region, evaluates thier habitat impact, and proposes measures to limit risk to essential fish habitat where required.		

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats.		
		In addition, after the introduction of the ITQ program in 1990, 60 side rig vessels, pulling 80 dredges were removed from the fishery (MAFMC 2003). The overall number of vessels has also decreased in the fishery. For surfclams, they decreased from 128 vessels in 1990 to 35 in 2001, and for ocean quahog, there were 56 vessels in 1990 and 30 in 2001. Only 4 side rig vessels remain, pulling 5 dredges. Most of the vessels today also use sorting machines that collect broken clams, which are no longer discarded. NMFS and the management councils have used a variety of strategies to lessen the impact of the surfclam and ocean quahog fisheries on the habitat including protecting VMEs with closed areas, and requiring fishing vessels to use VMS. Additionally, The fact that the fishery returns to the same areas to harvest the clams after allowing them to lie fallow, demonstrates that the habitat recovers sufficiently to support the return of the key indicator species (surfclam and ocean quahog). There is therefore some objective basis for confidence that the measures/partial strategy are working, based on information directly about the UoA and/or habitats involved. Therefore, the fishery meets the requirements of the SG60 and 80 levels, but not the SG 100 level, and there has not been specific testing that provides high confidence that the strategy is working.		
c	Management strategy implementation			
	Guidepost		There is **some quantitative evidence** that the measures/partial strategy is being implemented successfully.	There is **clear quantitative evidence** that the partial strategy/strategy is being implemented successfully and is achieving its objective, as outlined in scoring issue (a).
	Met?		Yes	No
	Justification	SIc requires that there be some quantitative evidence that the measures/partial strategy is being implemented successfully. This evidence includes that VMS data that tracks fishing vessels to ensure that they are not fishing in closed or protected habitat areas, in addition to the qualitative evidence that the vessels are able to return to the same areas to harvest after the clams have resettled and grown in the area. This provides both quantitative and qualitative evidence that the measures/partial strategy is being implemented successfully. Therefore the fishery meets the SG80 level, but does not meet the requirements of the SG100 level, as there is not clear quantitative evidence that that the partial strategy/strategy is being implemented successfully and is achieving its objective.		
d	**Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' measures to protect VMEs**			
	Guidepost	There is **qualitative evidence** that the UoA complies with its management requirements to protect VMEs.	There is **some quantitative evidence** that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.	There is **clear quantitative evidence** that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.
	Met?	Yes	Yes	Yes

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats.
	Justification	There are protections afforded to the VME's (identified in the background section on Habitat Impacts) via amendments to other fishery federal FMPs (MSB and Tilefish) that prohibit use of bottom trawling gear in the designated deep coral (MSB FMP Amendment 9) and the four canyons with HACP designations for Tilefish (FMP Amendment 1). The protections apply to all relevant MSC and non-MSC UoAs because they apply to all federally managed fisheries (and therefore all UoAs in the "managed area"). The VMEs identified in the management area all lay beyond the footprint of the fishery, as the fishery gear is unable to operate at the depths at which the VMEs are found (see Vulnerable Marine Ecosystems (VME) in the Surfclam and Ocean Quahog Fishery for more detail). This documented depth range, the VMS system that records where fishing effort occurs in the UoA, and enforcement records demonstrating monitoring of VMS tracks, are together considered to provide clear quantitative evidence of the effective implementation of management requirements and protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant. SG100 is met.
References		NEFMC 2016. Omnibus EFH Amendment 2
OVERALL PERFORMANCE INDICATOR SCORE:		**90**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 2.4.3 – Habitats information: surfclam and ocean quahog fisheries

PI 2.4.3		Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat.		
Scoring Issue		SG 60	SG 80	SG 100
a	Information quality			
	Guidepost	The types and distribution of the main habitats are **broadly understood**. OR If CSA is used to score PI 2.4.1 for the UoA: Qualitative information is adequate to estimate the types and distribution of the main habitats.	The nature, distribution and **vulnerability** of the main habitats in the UoA area are known at a level of detail relevant to the scale and intensity of the UoA. OR If CSA is used to score PI 2.4.1 for the UoA: Some quantitative information is available and is adequate to estimate the types and distribution of the main habitats.	The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.
	Met?	Yes	Yes	No
	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). Additionally, based on the results of the SASI analysis conducted for Omnibus EFH habitat amendment 2, while the impacts of the hydraulic dredge are substantial, the footprint of the fishery is relatively small, so the overall habitat impacts are small compared to other mobile fishing gears. Thus meeting the SG 80 requirements. Therefore this fishery meets the SG 60 and 80 requirements, but not the SG 100 level, as this scoring guidepost requires that distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats. Essentially, there is not sufficient mapping of the seabed to be able to support the SG100 level.		
b	Information adequacy for assessment of impacts			
	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. OR **If CSA is used to score PI 2.4.1 for the UoA:** Qualitative information is adequate to estimate the consequence and spatial	Information is adequate to allow for identification of the main impacts of the UoA on the main habitats, and there is reliable information on the spatial extent of interaction and on the timing and location of use of the fishing gear. OR **If CSA is used to score PI 2.4.1 for the UoA:** Some quantitative information is available and	The physical impacts of the gear on all habitats have been quantified fully.

PI 2.4.3		Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat.		
		attributes of the main habitats.	is adequate to estimate the consequence and spatial attributes of the main habitats.	
	Met?	Yes	Yes	No
	Justification	The areas where Atlantic surfclams and ocean quahogs are harvested consist mostly of sandy substrates with no vegetation or benthic structures (Wallace and Hoff 2005). At the depths where surfclams are fished, the seabed sediments are disturbed and re-suspended by storms and by strong bottom currents in some locations. Ocean quahog habitat consists mostly of finer sand and silt/clay substrates which are deeper than the surfclam habitat and less affected by natural physical disturbances. Neither species is found in commercial quantities in gravel or mud habitats or in waters deeper than 250 feet. Surfclam and ocean quahog habitats are considered to be 'high energy' environments in which the recovery times after a dredge passes is relatively short (Wallace and Hoff 2005, MAFMC 2011). Tracks left by mobile gear can endure for 16 hours in hard sand sediments and up to 5 hours in soft sediments (MAFMC 2003). As described previously, surfclams are harvested primarily in a small area off of the New Jersey coast, while ocean quahogs are harvested over a larger spatial area, including offshore waters. Areas with higher densities of clams are more likely to be dredged intensively, leading to a lower percentage of the bottom being affected (MAFMC 2003). A high proportion of the area where surfclams are found off of New Jersey is affected by dredging due to the small spatial scale and homogenous bottom. Additionally, surfclams grow more rapidly than ocean quahogs so the areas where they are found are dredged every few years. Areas where ocean quahogs are found are left undredged for many years, and these areas are more likely to be dredged as discrete patches, surrounded by undisturbed areas. Most of the 40,000 square nautical miles of continental shelf between the Virginia/North Carolina border and Nantucket Island (69° W longitude) is characterized by sandy bottom. In 2000 the spatial area impacted by the hydraulic clam dredge in federal waters was about 110 square nautical miles. The fishery therefore likely operates in a very small proportion of the total area of this habitat type (NEFSC 2002). Therefore the information is deemed to be adequate to allow for identification of the main impacts of the UoA on the main habitats, and there is reliable information on the spatial extent of interaction and on the timing and location of use of the fishing gear, thusexceeding the requirements of the SG60 level and meeting the requirements of the SG 80 level. The fishery does not meet the requirements of the SG 100 level, as the physical impacts of the hydraulic dredge gear on all habitats has not been quantified fully.		
c	Monitoring			
	Guidepost		Adequate information continues to be collected to detect any increase in risk to the main habitats.	Changes in habitat distributions over time are measured.
	Met?		Yes	No
	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. However, changes in habitat distributions over time have not been measured, therefore the fishery does not meet the SG 100 level for SIc.		

PI 2.4.3	Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat.	
References	NEFMC. 2016. Omnibus EFH Amendment 2.	
OVERALL PERFORMANCE INDICATOR SCORE:		80
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 2.5.1 – Ecosystem outcome: surfclam and ocean quahog fisheries

PI 2.5.1		The UoA 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	Ecosystem status			
	Guidepost	The UoA 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 UoA 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 UoA 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?	Yes	Yes	No
	Justification	The fishery is at least highly unlikely (less than 30% probability) to disrupt the key elements underlying ecosystem structure and function to a point where there would be serious or irreversible harm (defined by MSC "in relation to the capacity of the ecosystem to deliver ecosystem services"). See background on Ecosystem for complete identification of the key elements of the ecosystem. Neither surfclams nor ocean quahogs are key participants in the transfer of energy through the trophic web as described by the MSC low-trophic-level species requirements. Because of the nature of hydraulic dredging as a towed, bottom fishing activity, the impact of the fishery is focused on the seabed, and there are no known impacts on the pelagic environment. Atlantic surfclams are sedentary suspension feeders using siphons which are extended above the surface of the substrate to pump in water. They feed on phytoplankton. Predators of surfclams include certain species of crabs, sea stars, snails, and other crustaceans, as well as fish predators such cod and haddock. Ocean quahogs are suspension feeders, feeding on phytoplankton, and use siphons which are extended above the surface of the substrate to pump in water. Predators of ocean quahogs include certain species of crabs, sea stars, and other crustaceans, as well as fish species such as sculpins, ocean pout, cod, and haddock. Therefore the fishery meets the requirements of the SG 60 and 80 levels, but not the SG 100 level, as there is not clear evidence that the surfclam and ocean quahog fisheries are highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.		
References		See background section text.		
OVERALL PERFORMANCE INDICATOR SCORE:				**80**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.5.2 – Ecosystem management strategy: surfclam and ocean quahog fisheries

PI 2.5.2		There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function.		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guidepost	There are **measures** in place, if necessary which take into account the **potential impacts** of the fishery on key elements of the ecosystem.	There is a **partial strategy** in place, if necessary, which takes into account **available information and is expected to restrain impacts** of the UoA on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.	There is a **strategy** that consists of a **plan**, in place which contains measures to **address all main impacts of the UoA** on the ecosystem, and at least some of these measures are in place.
	Met?	Yes	Yes	No
	Justification	Because of the nature of the fishery (species prosecuted, gear deployed, areas fished; see above under PI 2.5.1), ecosystem impacts are expected to be negligible. As such, while there is a fishery specific component to the habitat impacts of the fishery in the new Omnibus EFH amendment 2, there is no fishery-specific management strategy pertaining to ecosystem impacts. However, because these fisheries are primarily managed according to a federal FMP in compliance with the MSA, 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. This is considered to be sufficient to justify a SG 80 score on this indicator. It is clear that there is no specific strategy that consists of a plan, in place which contains measures to address all main impacts of the surfclam and ocean quahog fisheries on the ecosystem, and at least some of these measures are in place, so the fishery does not meet the requirements of the SG 100 level.		
b	Management strategy evaluation			
	Guidepost	The **measures** are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ ecosystems).	There is **some objective basis for confidence** that the measures/partial strategy will work, based on some information directly about the UoA and/or the ecosystem involved	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on information directly about the UoA and/or ecosystem involved
	Met?	Yes	Yes	No
	Justification	As noted in SIa for this PI, because of the nature of the fishery (species prosecuted, gear deployed, areas fished; see above under PI 2.5.1), ecosystem impacts are expected to be negligible, and there is some objective basis for confidence that the measures/partial strategy will work, based on information directly about the surfclam and ocean quahog fisheries and/or the ecosystem involved. This is considered to be sufficient to justify a SG 80 score on this indicator, exceeding the requirements of the SG 60 where measures are considered likely to work based on plausible arguments. However the fishery does not meet the requirements of the SG 100 level where testing supports high confidence that the partial strategy/strategy will work.		
c	**Management strategy implementation**			
	Guidepost		There is **some evidence** that the measures/partial	There is clear evidence that the partial strategy/strategy is being implemented

PI 2.5.2		There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function.		
			strategy is being **implemented successfully**.	successfully and is achieving its objective as set out in scoring issue (a).
	Met?		Yes	No
	Justification	Again, as noted previously, because of the nature of the fishery (species prosecuted, gear deployed, areas fished; see above under PI 2.5.1), ecosystem impacts are expected to be negligible, and this is taken as evidence that the measures/partial strategy is being implemented successfully. Therefore the fishery meets the requirements of the SG 80 level, but not the SG 100 level, as there is no clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective as set out in SIa for PI 2.5.2		
References		See background section text.		
OVERALL PERFORMANCE INDICATOR SCORE:				**80**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.5.3 – Ecosystem information: surfclam and ocean quahog fisheries

PI 2.5.3		There is adequate knowledge of the impacts of the UoA on the ecosystem.		
Scoring Issue		SG 60	SG 80	SG 100
a	Information quality			
	Guidepost	Information is adequate to **identify** the key elements of the ecosystem.	Information is adequate to **broadly understand** the key elements of the ecosystem.	
	Met?	Yes	Yes	
	Justification	Benthic invertebrates such as surfclams and ocean quahogs play an important role in energy transfer within marine systems by consuming a broad range of benthic biomass and subsequently becoming important prey items for fish and other upper trophic level animals. Benthic invertebrates such as molluscs and corals filter phytoplankton and suspended detritus from the water column. As such, these animals serve as important conduits to pelagic and benthic habitats. In total, over two thousand species of benthic invertebrates have been identified on the Northeast Continental shelf, although most are relatively rare. Some of the more prominent benthic biomass trends throughout the NES LME include increases in American lobster, sea scallop, and sea star populations, and decreases in ocean quahog and Atlantic surfclam populations in recent years (Ecosystem Assessment Program 2012). Information is available to broadly understand the key elements of the ecosystem (SI (a)) and the main functions of the components in the ecosystem are known (SI (c)). The NEFSC produces an Ecosystem Status report for the Northeast Shelf Large Marine Ecosystem, and this is updated regularly (see http://www.nefsc.noaa.gov/publications/crd/crd1207/crd1207.pdf). This report summarizes the key ecosystem elements, both abiotic and biotic, which are monitored regularly. Therefore the fishery meets the requirements of the SG 60 and 80 levels for SIa.		
b	Investigation of UoA impacts			
	Guidepost	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, but **have not been investigated** in detail.	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, and **some have been investigated in detail**.	Main interactions between the UoA and these ecosystem elements can be inferred from existing information, and **have been investigated in detail**.
	Met?	Yes	Yes	No
	Justification	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, and some have been investigated in detail. As mentioned in previous performance indicators, the fisheries are small and localized, and targeting only two species of many benthic invertebrates serving the same overall functions within the ecosystem. In addition, biomass trends for both species are monitored, and although they are decreasing in some areas, they are increasing in others (e.g George's Bank quahogs), and populations of other species (e.g. scallops) filling a similar ecosystem niche are increasing, and there appears to be no relationship between the declining biomass trends in surfclam and ocean quahog and population trends of dependent predators, which are also monitored closely. However, not all interactions have been investigated in detail. Therefore, a score of SG80 is appropriate.		

PI 2.5.3		There is adequate knowledge of the impacts of the UoA on the ecosystem.		
c	Understanding of component functions			
	Guidepost		The main functions of the components (i.e., P1 target species, primary, secondary and ETP species and Habitats) in the ecosystem are **known**.	The impacts of the UoA on P1 target species, primary, secondary and ETP species and Habitats are identified and the main functions of these components in the ecosystem are **understood**.
	Met?		Yes	No
	Justification	Information is available to broadly understand the key elements of the ecosystem (SI (a)) and the main functions of the components in the ecosystem are known (SI (c)). The NEFSC produces an Ecosystem Status report for the Northeast Shelf Large Marine Ecosystem, and this is updated regularly (see http://www.nefsc.noaa.gov/publications/crd/crd1207/crd1207.pdf). This report summarizes the key ecosystem elements, both abiotic and biotic, which are monitored regularly. Therefore the fishery meets the requirements of the SG 80 level for SIc, but not the SG 100 level, as the impacts of the hydraulic dredge fisheries on P1 target species, primary, secondary and ETP species and habitats are identified but the main functions of these components in the ecosystem are not completely understood.		
d	Information relevance			
	Guidepost		Adequate information is available on the impacts of the UoA on these components to allow some of the main consequences for the ecosystem to be inferred.	Adequate information is available on the impacts of the UoA on the components **and elements** to allow the main consequences for the ecosystem to be inferred.
	Met?		Yes	No
	Justification	Main impacts of the fishery on these key ecosystem elements and some of the consequences for the ecosystem can be inferred from existing information, and some have been investigated in detail. As mentioned in previous performance indicators, the fisheries are small and localized, and targeting only two species of many benthic invertebrates serving the same overall functions within the ecosystem. In addition, biomass trends for both species are monitored, and although they are decreasing in some areas, they are increasing in others (e.g George's Bank quahogs), and populations of other species (e.g. scallops) filling a similar ecosystem niche are increasing, and there appears to be no relationship between the declining biomass trends in surfclam and ocean quahog and population trends of dependent predators, which are also monitored closely. Therefore the fishery meets the requirements of the SG 80 level for SId, but not the SG 100 level, as there is not adequate information available on the impacts of the surfclam and ocean quahog fisheries on the ecosystem components and elements to allow the main consequences for the ecosystem to be inferred.		
e	Monitoring			
	Guidepost		Adequate data continue to be collected to detect any increase in risk level.	Information is adequate to support the development of strategies to manage ecosystem impacts.
	Met?		Yes	Yes

PI 2.5.3		There is adequate knowledge of the impacts of the UoA on the ecosystem.
	Justification	Information is available to broadly understand the key elements of the ecosystem (SI (a)) and the main functions of the components in the ecosystem are known (SI (c)). The NEFSC produces an Ecosystem Status report for the Northeast Shelf Large Marine Ecosystem, and this is updated regularly (see http://www.nefsc.noaa.gov/publications/crd/crd1207/crd1207.pdf). This report summarizes the key ecosystem elements, both abiotic and biotic, which are monitored regularly. Therefore, the fishery meets the requirements of the SG 80 and 100 levels as the information monitoring Information is adequate to detect any increase in risk level and to support the development of strategies to manage ecosystem impacts.
References		See background section text. Ecosystem Status report for the Northeast Shelf Large Marine Ecosystem, and this is updated regularly (see http://www.nefsc.noaa.gov/publications/crd/crd1207/crd1207.pdf).
OVERALL PERFORMANCE INDICATOR SCORE:		**85**
CONDITION NUMBER (if relevant):		

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 sustainability in the UoA(s); 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	Compatibility of laws or standards with effective management			
	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 surfclam and ocean quahog fisheries meet the requirements for SG 100.		
b	Resolution of disputes			
	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 UoA.	The management system incorporates or is 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—		

PI 3.1.1		The management system exists within an appropriate legal and/or customary framework which ensures that it: • **Is capable of delivering sustainability in the UoA(s); 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.**		
		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, including legal challenges to the surfclam and ocean quahog fishery management plan.		
c	Respect for rights			
	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;		

PI 3.1.1		**The management system exists within an appropriate legal and/or customary framework which ensures that it:** • **Is capable of delivering sustainability in the UoA(s); 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) 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 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 surfclam and ocean quahog 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	Roles and responsibilities			
	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 surfclam and ocean quahog are as follows: • National Marine Fisheries Service ("NMFS") (NOAA) – final approving authority for the SCOQ 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 of both clam species, 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 surfclam/quahog fishery through the initiation, development, and 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 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. • Surfclam, Ocean Quahog and Tilefish Committee of the MAFMC – committee comprised of six 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.		

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**		
		The surfclam and ocean quahog fishery meets the requirements for SG 100 for explicitly defined and well understood roles and responsibilities for all areas of action.		
b	Consultation processes			
	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 surfclam and ocean quahog fishery therefore meets the requirements of SG 100.		
c	Participation			
	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 surfclam and ocean quahog fishery meets the requirements of SG 100.		
References		MSFCMA MAFMC Statement of Organization, Practices, and Procedures Revised December 2015		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**

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**
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 fisheries standard, and incorporates the precautionary approach.		
Scoring Issue		SG 60	SG 80	SG 100
a	Objectives			
	Guidepost	Long-term objectives to guide decision-making, consistent with the MSC fisheries standard and the precautionary approach, are **implicit** within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC fisheries standard and the precautionary approach are **explicit** within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC fisheries standard 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 surfclam and ocean quahog 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 3.2.1 Fishery-specific objectives

<table>
<tr><td colspan="2">PI 3.2.1</td><td colspan="3">The fishery-specific management system has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2.</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="4">a</td><td colspan="4">Objectives</td></tr>
<tr><td>Guidepost</td><td>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.</td><td>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.</td><td>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.</td></tr>
<tr><td>Met?</td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td>Justification</td><td colspan="3">Amendment 8 to the Surfclam and Ocean Quahog FMP adopted four objectives to meet this overarching goal (MAFMC 1988) that continue to guide management of the fishery today. They are:
▪ Conserve and rebuild Atlantic surfclam and ocean quahog resources by stabilizing annual harvest rates throughout the management unit in a way that minimizes short term economic dislocations.
▪ Simplify to the maximum extent the regulatory requirement of surfclam and ocean quahog management to minimize the government and private cost of administering and complying with regulatory, reporting, enforcement, and research requirements of surfclam and ocean quahog management.
▪ Provide the opportunity for industry to operate efficiently, consistent with the conservation of surfclam and ocean quahog resources, which will bring harvesting capacity in balance with processing and biological capacity and allow industry participants to achieve economic efficiency including efficient utilization of capital resources by the industry.
▪ Provide a management regime and regulatory framework which is flexible and adaptive to unanticipated short term events or circumstances and consistent with overall plan objectives and long term industry planning and investment needs.
Regular periodic stock assessments provide measurable outcomes for the management of the surfclam and ocean quahog fisheries. The fishery has "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," thereby meeting the requirements for SG 100..</td></tr>
<tr><td colspan="2">References</td><td colspan="3">44th Northeast Regional Stock Assessment Workshop (44th SAW) 2007
MAFMC 1988
Northeast Fisheries Science Center 2013</td></tr>
<tr><td colspan="4">OVERALL PERFORMANCE INDICATOR SCORE:</td><td>100</td></tr>
<tr><td colspan="4">CONDITION NUMBER (if relevant):</td><td></td></tr>
</table>

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 surfclam and ocean quahog 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 adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to **serious and other important issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to **all issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.
	Met?	Y	Y	Y
	Justification	The MAFMC 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. Amendment 17 to the FMP was implemented on June 15, 2016 for the purpose of allowing the incorporation of advancements in the best scientific information as it becomes available. 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		

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.		
		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 surfclam and ocean quahog FMP through Amendment 16, adopted in July 2011. The surfclam and ocean quahog 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 surfclam and ocean quahog 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	The management system or fishery is attempting to comply in a timely fashion with judicial decisions	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial

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.		
		defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	arising from any legal challenges.	decisions arising from legal challenges.
	Met?	NA	Y	Y
	Justification	The management system for surfclams and ocean quahogs has not been subject to continuing court challenges. The ITQ system was challenged when the system was first implemented but the decision favored the fishery management system. 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 surfclam and ocean quahog fishery meets the requirements for SG 100.		
References		MRAG Americas 2014		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

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	Not Scored
	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 surfclam and ocean quahog fisheries, 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; Catch and Effort database to track catch against allocations; Electronic vessel monitoring systems (VMS) on each vessel; And, potential catch seizure and significant fines and loss of fishing privileges for violations of regulations. In a 1990 review of ITQ fisheries, Eugene Buck of the Congressional Research Service wrote that: “Before the ITQ program, enforcement costs in this fishery were exceptionally high because unusually stringent management regulations were in effect -- the Coast Guard closely monitored the number of trips and fishing hours of each individual vessel. Now extensive monitoring is no longer necessary; dockside monitoring alone is considered adequate.” Whereas no existing documents demonstrated the ability of the monitoring, control and surveillance system to enforce relevant management measures, strategies, and/or rules, the assessment team filed a Freedom of Information Act Request (FOIA) with the NMFS Office of Law Enforcement (OLE) seeking records related to enforcement actions in the surfclam/ocean quahog fishery for the years 2010 through 2015. OLE provided documents related to ten incidents, including five inspections in which no violations were found. All of the incidents occurred during the years 2010-2013. No records for 2014 or 2015 were provided. The records provided by OLE via the FOIA request (See Appendix 6) demonstrated that there was a monitoring, control and surveillance system in place during 2010-2013. Incident reports showed that VMS, Coast Guard boardings, and dockside inspections were all utilized to enforce the relevant management measures. The records do not provide any information regarding the monitoring, control and surveillance system in the years 2014-2015. 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 surfclam and ocean quahog fishery meets the requirements for SG 80.		
b	Sanctions			

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with.		
	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 thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and **demonstrably** provide effective deterrence.
	Met?	Y	N	Not Scored
	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. To determine whether sanctions are consistently applied and providing effective deterrence it is critical to understand the level of enforcement relative to the number and types of violations. The information provided to the assessment team thus far, including the records provided by NOAA OLE, does not provide sufficient information to do so. It is not clear based on records provided by NOAA OLE via the FOIA Request (see Appendix 6) whether every dockside inspection is recorded, and whether a lack of records in 2014-2015 mean that there were zero inspections. The assessment team notes that some dockside inspections may be performed by State enforcement authorities, but the assessment team has seen no records from State dockside enforcement relevant to the UoA (Federal) fishery. Similarly, records provided included 4 violations found via VMS monitoring in 2010-2013 and none from 2014-2015. The assessment team has not been provided with information regarding the level of VMS monitoring to understand whether the violations noted in 2010-2013 are likely to encompass all, or nearly, all area violations; or if these violations were found via a low level of VMS surveillance, in which case the records may imply a more systematic issue with area closure violations. Nor does the assessment team have information regarding VMS monitoring levels or records from 2014-2015. Therefore, it can be said that sanctions to deal with noncompliance exist. However, the records provided to the assessment team thus far are not sufficient to verify that sanctions are **consistently applied** and thought to **provide effective deterrence**, which is required for SG 80.		
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.

PI 3.2.3		**Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with.**		
	Met?	Y	Y	Not Scored
	Justification	Anecdotal information indicates that fishers comply with the management system under assessment and provide information of importance to the effective management of the fishery. The surfclam and ocean quahog fishery meets the requirements of SG 80. The lack of clarity in records provided on enforcement actions and penalties in recent years 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 (though this is not explicitly scored due to the score under Sib).		
d	Systematic non-compliance			
	Guidepost		There is no evidence of systematic non-compliance.	
	Met?		Y	
	Justification	On the basis of information available for the assessment, there is no evidence of systematic non-compliance. The surfclam and ocean quahog 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 Appendix 6		
OVERALL PERFORMANCE INDICATOR SCORE:				**75**
CONDITION NUMBER (if relevant):				**3**

Evaluation Table for PI 3.2.4 – Monitoring and management performance evaluation

PI 3.2.4		**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	Evaluation coverage			
	Guidepost	There are mechanisms in place to evaluate **some** parts of the fishery-specific management system.	There are mechanisms in place to evaluate **key** parts of the fishery-specific management system	There are mechanisms in place to evaluate **all** parts of the fishery-specific 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 surfclam/quahog 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 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. ▪ Surfclam and Ocean Quahog Committee of the MAFMC – committee comprised of eight 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. ▪ Surfclam and Ocean Quahog Advisory Panel (AP)– composed of seven 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 surfclam and ocean quahog fisheries meet the requirements for SG 100.		
b	Internal and/or external review			
	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		

PI 3.2.4		**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.**
		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 surfclam and ocean quahog fisheries meet the requirements for SG 80, but does not quite meet the requirements for SG 100 because there is no regular external review.
References		MRAG 2014 Marine Stewardship Council (MSC). 2014. MSC Fisheries Certification –Requirements v2.0. Marine Stewardship Council. London
OVERALL PERFORMANCE INDICATOR SCORE:		**90**
CONDITION NUMBER (if relevant):		

Appendix 1a Conditions

Condition 1a (surfclam)

Performance Indicator	**2.1.3: Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species**
Score	70
Rationale	See Evaluation Table for PI 2.1.3 – Primary species information: Surfclam fishery (SIc)
Condition	By the 3rd surveillance audit, provide evidence that information is adequate to support a **partial strategy** to manage **main** Primary species.
Milestones	Year 1-3: Provide updated information regarding primary species impacts from the reinstated observer program to the assessment team at each of the Year 1-3 annual surveillance audits. By Year 3 it is expected that information will be sufficient to close the condition.
Client action plan	See below.

Consultation on condition	None expected. Information expected to be available via standard agency reporting.

Condition 1b (ocean quahog)

Performance Indicator	**2.1.3: Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species**
Score	70
Rationale	See Evaluation Table for PI 2.1.3 – Primary species information: Ocean quahog fishery (SIc)
Condition	By the 3rd surveillance audit, provide evidence that information is adequate to support a **partial strategy** to manage **main** Primary species.
Milestones	Year 1-3: Provide updated information regarding primary species impacts from the reinstated observer program to the assessment team at each of the Year 1-3 annual surveillance audits. By Year 3 it is expected that information will be sufficient to close the condition.
Client action plan	See below.
Consultation on condition	None expected. Information expected to be available via standard agency reporting.

Condition 2a (surfclam)

Performance Indicator	**2.2.3: Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species.**
Score	70
Rationale	See Evaluation Table for PI 2.2.3 – Secondary species information: Surfclam fishery (SIc)
Condition	By the 3rd surveillance audit, provide evidence that information is adequate to support a **partial strategy** to manage **main** Secondary species.
Milestones	Year 1-3: Provide updated information regarding secondary species impacts from the reinstated observer program to the assessment team at each of the Year 1-3 annual surveillance audits. By Year 3 it is expected that information will be sufficient to close the condition.
Client action plan	See below.
Consultation on condition	None expected. Information expected to be available via standard agency reporting.

Condition 2b (ocean quahog)

Performance Indicator	**2.2.3: Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species.**
Score	70

Rationale	See Evaluation Table for PI 2.2.3 – Secondary species information: Ocean quahog fishery (SIc)
Condition	By the 3rd surveillance audit, provide evidence that information is adequate to support a **partial strategy** to manage **main** Secondary species.
Milestones	Year 1-3: Provide updated information regarding secondary species impacts from the reinstated observer program to the assessment team at each of the Year 1-3 annual surveillance audits. By Year 3 it is expected that information will be sufficient to close the condition.
Client action plan	See below.
Consultation on condition	None expected. Information expected to be available via standard agency reporting.

Condition 3 (both)

Performance Indicator	**3.2.3: Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with.**
Score	75
Rationale	See Evaluation Table for PI 3.2.3 – Compliance and enforcement (SIb)
Condition	By the 1st annual surveillance, provide evidence via fishery-specific enforcement records that sanctions to deal with noncompliance are consistently applied and thought to provide effective deterrence.
Milestones	NA- due to close in Year 1.
Client action plan	See below
Consultation on condition	Agency consultation in progress (See appendix 6). No additional resources expected.

Action Plan for Conditions Reported in Client Draft Report

Section 6.3 ("Summary of Conditions") of the Client Draft Report enumerates the specific conditions included with the proposed certification of the surfclam and ocean quahog fisheries. Those conditions, respectively, pertain to (1) the collection of updated and more extensive observer information to address "the need for more recent data concerning impact on non-target catch"; and (2) collection of data regarding citations and fines/penalties to confirm that the management scheme is being effectively monitored and enforced. The first substantive condition is further divided into four subparts. The action plan for addressing each of these conditions is as follows:

Condition 1a (Surfclam) and 1b (Ocean Quahog):

These conditions are explained in detail under Performance Indicators 2.1.3 (surfclam) and 2.1.3 (ocean quahog) at pages A29-30, and A44-45 of the Client Draft Report. Since the issue addressed and the

language of both of these sections of the draft are identical, this action plan will treat conditions 1a and 1b collectively.

A system and protocol for collection of the data and information that is the subject of conditions 1a and 1b is now in place and is operational. Observers for clam vessels are trained and assigned through the Northeast Fisheries Observer Program (NEFOP), which is a part of the Northeast Fisheries Science Center's Fisheries Sampling Branch. General information about NEFOP, including methodologies and training requirements, is available at www.nefsc.noaa.gov/fsb/.

The Client Draft Report accurately recites that historic data from observer coverage on hydraulic clam dredge vessels has been quite limited. Conditions 1a and 1b now can be addressed going forward, however, because recent changes to NOAA's Standardized Bycatch Reporting Methodology (SBRM) have increased the coverage on clam vessels. Further, as the result of a consent decree following litigation between NOAA and certain private parties, a specific minimum number of observed trips will be required for all fisheries. In the instance of the surfclam/quahog fleet, this will require at least 140 observed trips per year.

As part of the SBRM process, NEFSC creates a set of two annual reports each spring. One report details the bycatch for each fishery during the previous year, while the other explains the observer sea day schedule for the year ahead. Those reports will continue to be available and may be accessed at www.nefsc.noaa.gov/fsb/sbrm/.

There is about a one year lag before the observer data shows up in the bycatch reports. Therefore, the most recent reports will not yet reflect bycatch data from the new coverage on clam vessels, but that information will show up in reports going forward.

As part of our action plan surfclam/quahog industry representatives will monitor these bycatch reports for availability. We believe that, as required by the third surveillance audit, these reports will provide sufficient evidence regarding the entire catch distribution by weight by species for sampled tows to consider "information [that is] adequate to support a partial strategy to manage main Primary species." We therefore believe that this plan of action will satisfy the requirements of conditions 1a and 1b.

Condition 2a (Surfclam) and 2b (Ocean Quahog):

These conditions are explained under Performance Indicators 2.2.3 (surfclam) and 2.2.3 (ocean quahog) in the Client Draft Report. The only difference between conditions 2a and 2b, as compared with conditions 1a and 1b, is that these former conditions pertain to the need for observer information relating to impact on secondary species, as opposed to impact upon primary species addressed in the latter.

Because conditions 2a and 2b relate to the identical issue, we incorporate by reference our action plan for conditions 1a and 1b as the action plan for conditions 2a and 2b as well.

Condition 3:

This condition is explained under Performance Indicator 3.2.3 and requires the production/identification of records that will demonstrate the extent to which there have been enforcement inspections of the surfclam/ocean quahog fishery and the resulting number of industry violations of the surfclam/quahog ITQ management scheme and associated regulations. This condition additionally requires a quantification of penalties that have been issued for such violations, all for the purpose of demonstrating that the applicable management measures are being implemented and enforced.

The assessment team submitted a FOIA request to NOAA/NMFS requesting all documentation that would reflect enforcement actions and citations in the surfclam/quahog fishery, for violations of the management scheme, during the period 2010 through 2015. The agency's response confirmed that from 2010 through 2013 one fine was imposed for a violation, and three written warnings were delivered. Six other inspections occurred where the agents concluded that there was no violation. The agency's response did not indicate that any violations occurred during 2014 and 2015.

Based upon this the assessment team has concluded that "it isn't clear whether there were no violations found in 2014-2015, there was no enforcement activity, or [the agency] just failed to include those records." According to the team the records produced do not afford a "sufficient sense of the level of enforcement coverage via dockside inspections and VMS tracking ...."

The client group will endeavor to collect additional factual information to address the assessment team's concerns by the date of the first annual surveillance. We will first confer with the agency, as it has invited the FOIA requester to do, about the issue of records for 2014-15, including whether the records for that period in fact have been produced. If appropriate, we will follow up with an additional FOIA request fine tuned to elicit the specific information bearing on violations, citations and/or fines during the 2014-15 time period.

In addition, to resolve the assessment team's concerns about dockside inspections and VMS tracking we will gather information from knowledgeable parties, including the inspectors as well as the inspected, and we will submit a detailed report on how the VMS tracking scheme is administered and supervised for compliance. All of these initiatives will be supported with documentation, including affidavits where appropriate, to provide a comfort level on both the level of inspections and the procedures for monitoring compliance with VMS regulations in particular, and with the ITQ program in general.

We will continue to submit information to the assessment team as it is compiled, and will be sure that we have provided all information available by no later than the date of this first surveillance.

Appendix 2 Peer Review Reports

Peer Review 1:

Summary of Peer Reviewer Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes**	**CAB Response**
Justification: Yes – overall, the fishery deserves to pass, as has been indicated. In my opinion, some scores are too high, in particular in P2 (I have provided a detailed commentary in the main body of my review, below), but there is nothing that should prevent the fishery from proceeding to certification – well done to the fishery and the assessment team.		No response (NR). Specific comments regarding Principle 2 scores addressed in relevant fields below.

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe? ***[Reference: FCR 7.11.1 and sub-clauses]***	**Qualified Yes**	**CAB Response**
Justification: My only comment here is with respect to the bycatch data now being collected through the observer programme. It is clearly good that new data are being collected, but in order to '*provide evidence that information is adequate to support a partial strategy*', the data need to be shown to be representative of the fishery in space and time. Essentially, whilst noting that the CAP indicates this should be entirely possible, it is important that the milestones address the sampling strategy, as well as simply the provision of the bycatch data.		The Action Plan from the client explicitly recognizes the information required "regarding the entire catch distribution by weight by species," and based on what is known about the observer program and the associated sampling plan it is expected that by the Year 3 surveillance audit there will be sufficient to meet the condition. Milestones state that observer data and reports will be reviewed on an annual basis, which the assessment team believes will be sufficient to monitor whether the sampling strategy is producing sufficient data to keep the fishery on track to close the conditions.

If included:

Do you think the client action plan is sufficient to close the conditions raised? ***[Reference FCR 7.11.2-7.11.3 and sub-clauses]***	**Yes**	**CAB Response**
Justification: The CAP looks appropriate. It is worth noting that it is encouraging to see the industry's transparent approach to the provision of information – this bodes well for the fishery's future within the MSC system.		Noted. No further response required.

Table 28 For reports using one of the default assessment trees:

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
SURFCLAM					
1.1.1 surf	No	Generally yes, but with a comment	N/A	I don't think the score is wrong, but the assertion in the scoring text that the stock is at near virgin biomass levels feels at odds with the declining biomass over recent times to a level around the target biomass (with a lower confidence interval that extends below the target level), as shown in Figure 11, and with the comment in the introductuon P.29 that: "Trips harvesting surfclams have increased in length as catch rates have declined, as the stock abundance has declined from virgin levels to the biomass at MSY". Also, with the the text on P.35 that says: "There was a doubling of effort in the ten years prior to 2011 while catches remained stable…… LPUE values by region in the few	The surf clam resource on the east coast of the U.S. is well studied and understood. Over time the scientific surveys have improved, and surfclams are now found in habitats not previously well sampled or they were not previously found. The fishery is limited not by quota, but by market demand, and the resource is well above B_{MSY}. Fishermen fish where it makes the most economic sense to fish, relative to costs. This distorts any fishery dependent CPUE. The staff comment that the stock is near virgin biomass levels was based on the 2016 stock assessment, which was underway at the time this report was being written. There are multiple possible explanations for the overall stock being at high levels after catch rates in the fished

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				years leading up to 2011 were at or among the lowest since the ITQ began in 1990 except on GBK….. Increased fishing time as a result of sparser clam beds has led to higher fuel costs. The surfclam fishery has been unable to locate large, dense beds of surfclams to replace those that were a mainstay for the fleet for many years … (e.g., the eastern Nantucket Island beds that were discovered in 2004 are no longer producing high catches)." How are these texts married with the idea that the stock is at a virgin level?	areas had declined. Possible explanations have been added to the Stock Assessment section in the report. In essence, the surfclam resource was intially fished down from the virgin biomass, as it should be, but now due to limited markets, the stock is rebuilding to near virgin levels (considered to be the biomass in 1999). The science is clear on this, it is not an industry based argument. However, while the assessment team has offered plausible explanations for a 'virgin biomass' status, we re-state that the 2016 assessment has not been released. Therefore, though the pers comm information regarding outcomes of the 2016 assessment is included in order to provide the most up-to-date information available on the fishery, the assessment evaluation is focused on the published 2013 stock assessment .

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.1.2 surf	Not scored	Not scored	N/A	Nothing to add	
1.2.1 surf	Geneally, yes	Generally, yes, but with a comment.		The text for SIf states that 50% post-release mortality of surfclams (which I am taking to assume is referring to clams that are in the dredge path but are not retained by the cage/bag) is 'minimal'. I disagree, and suggest that this level could be of concern, for example if mixed beds of legal and sublegal sized surfclams were targeted – that could result in high levels of mortality of unwanted catch. It would be useful to know if any discusson around protecting beds containing significant numbers of sublegal sized animals had been held, or are there already measures in place to protect such beds prior to the animals recruiting to the fishery?	As noted in the report, the surf clam fishery rotates through productive clam beds on a voluntary basis. There are no sublegal sized animals because the minimum size is regularly suspended as provided for in the FMP (see Fisheries Regulations to Meet Objectives). 50% mortality referred to discard mortality based on a 1989 study by Murawski and Serchuk. As there is no discarding in the fishery currently (because there is no sublegal size), this percentage is not relevant. NEFSC has identified an incidental mortality rate of 12% to account for clams (of all sizes) damaged but not retained during fishing. This has been clarified in the background text (See Fishing Practices) and rationales. Dredge design has evolved over the years to match the selectivity of the dredge to

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
					the size preference of the processors. The hydraulic dredge is exceptionally efficient, catching 80-95% of clams of suitable size in their path (Wallace & Hoff 2005, Meyer et al 1981, Thorarinsdottir et al 2010) The background section: Fishing Practices has been updated to more clearly describe gear selectivity and provide additional references. Processors discourage the boats from fishing in areas with large numbers of small clams. Clams tend to experience periodic recruitment events, rather than regular, annual recruitment. For that reason, clams in beds dense enough to provide profitable fishing tend to be of similar size. This is industry based sound management.
1.2.2 surf	Yes	Yes	N/A	Nothing to add.	NR
1.2.3 surf	Yes	No	N/A	A score of 100 is given for SIb, but the	As noted in the report, and in previous

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				rationale supports only a score of 80 as there is no indication that "there is a good understanding of inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty."	responses herein, the science that supports the management of the fishery is comprehensive. The combination of regular scientific survey and complete fishery dependent landings data allows for the development of robust assessment models with few uncertainties. The fishery is ITQ based, and the landed clams are tracked from the boat to processing by the National Shellfish Sanitiation Program. There is no opportunity for unreported landings. The stock assessment reports feature a depth of discussion of uncertainties in data sources and model estimations, sensitivity analyses, and research recommendations (e.g. NEFSC 2013). The rationale has been revised to more clearly demonstrate alignment with the SG100 scoring guidepost, and additional information regarding the treatment of uncertainty in the model has been added to the stock assessment section of the background.

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.2.4 surf	Yes	Yes	N/A	Nothing to add.	NR
OCEAN QUAHOG					
1.1.1 oq	Yes	No	N/A	SIb, SG100 requires that "There is a high degree of certainty that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years." A score of 100 is given for the PI, and it is stated that "The stock has undergone fishing down since the beginning of the fishery, and the biomass has not yet reached Bmsy." It is not clear, though, how this marries with the statement in the introduction on P.57 that "The new reference points are not referred to as MSY reference points because the potential productivity of the ocean quahog stock under fishing is unknown." Further explanation appears to be required.	The management agency has recently adopted new reference points based on a more precautionary approach given the now well-understood long life of this species. The reference points are not referred to as MSY reference points but the reference points were chosen based on the best available science, including analogies with long-lived West Coast groundfish species. The target BRPs were set by stock assessment scientists to maintain favorable stock conditions and the threshold BRPs were set to avoid undesirable stock conditions (Chute et al. 2013).The team continues to beleive that a score of 100 for this PI is warranted. The rationale has been revised to provide further and clearer justification for this score. Additional content has been added to the stock assessment section of the

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
					background for ocean quahog to clarify and explain the rationale for use of non-msy based BRPs based on the nature of the ocean quahog stock and economics of the fishery.
1.1.2 oq	Not scored	Not scored	N/A	Nothing to add.	
1.2.1 oq	No	No	N/A	The text focuses solely on the setting of an ABC and an ACL, but there is more to the harvest strategy than that – the setting of a minimum size, the use of bar spacing that prevents undersized animals being taken (also the signfiicant penalties that would be incurred if undersized animals are landed), the limited licensing and use of the ITQ system, the VMS system, logbook reporting, cage tag requirements, etc. – all these and more are also elements of the harvest strategy, so a revison to include them would much better support the high score awarded.	The team appreciates the peer reviewer's comments acknowledging that the harvest strategy additionally includes the combination of monitoring, stock assessment, harvest control rules and management actions. (We note that the minimum size has been suspended annually in recent years, so this is not an active aspect of the harvest strategy. (See Section: Fisheries Regulations to Meet Objectives)) However, since other PIs specifically address the monitoring, stock assessment, etc., and since the entire harvest strategy is described in the background section of the

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
					report, the team decided that rather then repeating all this material in the scoring evidence that has been previously presented, it is more appropriate to focus on the evidence that relates the application of the science to setting the quota. Nonetheless, in response, an additional statement regarding additional aspects of the harvest strategy has been included in SIa.
1.2.2 oq	Yes	Yes	N/A	Nothing to add.	NR
1.2.3 oq	Yes	No	N/A	The text of SIa states that "*Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy for surf clams.*", and is scored at 100. Apart from the need to edit for ocean quahog, this rationale supports an 80 score, only. For SIb, there is no discussion of how the fishery meets the requirements of 'all	The typo has been correected, and the team regrets the error. However, the team disagrees with the peer reviewers comment regarding the scoring. As noted in the report, and in previous responses herein, the science that supports the management of the fishery is comprehensive. The combination of regular scientific surveys and complete fishery dependent landings data allows for the development of robust assessment

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				information', nor of the requirement for 'good understanding of the inherent uncertainties in the information'. A score of 100 is not justified.	models with few uncertainties. The fishery is ITQ based, and the landed clams are tracked from the boat to processing by the National Shellfish Sanitiation Program. There is no opportunity for unreported landings. The stock assessment reports include a thorough discussion of uncertainties in the information, demonstrating a *good understanding*. The team stands behind the score of 100 for SIa and b, and has updated the rationales to support this conclusion.
1.2.4 oq	Yes	Yes (with a clarification)	N/A	A score of 100 is given for the PI, but the introductory section states (P.56): "*During SARC 48 (NEFSC 2009) Biological Reference Points (BRPs) for ocean quahogs were revisited and changes were recommended based on the unique population dynamics of very long-lived species with low rates of adult natural mortality. The revised BRPs were peer reviewed and considered the best science (Chute et al. 2013), but they were not incorporated in the FMP as an*	The MAFMC formally incorporated the precautionary approach into the surfclam and ocean quahog FMP through Amendment 16, adopted in July 2011. The FMP was further amended to take into account changes in scientific recommendations by Amendment 17, implemented on June 15, 2016. The purpose of Amendment 17 is to ensure that "the FMP will now include broad criteria to allow for greater flexibility in incorporating changes to the definitions of

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				amendment or framework process had not yet taken place". I have confirmed with the CAB that the revised BRPs are being used by managers even though not incorporated in to the FMP, but this is a little unclear in the scoring rationale for the PI. A revision to clarify this point would be useful for SIb.	the maximum fishing mortality threshold and/or minimum stock size threshold as the best scientific information becomes available…" Managers had previously adopted revised BRPs and Amendment 17 assured that these and future scientific advancements will not conflict with the language of the FMP. The background has been revised to clarify the above.
SURFCLAM					
2.1.1 surf	Yes	No	N/A	I note there is a condition on the primary species information PI, and that states: "Unfortunately, there are only a limited number of observations, 16 trips in the surfclam fishery. The observations are about one decade old … it can be said that quantitative and qualitative information is sufficient to at least estimate impact of the UoA on main primary species".	The assessment team agrees that data obtained from the NMFS Observer Program database is not adequate to assure proper classification of main and minor species for scoring, this shortcoming is evaluated under PI 2.1.3(c), deserving assignation of condition 1a. The outcome provided in PI 2.1.1 for the "status" of the primary minor species are

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				Albeit that the fishery may be working in similar areas (although not in the same areas, given the fishery's northern extension in recent years) and with the same gear as previously, it's not clear at all that these limited, old data provide a high degree of certianty for any of the SIs. A score of 80 is probably just OK, though.	based on stock assessments of these species. Only for two species considered to be experiencing overfishing (summer flounder and winter skate) were the volumes provided by the NMFS Observer Program contemplated when determining status. Subsequent assessments of this fishery will revisit and update as necessary the classification of P2 species based on information provided by the actions responding to condition 1a.
2.1.2 surf	No	No	N/A	The introduction describes the recent introduction of an observer programme for the fishery, but this is not discussed in the scoring. It is also noted that, for SIa, to be a 'Strategy' (score 100), it "*should contain mechanisms for the modification fishing practices in the light of the identification of unacceptable impacts.*" (FCR Table SA8). This implies monitoring being in place, which there may well now be (possibly justifying a score of 100 for SIa), but it is so new that there are no data and therefore no way to establish that (for SIc), it "*is*	Information about the reinstatement of the observer program has been included in PI 2.1.2(a). The assessment team considers there to be a national and regional strategy for bycatch management via annual reporting systems such as the National Bycatch Report, Standardized Bycatch Reporting Methodology, and Fishery Management Plans (FMP) which consider catch by non-directed fisheries. Amendments to the FMPs constitute a mechanism for

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	**CAB Response**
				achieving its overall objective as set out in scoring issue (a)." Finally, in the absence of any bycatch data fromthis fishery for 10 years, and despite there being a NMFS bycatch review programme in place generally, it is also very hard to see how a score of 100 is justified for SIf, for there being a "*biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all primary species*". I would suggest a score of 60 is more reasonable, with the expectation that a new review would happen once the new bycatch data had started coming in.	modification of fishing practices. The UoA specific strategy now includes a reinstated observer program that will contribute more robust information. The lack of other fishery-specific measures pertaining to bycatch management for this UoA is considered due to the high selectivity of the gear. SIa has been revised with increased references to the various measures, policies, and evaluation mechanisms that are considered to support the conclusion that there is a strategy in place in the UoA for managing all primary species. Evidence of implementation of the strategy mentioned in SIa has been included in Sic. The assessment team considers the lack of information itself best addressed via a condition on PI 2.1.3. Similarly, additional forms of review are cited in regards to Sie (not f), and the

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
					assessment team notes that such a review is not entirely dependent upon observer data. However, the assessment team concedes that although these reviews evaluate bycatch and discards, there is not a formal bienniel review that directly assesses the *potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all primary species.* The score has been revised to SG80, and PI revised downward to 90.
2.1.3 surf	Yes	Yes	Yes	Nothing to add.	NR
2.2.1 surf	Yes	No	N/A	SIa is scored at 80, with the justification that the data are a decade old. This is appropriate (c.f. scoring for PI 2.1.1). For SIb, given the absence of recent data, unless there are absolutely no species which are below biologically-based limits and which could possibly be taken by the fishery, then it is not entirely clear how this is met.	As stated in response to Peer review comments on PI 2.1.1, the team scored based on elements as determined by the information available. Based on this, as stated in 2.2.1b there are no minor secondary speces below biologically based limits. Data adequacy to assure proper classification of main and minor species for scoring, this shortcoming is evaluated

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
					under PI 2.1.3(c), where a condition has been assigned (2a).
2.2.2 surf	No	No	N/A	Same comment as for PI 2.1.2 – in the absence of monitoring data, it isn't clear how the fishery can meet 100 here for any of the SIs (possibly excepting SIa), and a condition on SIf appears appropriate given the recent (2016) initiation of a bycatch data collection process.	See response to 2.1.2 above. Rationales and the score for SIe revised.
2.2.3 surf	Yes	Yes	Yes	Nothing to add.	NR
OCEAN QUAHOG					
2.1.1 oq	Yes	No	N/A	The scores here appear to be identical to those for surfclam, and the scoring text very similar. As such, all comments regarding the adequacy of the data made for surfclam also apply here.	Scores and rationales are similar given the operational similarities of the fisheries and their combined management. See response for 2.1.1 for surfclam.
2.1.2 oq	No	No	N/A	The scores here appear to be identical to those for surfclam, and the scoring text very	Scores and rationales are similar given the operational similarities of the fisheries and

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				similar. As such, all comments regarding the adequacy of the data made for surfclam also apply here.	their combined management. See response for 2.1.2 for surflcam. Rationales and the score for SIe revised.
2.1.3 oq	Yes	Yes	Yes	Nothing further to add	NR
2.2.1 oq	Yes	No	N/A	The scores here appear to be identical to those for surfclam, and the scoring text very similar. As such, all comments regarding the adequacy of the data made for surfclam also apply here.	Scores and rationales are similar given the operational similarities of the fisheries and their combined management. See response for 2.2.1 for surflcam.
2.2.2 oq	No	No	N/A	The scores here appear to be identical to those for surfclam, and the scoring text very similar. As such, all comments regarding the adequacy of the data made for surfclam also apply here.	Agreed- scores and rationales are similar given the operational similarities of the fisheries and their combined management. See response for 2.2.2 for surflcam. Rationales and the score for SIe revised.
2.2.3 oq	Yes	Yes	Yes	Nothing further to add	NR
BOTH SPECIES					
2.3.1	Yes, generally	Yes, generally		The gear in this fishery is relatively slow and noisy, so I wouldn't expect any significant	The evidence presented in 2.3.1 addresses marine mammals, sea turtles and sea birds,

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				direct interactions with ETP species. Nevertheless, the fishery is scored 100 for PI 2.3.1, despite the text for PI 2.3.3 starting off by saying "*While there is no data from these specific fisheries available in order to allow fishery related mortality and the impact of fishing to be quantitatively estimated (required for SG80)*….". Also, for PI 2.3.1, the report relies predominantly on the LOF Tier III classification to score the fishery at 100, which is purely a marine mammal classification, and then makes a somewhat passing mention to turtles, seabirds and 'other protected species'. I don't know this bit of the US well, so have no idea what might be included in the 'other protected species' group – might some of these ETP species be taken in the fishery? The issue for SIc is indirect effects, so it is not particualrly relevant that "*Turtles, which have been taken in trawl fishing gear and sea scallop dredges, have not been*	and there is substantial presentation in the background section related to protected species for these groups of animals. The only other relevant ETP species that could possibly interact with a hydraulic dredge is an Atlantic salmon, and that is both highly unlikely and never observed. Note that there are regular scientic surveys of the surf clam and ocean quahog resource that use chartered commercial vessles equipped with hydraulic dredges, and they would also report any gear interactions with ETP species, and this has never occurred. The team agrees with the reviewer that the statement concerning turtles is not relevant and it was removed. In further consideraiton of indirect effects, the team

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				reportedly taken in clam dredges" - instead, is the habitat, or breeding, feeding or resting behaviour of any ETP species impacted signficantly – what evidence is there to support a score of 100, here??	agrees that the justification for a lack of indirect effects is based on inference of information on direct impacts to ETP species and studies on general impacts of the UoA on habitat and ecosystem; rather than evidence specific to indirect impacts on ETP species. Therefore, the team has rescored this SI to 80, now considering indirect effects *highly unlikely to not create acceptable impacts*, rather than stating that *there is a high degree of certainty there are no significant detrimental indirect effects.*
2.3.2	No	No	N/A	I agree that the fishery is generally likely to be low risk for ETP species, but the fishery is scored 100, here. This requires that a comprehenxsive strategy is in place, but a *""comprehensive strategy" (applicable only for ETP component) is a complete and tested strategy made up of linked monitoring, analyses, and management measures and responses*" (FCR Table SA8), and that "*There is clear evidence that the strategy/comprehensive strategy is being*	The NMFS and the two management councils (NEFMC and MSFMC) have extensive and comprehensive strategies that address marine mammals, ses turtles, and other protected species. These are described in the background section of the report. The surf clam and ocean quahog fishery due to its unique gear type has no interactions with these protected species, both in the commercial fishery, and in the periodic scientific surveys using chartered

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				implemented successfully" (SId). In the absence of any independent on-board monitoring (at least until very recenlty), it is not clear how this can be achieved. The text for SIf focuses only on the LOF, which is applicable only to marine mammals. The review would need to be for all ETP species, however. A score of 60 seems more appropriate, here.	commercial vessels. This justifies the score of 100.
2.3.3	Yes	Yes	Yes	Nothing further to add	NR
2.4.1	Yes	Yes (could be higher)	N/A	The discussion is comprehensive, but a higher score for SIa can be justified on the basis of the swept area in comparison to the area of habitat (110 sq. miles annually (albeit 2000 data), compared with 40,000 sq. miles of habiat).	NR
2.4.2	Yes	No	N/A, although apparently a condition was thought	I think the ITQ management approach which limits effort, and the speed of the gear across the ground, together with the inabiility of the gear to work on unsuitable	Additional aspects of the ITQ management system are noted and the assessment team agrees that these provide evidence of at least a partial strategy. The assessment

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
			appropriate	ground (as well as, preusmably, the skippers' desire to focus on productive grounds (which are energetic sands/sandy muds) and avoid unsuitable habitat to avoid wasting time and effort and reduce any risk of damage to the gear) would constitute elements of a partial strategy for habitats. However, these elements have been given only very limited prominence. Also, the PI is scored 90, with no condition. However, SIc (requiring quantitative evidence) is scored a default 60, only, and the text states: "As noted for SIb for this PI, the fishery returns to the same areas to fish after allowing the bottom to lie fallow. This only offers some qualitative evidence that the measures/partial strategy is being implemented successfully. Therefore the fishery does not meet the requirements of the SG80 or 100 levels, as there is not quantitative evidence that that the partial strategy/strategy is being implemented	team has chosen to focus scoring on the strength of the Omnibus EFH Amendment, which is deemed to constitute a strategy. There was an error in the course of revisions of the report pertaining to SIc, and the assessment team intended a score of SG80 for this SI. The scoring in the report has been changed again to indicate that the fishery meets the SG 80 level, and the rationale for this has also been modified to support that determination. SIc requires that there be some quantitative evidence that the measures/partial strategy is being implemented successfully. This evidence iccludes that VMS (Vessel Monitoring System) data that tracks fishing vessels to ensure that they are not fishing in closed or

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				successfully and is achieving its objective." A recalcualtion of the score and a condition was apparently considered to be required, here. However, I would argue that the calcualtion of swept area in comparison to the area of habitat would provide the quantitative evidence needed to meet the SG80 requirement, at least.	protected habitat areas, in addition to the qualitative evidence that the vessels are able to return to the same areas to harvest after the clams have resettled and grown in the area. Overall, this PI maintains a score of 90.
2.4.3	Yes	Yes	Yes	Nothing further to add	NR
2.5.1	No	No	N/A	The 'key ecosystem elements' are not defined in the introduction or the scoring text, so it is diffcult to determine if the score for this PI is approriate. On the basis, the justification needs to be strengthened.	The background section of the report has been modified to include a list of the key ecosystem elements that the NMFS is monitoring. However, the text in this section is clear as to the minimal impact of the fishery on ecosystem, and the score of SG 80 for this PI is fully justified.
2.5.2	Yes, generally	Yes, generally	N/A	Subject to the fact that the key ecosystem components are not described, nothing	The background section of the report has been modified to include a list of the key

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				further to add	ecosystem elements that the NMFS is monitoring. However, the teext in this section is clear as to the minimal impact of the fishery on ecosystem
2.5.3	Yes, generally	Yes, generally	N/A	Subject to the fact that the key ecosystem components are not described, nothing further to add	The background section of the report has been modified to include a list of the key ecosystem elements that the NMFS is monitoring. However, the teext in this section is clear as to the minimal impact of the fishery on ecosystem
3.1.1	Yes	Yes	Yes	Nothing further to add	No response required
3.1.2	Yes	Yes	Yes	Nothing further to add	No response required
3.1.3	Yes	Yes	Yes	Nothing further to add	No response required
3.2.1	Yes	Yes	Yes	Nothing further to add	No response required
3.2.2	Yes	Yes, generally	N/A	The report introduction states (P.56): "*During SARC 48 (NEFSC 2009) Biological Reference Points (BRPs) for ocean quahogs were revisited and changes were*	The MAFMC formally incorporated the precautionary approach into the surfclam and ocean quahog FMP through Amendment 16, adopted in July 2011. The

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				recommended based on the unique population dynamics of very long-lived species with low rates of adult natural mortality. The revised BRPs were peer reviewed and considered the best science (Chute et al. 2013), but they were not incorporated in the FMP as an amendment or framework process had not yet taken place". A score of 100 for SIb was given (= *Decision-making processes respond to* ***all issues*** *identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner*…). I have confirmed with the CAB that the revised BRPs are being used to manage the fishery, so it is apparent that managers have responded to the new BRP information. As such, this might be a useful example (none are provided in the scoring text) as to how the managers respond (none are provided).	FMP was further amended to take into account changes in scientific recommendations by Amendment 17, implemented on June 15, 2016. The purpose of Amendment 17 is to insure that "the FMP will now include broad criteria to allow for greater flexibility in incorporating changes to the definitions of the maximum fishing mortality threshold and/or minimum stock size threshold as the best scientific information becomes available…" Managers had previously adopted revised BRPs and Amendment 17 assured that these and future scientific advancements will not conflict with the language of the FMP. This Amendment had not been implemented at the time of scoring. The scoring issue rationale and background rationale has been revised to include this updated Amendment to more clearly support the score of SG100.

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				A non-binding recommendation to update the FMP might also be appropriate, given the length of time between now and when the revised assessment approach was developed. For SIC, it is noted that the requirement is that "*Decision-making processes use the precautionary approach and are based on best available information*". While the text describes how the best available science and evidence is used, the use of the precautionary approach is not addressed directly. I'm pretty sure the PA is used, though, so I think this just needs an edit.	The scoring issue rationale has been revised to clearly state that "The MAFMC formally incorporated the precautionary approach into the surfclam and ocean quahog FMP through Amendment 16, adopted in July 2011."
3.2.3	Yes	Yes	Yes	Nothing further to add	No response required
3.2.4	Yes	Yes	Yes	Nothing further to add	No response required

Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary) can be added below and on additional pages

1) Generally, the introductory sections of the report are very comprehensive and well written. I have provided a number of comments in the draft report, though, where I spotted some editorial issues or where some wording appeared to me to be ambiguous or otherwise needed clarification.
The assessment team appreciates the editorial feedback and has incorporated many of the suggested changes and prompts for clarity.

2) The report structure comprises separate P1 scoring tables for surfclam and ocean quahog, but at times the P1 text refers to both species and can be a little confusing (e.g., Surfclam PI 1.2.1, SIf, states:
"*Based on the observed catch composition data in P2, there is no discarding of target species, as the dredge only select sizes of surfclams and ocean quahogs that are commercially valuable. That said, the post release mortality, of ocean quahog in the commercial fishery is estimated to be 10%; it is higher for surfclams (50%) because they cannot re-burrow as quickly, making them susceptible to predators such as crabs, sea stars, snails, fish and skates (NOAA 2000). Therefore, there is minimal mortality of unwanted catch of the target stock*.").

   Essentially, having gone as far as producing separate tables for surfclam and ocean quahog, I would recommend stripping out all references to the 'other' species in the scoring texts.
   Noted. Further attempts to clarify have been made.

Peer Reviewer 2:

Summary of Peer Reviewer Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes**	**CAB Response**
Justification: This is a detailed assessment, carried out according to the requirements of CR v2. The justifications and scoring appear to me to be generally appropriate and I can find little to comment on or criticize. One general criticism is that, throughout the narrative text and scoring justifications, very general and often sweeping statements are made, unsupported by any presentation of evidence. That is, there is a lack of scientific precision and clarity throughout. For example, the statement that 'a gear that is highly selective at capturing only surfclams of marketable size and minimize that catch of other species'. Firstly, I don't believe that any gear is so selective that it only captures animals of a certain size - and this could have been so easily clarified by presenting data on the size frequency distribution of the catch. And how small is 'minimized? There are numerous examples of this sort of wooly statement that could have been easily avoided. Finally, a personal gripe, not really relevant here but I will say it anyway. I know this is an American fishery and the USA lags behind the rest of the world in the adoption of standardized units, but could assessors please try to do something about the plethora of units (metric tonnes, pounds, bushels, Maine bushels(!), metres, cm, inches etc.) often used in the same paragraph. At least try to put more converted values in the text to stop the reader having to sit with a calculator in order to understand what is going on!		The assessment team notes and thanks the peer reviewer for the overall positive feedback. With regard to the gear selectivity, there is currently no minimum clam size required at landing (See Section: Fisheries Regulations to Meet Objectives). In practice, the acceptable size range is industry set according to the preferences of processors. The bar spacing in the cage or bag section of the hydraulic calm dredge is set to provide a size distribution of clams that is marketable to processors. Research demonstrates that hydraulic clam dredges are highly efficient, catching 80-95% of clams of suitable size in their path (Wallace & Hoff 2005, Meyer et al 1981, Thorarinsdottir et al 2010) There are no discards of target species (NEFSC 2013, Chute et al. 2013), and incidental mortality of clams in the path of the dredge (but not retained by the fishery) is estimated and accounted for in stock assessment reports. In response to the peer reviewer request, further information and a figure on gear selectivity has been added to the background section on Fishing Practices. With regard to the units used in the report, the team has used units consistent with the management agency reported landings in the fishery, and those used in the science that supports the management of the fishery. The team agrees that they are confusing, and the conversions are less than intuitive. However, the assessment team sought to present data in the form most familiar to local stakeholders, as recorded and presented by management. It is not feasible within the scope of available time for MSC assessment to convert all data to be presented in multiple units, however, additional conversion information has been added to the glossary and various figure captions in response.

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe? ***[Reference: FCR 7.11.1 and sub-clauses]***	**Yes**	**CAB Response**
Justification: I believe that the 3 conditions are appropriately written to achieve the SG80 outcome. Since a system and protocol for collection of the required information for conditions 1 a & b and 2 a & b is, in fact, already in place and has been operational for the past year, the required outcome should be achieved within the required timeframe of three years. The data should also be of better quality since new regulations on the proportions of observer trips means that the surfclam/quahog fleet will receive at least 140 observed trips per year. Condition 3 is slightly more questionable as it relies on the cooperation of NOAA/NMFS releasing the required data speedily, but since the required information is only very basic data on enforcement and penalties, there would appear to be no reason why government should not be cooperative in providing these data before the first annual audit.		Noted. The assessment team considers the extent of correspondence presented in Appendix 6 sufficient demonstration of communication and acknowledgment of the information needed on the part of the agency. The condition only requires provision of information that should be available and not require external resources or funding. The FOIA process, albeit time consuming, provides an outlet for access to information not readily available.

If included:

Do you think the client action plan is sufficient to close the conditions raised? ***[Reference FCR 7.11.2-7.11.3 and sub-clauses]***	**Yes**	**CAB Response**
Justification: The client action plan should provide all the industry coordination and cooperation required to close the conditions.		No response required (NR).

Table 29 For reports using one of the default assessment trees:

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.1.1 Surfclam	Yes	Yes	NA	Comment: A good detailed assessment of stock status	No response (NR)
1.1.2	NA	NA	NA		
1.2.1	Yes	No	NA	I am not convinced that 1.2.1f reaches the SG100 level. While there may be a biennial review, what alternative measures to minimise UoA related mortality have been considered? Can you really argue that 'there is minimal mortality of the unwanted catch of the target stock' when post-release mortality of surfclams is 50%? Also I am surprised that surfclams burrow more slowly than ocean quahog – is that really true? There is nothing in the Biology section of the report on behaviour, such as burrowing activity of either species and no references.	The information on burrowing and post release mortality was included as background information, and it is important to note that post-release mortality is not currently relevant in the fishery because there is no minimum size and no discarding (NEFSC 2013). As noted in the report and in a previous response, there is no minimum size for landing surf clams or ocean quahogs (See Section: Fisheries Regulations to Meet Objectives). The acceptable clam size is industry set according to the preferences of the processors. The bar spacing in the cage or bag section of the hydraulic calm dredge is set to provide a size distribution of clams that

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				In the Fishing Practices section, it says 'they are designed to retain very few undersised clams'. But how many is this? There are no data presented. And do the dredges retain more undersized when full? A graph of the size frequency distribution of the catch would have clarified this. What I am trying to get at is some idea of the likely level of mortality associated with the discarded undersized catch and the incidental mortality on the seabed.	is marketable to processors. There are no discards of clams at sea (NEFSC 2013), and incidental mortality of clams in the path of the dredge is estimated and accounted for in stock assessments (estimated to be 12% for surfclams). As noted in the report, previous research of the efficiency of the hydraulic calm dredge has demonstrated that it is extremely efficient, catching 80-95% of clams of suitable size in the gear's path (Wallace & Hoff 2005, Meyer et al 1981, Thorarinsdottir et al 2010). Therefore, the team believes that the evidence supports the SG100 level. A figure and further information (and references) regarding the size selectivity of the commercial dredge has been added to the background text, and the rationale has been revised.
1.2.2	Yes	No	NA	In the justification for b) it does not state what the main uncertainties are and the SG100 asks for evidence but this is not stated in the justification.	SIb was scored at 80 and not 100, and therefore evidence at the SG100 level is not required. Uncertainties in the stock assessment supporting the BRPs and HCR are discussed in 1.2.3.

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.2.3	Yes	No	NA	The justifications state that sufficient relevant information is available by repeating the wording in the SG's but little of this information is actually given in the narrative text section so that it is not possible for peer reviewers or other readers to actually judge if it is true. Where, for example, is there data or information on stock structure and stock productivity?	The background text section on the surf clam stock assessment outlines the data that is used in the assessment models, and this includes both fishery dependent and fishery independent, scientific survey data, and it includes data on stock structure. Clarification that this information is in the stock assessments, including associated references to stock assessment reports, have been added to the rationale.
1.2.4	Yes	Yes	NA		NR
1.1.1 Ocean Quahog	Yes	Yes	NA		NR
1.1.2	NA	NA	NA		
1.2.1	Yes	No	NA	I have the same reservations about scoring f) at SG100 as detailed in 1.2.1 for Surfclams above, although the situation may be less of a concern here because post-capture mortality	The information on burrowing and post release mortality was included as background information, and it is important to note that post-release mortality (the 10% figure noted was based on discards) is not currently

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				is apparently only 10%, compared with 50% in the surfcalm. However, there is no detail, only general statements in the Biology section about burrowing behaviour, or the size distribution of the catch, so it is difficult to determine actual levels of mortality of discarded catch and incidental mortality on the seabed.	relevant in the fishery because there is no discarding (NEFSC 2013). As noted and now further clarified in the report, there is no minimum size for landing surf clams or ocean quahogs (See Section: Fisheries Regulations to Meet Objectives). The acceptable clam size is industry set according to the preferences of the processors. The bar spacing in the cage or bag section of the hydraulic calm dredge is set to provide a size distribution of clams that are marketable to processors. There are no discards of clams at sea (NEFSC 2013), and incidental mortality of clams in the path of the dredge is estimated and accounted for in stock assessments (estimated to be 5% for ocean quahog). As noted and now further clarified and referenced in the report, previous research of the efficiency of the hydraulic calm dredge has demonstrated that it is extremely efficient, catching 80-95% of clams of suitable size in the gear's path (Wallace & Hoff 2005,

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
					Meyer et al 1981, Thorarinsdottir et al 2010). Therefore, the team believes that the evidence supports the SG100 level. A figure and further information (and references) regarding the size selectivity of the commercial dredge has been added to the background text, and the rationale has been revised.
1.2.2	Yes	No	NA	In the justification for b) it does not state what the main uncertainties are and the SG100 asks for evidence but this is not stated in the justification.	Sib was scored at 80 and not 100, and therefore evidence at the SG100 level is not required. Uncertainties in the stock assessment, which forms the basis of the HCR, are discussed in 1.2.3.
1.2.3	Yes	No	NA	The justifications state that sufficient relevant information is available by repeating the wording in the SG's but little of this information is actually given in the narrative text section so that it is not possible for peer reviewers or other readers to actually judge if it is true. Where, for	The ocean quahog stock assessment outlines the data that is used in the assessment models, and this includes both fishery dependent and fishery independent, scientific survey data, and it includes data on stock structure. The rationale has been clarified to more clearly reference the stock assessment reports.

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				example, is there data or information on stock structure and stock productivity?	
1.2.4	Yes	Maybe	NA	Can you confirm that the new reference points proposed in 2013 are being used in the management of the fishery, even though they have not yet been incorporated into the FMP?	The MAFMC formally incorporated the precautionary approach into the surfclam and ocean quahog FMP through Amendment 16, adopted in July 2011. The FMP was further amended to take into account changes in scientific recommendations by Amendment 17, implemented on June 15, 2016. The purpose of Amendment 17 is to insure that "the FMP will now include broad criteria to allow for greater flexibility in incorporating changes to the definitions of the maximum fishing mortality threshold and/or minimum stock size threshold as the best scientific information becomes available…" Managers had previously adopted revised BRPs and Amendment 17 assured that these and future scientific advancements will not conflict with the language of the FMP. The background has been clarified based on the above explanation.

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.1.1 Surfclam Primary species	Yes	Yes	NA		NR
2.1.2	Yes	Yes	NA		NR
2.1.3	Yes	Yes	Yes	It is essential that up-to-date information is available but it seems that the colletction of suitable data is now being collected and should enable this condition to be closed on schedule during the period of certification.	NR
2.2.1 Surfclam Secondary species	Yes	Yes	NA		NR
2.2.2	Yes	Yes	NA		NR
2.2.3	Yes	No	Yes	a) is scored at SG80, but the Guidepost asks for 'adequate to	The rationale stated 'at least' in terms of the SG60 guidepost, going on to support the

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				assess' – is this the same as 'sufficient to at least estimate' ?	SG80 level of 'Adequate to assess.' Noting that this format was hard to follow, the rationale has been revised for 2.1.3a and 2.2.3a for both species.
2.1.2 Ocean Quahog Primary spp.	Yes	No	NA	I agree with the score but the justification for e) lacks detail on gear selectivity. Just how big is 'minimal'? No gear will only catch animals of marketable size and does retension vary as the dredge fills? No data on undersized discards is given in the narrative text.	See previous responses to comments on the hydraulic dredge selectivity pertaining to 1.2.1. Again the dredge is designed to capture only marketable ocean quahogs, there is no federal minimum size, and there are no discards (Chute et al. 2013). This statement has been included in the text, and additional information regarding gear selectivity has been added to the background section: Fishing Practices.. Processors have a preferred size range, but do not impose a minimum size on the boats. All clams caught in the dredge are landed.
2.1.3	Yes	No	Yes	As 2.2.3 above. a) is scored at SG80, but the Guidepost asks for 'adequate to assess' – is this the same as 'sufficient to at least estimate' ? OK. On further reading I guess your argument for scoring 80 is sound.	See response to 2.1.3 for surfclam above.

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.2.1Ocean quahog Secondary spp.	Yes	No	NA	For b) where you score SG100, does the argument used for a) SG100 not also apply –"because of the age of the data and the small sample size".	No because the scoring guidepost asks whether there are minor species below biologically based limits (there are none), not the degree of certainty regarding impacts being within biologically based limits.
2.2.2.	Yes	No	NA	In the justification for b) there are two mentions of surf clam fishery, which should presumably be ocean quahog. In all the justifications where you stress the selectivity of the gear minimizing bycatch you do not assess incidental impacts on the seabed. Hydraulic dredges cause major disturbance to the seabed so the mortality they generate must be large – is this scored elsewhere? e) I do not agree with your statement that 'a harvesting gear that selects only marketable sizes of the target speces'. There is no such thing. However, I agree with the score.	The team has corrected the text to "ocean quahog" this was a typo. The habitat impacts of the hydralic dredge are addressed on scoring of PIs 2.4, and in the background text section on habitat impacts of the hydraulic dredge of the report. Finally, as noted previuosly in our responses to reviewer comments, the hydraulic dredge used in these fisheries is designed so that it only captures marketable clams. There is no minimum legal size for landing (See Section: Fisheries Regulations to Meet Objectives). In practice, the acceptable size range is based on processor requirements, and the dredge is designed accordingly. In response to this and previous comments, more information on gear selectivity has been provided in the background section on Fishing Practices.

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.2.3	Yes	No	Yes	As before, I think it is essential that up-to-date data are available. A lot can change in 10 years!	NR
2.3.1 Both spp.	Yes	Yes	NA		NR
2.3.2	Yes	Yes	NA		NR
2.3.3	Yes	No	NA	The lack of ETP interactions makes this PI difficult to assess but the team make a strong justifications for awarding the score of 80, which I accept.	NR
2.4.1 Both spp.	No	No	NA	a). This is a good, detailed, justification that stresses the small size of the footprint of the fishery in relaton to the area of suitable habitat. What I think is missing is some assessment of the rate of	The Gilkinson et al. paper is an excellent paper, however the team does not consider it relevant to this assessment. The habitat impacts of the hydraulic dredge on the US east coast have been well studied by both independemnt academic investigations and

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				return to the same small areas; this could be important considering the very slow growth rates of ocean quahogs, in particular, and their low productivity. If they are returning to the same small patches very regularly there could be long term changes in the benthos, with a decline of slow moving, slow growing and irregularly recruiting species. I am surprised and disappointed to find that in the narrative text and all the P2 scoring justificatons, and particularly those concerned with gear impacts and habitat, there is no mention of any of the Canadian work on the Arctic surfclam hydraulic dredge fishery. In particular, the paper by Gilkinson et al. 2005, ICES Journal of Marine Science 62, 925-947 is highly relevant here. The Canadian work shows much longer lasting impacts on benthic communites than you are quoting here. Why might this be? There are	the NEMFC as part of the recent omnibus habitat amendment 2. The results of those analyses were used in our assessment, and are considered more than adequate to address the impacts of this gear on the habitat in this fishery. The Arctic surfclam fishery is prosecuted in a considerably colder environment, where seasons are shorter and biological processes are slower, hence longer recovery periods. Further, the footprint of the surf clam and ocean quahog is very small, and this limits the impact of an admittedly habitat destructive gear. The improtant issue is the recovery time, and that is envoronmentally based, and temprerature dependent.

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				many other papers and reports that are relevant.	
2.4.2	Yes	Yes	NA		NR
2.4.3	No	Yes	NA	You should include some reference to, and consideration, of the Candian Arctic surfclam research and MSC assessment.	Same response as 2.4.1.
2.5.1	Yes	Yes	NA		NR
2.5.2	Yes	Yes	NA		NR
2.5.3	Yes	Yes	NA		NR
3.1.1	Yes	Yes	NA		NR
3.1.2	Yes	Yes	NA		NR
3.1.3	Yes	Yes	NA		NR
3.2.1	Yes	Yes	NA		NR
3.2.2	Yes	Yes	NA		NR

Performance Indicator	Has all available relevant information 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. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
3.2.3	Yes	Yes	Yes		NR
3.2.4	Yes	Yes	NA		NR

Appendix 3 Stakeholder submissions

There were no stakeholder submissions received to prior to or during the Public Comment Draft phase. MSC submitted a Technical Oversight report during the Public Comment phase, provided below with respective assessment team responses.

Table 30. MSC Technical Oversight (TO) Report and Assessment Team Responses.

Page	Requirement	Reference	Details	PI	Assessment Team Response
170, 185	FCR-7.10.6.1 v.2.0	A rationale shall be presented to support the team's conclusion.	PI 2.2.1, SI b (Surfclam fishery)) Horseshoe crab identified as a minor species with unknown stock status. If this is the case, rationale is needed to explain how the fishery would not hinder recovery/rebuilding of this species if it were deemed to be below biologically based limits. The previous SI says that this species is 'managed' but just needs further fleshing out in relation to the impacts of this fishery.	2.2.1	2.2.1 Surfclam: The TO comment incorrectly states that the wording at SG 100 states that "rationale is needed to explain how the fishery would not hinder recovery/rebuilding of this species if it were deemed to be below biologically based limits". The wording for 2.2.1 at SG 100 states that "for minor species that are below biologically based limits, there is evidence that the UoA does not hinder the recovery and rebuilding of secondary species." As noted in the PCDR, horseshoe crab represent 0.03% of the catch of surf clams by weight, therefore they are a minor species. The horseshoe crab fishery is managed by ASMFC, and while there is no stock status determination, and no reference points, landings have been consistent with quotas and state allocations since the early 2000s when quotas were instituted by ASMFC. Therefore, this is a minor species that is not below biologically based limits, and the SG 100 SI b is met for horseshoe crabs as a minor species.
			2.2.1, SIa (Ocean quahog) – report says no 'main' species but justification in SIa seems to indicate that sea scallop is a less-resilient species and makes up 4.5% of the catch. If sea scallop is not 'less resilient' but makes up 4.5% of the catch, this should be made clearer. If it is the case that it is both less resilient and 4.5%		2.2.1 Ocean Quahog: Sea Scallops are an MSC-certified commerical fishery managed with reference points and are therefore classified as a Primary species in this fishery. Sea scallops are not considered 'less resilient,' and represent less than 5% of the UoA catch: therefore they are minor Primary species. The reference to sea scallops was removed from 2.2.1, and the language in 2.1.1a was revised to clarify that scallops are not considered 'less resilient.'

			of the catch, it should be treated as main.		
192	FCR-SA3.10.1 v.2.0	In scoring issue (a), "where national and/or international requirements set limits" refers to limits set for protection and rebuilding, provided through the national legislation or binding international agreements, as defined in SA3.1.5 and subclauses. SA3.10.1.1 If there is no applicable national legislation or bidning international agreement, scoring issue (a) shall not be scored.	PI 2.3.1, SI a. It is not clear if scoring issue a needs to be scored in this case. Our intent is that this scoring issue is only scored when applicable national/international requirements set limits. No reference is made to specific mortality limits set for any of the groups of species mentioned. Note: there is a distinction in FCR v2.0 in how this is treated compared to CR v1.3 and earlier. See also interpretations website topic here: http://msc-info.accreditation-services.com/questions/etp-and-limits/.	2.3.1	The assessment team thanks MSC for references to further guidance regarding the definition of limits and regarding PBRs. Based on this additional guidance, the team agrees that PBRs are not quantitative limits, and therefore SIa should not be scored.
121	FCR-7.12.1.5c v.2.0	The CAB shall identify and document: a. The UoC,	"The fishery certification will end, and chain of custody begin, at the point at which landings are made from fishing vessels to a named buyer or processing facility (i.e.,		'Named' buyers or processors include only those companies listed in the client group, and/or on the MSC Fishery Certificate. Product offloaded to buyers or processors not on the certificate is not eligible for use the MSC ecolabel. Therefore, the point at which chain of custody begins is only relevant for the 'named'

		b. The point of intended change of ownership, and c. The point from which subsequent Chain of Custody is required.	at the point of change of ownership)." It is not clear why the sentence above makes a specific reference to named buyers and processing facilities. What is a named buyer or processing facility? There may also be confusion as to where CoC begins if product is not landed to a named buyer or processing facility.		processors or buyers. The wording has been revised for clarity (now page 122).
121, 14	FCR_7.12.2.1 v.2.0	The CAB shall determine and document the scope of the fishery certificate, including the parties and categories of parties eligible to use the certificate and the point(s) at which chain of custody is needed	The report states on page 121 states that "only processors named on the fishery certificate are eligible for use of the ecolabel" - are these the same as the client group listed on page 14? It would be helpful to the reader to know if there is a link between the client group and eligibility to use the ecolabel.		Yes, the processors on the fishery certficate at this time are equivalent to those in the client group listed on pg14, and only processors named on the fishery certificate are eligible to use the ecolabel. Should the client group accept other entities under certificate sharing, those would be recognized on the fishery certificate, thus "only processors named on the fishery certificate are eligible for use of the ecolabel." This is further clarified in the report (now page 122).

Appendix 4 Surveillance Frequency

The surveillance program will be conducted according to the Default Surveillance Level 6. This includes an annual on-site audit with two surveillance team members. This program is considered most appropriate for an initial certification period where there are conditions on the fishery. Surveillance audits are planned to be conducted near the anniversary date of the fishery certificate, in accordance with requirements of FCRV2.0 7.23.6.

Table 31. Fishery Surveillance Program

Surveillance Level	Year 1	Year 2	Year 3	Year 4
Default Level 6	*On-site surveillance audit*	*On-site surveillance audit*	*On-site surveillance audit*	*On-site surveillance audit & re-certification site visit*

Appendix 5 Objections Process

NA. No objections were received.

Appendix 6 Records Pertaining to the FOIA Request with NOAA OLE

April 2016 NOAA OLE Response to Initial FOIA Request

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Office of Law Enforcement (OLE)
1315 East West Hwy
SSMC 3 RM 3301
Silver Spring, Maryland 20910

April 25, 2015

Richard B. Allen
145 High St Apt A
Westerly, RI 02891

Re: FOIA Request No. DOC-NOAA-2016-000889

Dear Mr. Allen,

This letter is in response to your Freedom of Information Act (FOIA) request DOC-NOAA-2016-000889 dated April 1, 2016 and was received by our office on April 11, 2016.

Specifically you requested:

> *"...1. How many dockside inspections of surfclam and ocean quahog landings did NMFS agents carry out each year for the years 2010 through 2015? 2. How many citations were issued for violations of the surfclam and ocean quahog regulations each year from 2010 through2015? 3. How many permit sanctions resulting from federal surfclam and ocean quahog violations were imposed on surfclam and ocean quahog permit holders each year from 2010 through 2015? 4. What is the total amount of fines resulting from violations of federal surfclam and ocean quahog regulations that were assessed on surfclam and ocean quahog permit holders or operators each year from 2010 through 2015?"*

We are writing to request for clarification regarding the FOIA request you have submitted as it refer to asking "How many ...? What is ...?" questions rather than asking for specific Agency records.

Pursuant to 15 CFR 4.4(c) "the records requested must be described in enough detail to enable Department personnel to locate them with a reasonable amount of effort. If possible, a request should include specific information about each record sought, such as the date, title or name, author, recipient, and subject matter of the records. In general, the more specific the request describes the records sought, the greater likelihood that the Department will be able to locate those records."

Your request will not be processed until we hear from you. If we do not hear from you by June 6, 2016, we will close the request in our system. We receive correspondence only on business days from 8:30 a.m. to 5:00 p.m., Eastern Time. FOIA appeals received outside of our normal business hours will be deemed received on the next business day.

May 2016 Letter from Client Group to NMFS

SEA WATCH INTERNATIONAL, LTD.
8978 GLEBE PARK DRIVE, EASTON, MD 21601-7004
MAIN 410-822-7500 • FAX 410-820-5260

May 18, 2016

VIA ELECTRONIC MAIL

John K. Bullard, Regional Administrator
Douglas Potts, Fishery Policy Analyst
National Marine Fisheries Service
Greater Atlantic Regional Fisheries Office
55 Great Republic Drive
Gloucester, MA 01930

Re: Marine Stewardship Council (MSC) Certification of Surfclam/Ocean Quahog Resources for Sustainability

Dear John and Doug:

This is to follow up on my conversation with Doug last week regarding the Marine Stewardship Council's ongoing review of the surfclam/quahog resource, and management regime, to determine whether we are eligible for certification by MSC as a "sustainable fishery."

As part of its review MSC takes a look at not only the status of the resource itself, but also the nature of our management program and, in particular, how our management measures are enforced. To that end, MSC reviewers have posed some questions to the Office of Law Enforcement which have not been answered, and a follow up FOIA request is not progressing very expeditiously at this time.

The information the MSC reviewers are looking for is pretty straightforward, and I am hopeful that you can direct us to an individual or individuals who could provide answers to several basic questions, without the need to request an unnecessary multitude of documents through the FOIA procedures. I think you will agree that it is in the best interest not only of our industry, but also of NOAA/NMFS, that we successfully are certified as a "sustainable fishery" by MSC.

The specific enforcement questions that the MSC reviewers have posed are as follows:

- Number of dockside inspections of surfclam and ocean quahog landings annually by NMFS, for 2010-2015.
- Number of citations issued for violations of surfclam and ocean quahog regulations annually, for 2010-2015.

Quality and Satisfaction Guaranteed

- Number of permit sanctions resulting from surfclam and ocean quahog violations imposed on permit holders annually, for 2010-2015.

- Total amount of fines resulting from violations of surfclam and ocean quahog regulations assessed on permit holders or operators annually, for 2010-2015.

As to the first bullet point, I think that to the extent "dockside inspections" are occurring, this is carried out through state officials (at least in Massachusetts and NJ) on delegation, and I believe that monitoring of surfclam/quahog tags occurs through reports submitted to your agency as opposed to dockside inspections. But if I could be referred to someone in the agency who could clarify the nature and extent of dockside inspections by the federal government, that would be most helpful.

As to the remaining three bullet points, I would think that the Office of Law Enforcement would have this information and that it would not be too voluminous – since we have had few violations since our ITQ program was established. But again, if you can refer me to someone through whom I could pull together this information, that would be most helpful.

I apologize for any burden resulting from this request, but at this point the only issue holding up the preparation of an MSC draft report on our certification is that relating to the bullet points above. So if we can get this information finalized, we should soon have a draft report that, hopefully, will lead the way to the publication of certification for our fishery, and our management program.

I thank you in advance for your assistance with this, and please let me know if I can clarify this request any further.

Very truly yours,

Thomas T. Alspach,
General Counsel

TTA/tsd
cc: Richard Robins, MAFMC
Dr. Chris Moore, MAFMC
Sea Watch International, Ltd.
Bumble Bee Seafood
Atlantic Capes Seafood
Lamonica Fine Foods
Surfside Products, Inc.

June 2016 Email to OLE to Clarify FOIA Request

From: Richard Allen
To: arlyn.penaranda@noaa.gov
Cc: Thomas T. Alspach; Jennifer Humphenstine; Joseph DeAlteris (Joseph DeAlteris)
Subject: FOIA Request No. DOC-NOAA-2016-000889
Date: Friday, June 3, 2016 5:35:38 AM

June 3, 2016

Arlyn Penaranda, FOIA Coordinator
National Oceanic and Atmospheric Admin.
National Marine Fisheries Service
Office of Law Enforcement
1315 East West Highway
SSMC 3 RM 3301
Silver Spring, MD 20910

RE: FOIA Request No. DOC-NOAA-2016-000889

Dear Ms. Penaranda:

This is in response to your correspondence of April 25, 2016 regarding the above captioned FOIA request.

In order to conform with the advice in your letter, please amend our request to make reference to the following:

1. All documents that constitute or quantify dockside inspections under the authority of NMFS of surfclam and ocean quahog landings for each of the years 2010 through 2015.

2. All documents that constitute or quantify all citations issued by NMFS or NOAA for violations of surfclam and ocean quahog regulations for each of the years 2010 through 2015.

3. All documents that constitute or quantify permit sanctions resulting from violations of federal surfclam and ocean quahog regulations, imposed on surfclam and ocean quahog ITQ permit holders, for each of the years 2010 through 2015.

4. All documents that constitute or quantify the total amount of fines resulting from violations of federal surfclam and ocean quahog regulations, assessed on surfclam and ocean quahog ITQ permit holders or operators, for each of the years 2010 through 2015.

We hope that this will clarify our request so that you may proceed.

In the meantime, Thomas Alspach on our behalf has been attempting to make contact with your FOIA coordinator, in order to attempt to narrow our requests to the extent possible. That effort will continue.

Please call or email me should you have questions about any of the above. Thank you for your assistance.

Very truly yours,

Richard B. Allen

June 2016: OLE Response Regarding FOIA Request

From: Richard Allen
To: "Lorna Martin-Gross - NOAA Federal"
Cc: Thomas T. Alspach; Joseph DeAlteris (Joseph DeAlteris); Jennifer Humberstone
Subject: RE: FOIA Request No. DOC-NOAA-2016-000889
Date: Friday, June 17, 2016 2:06:16 PM

Dear Ms. Martin-Gross,

Thank you for the update. I will be looking forward to receiving the documents.

Richard Allen

From: Lorna Martin-Gross - NOAA Federal [mailto:lorna.martin-gross@noaa.gov]
Sent: Friday, June 17, 2016 2:53 PM
To: rballen63@gmail.com; talspach@goeaston.net
Cc: arlyn.penaranda@noaa.gov
Subject: FOIA Request No. DOC-NOAA-2016-000889

Good afternoon Mr. Allen,

I am writing to provide you with a status update of your subject FOIA request. The request was transferred to me in Ms. Penaranda's absence. You modified the scope of the request on June 3, 2016; the perfected request reads:

"1. All documents that constitute or quantify dockside inspections under the authority of NMFS of surfclam and ocean quahog landings for each of the years 2010 through 2015.

2. All documents that constitute or quantify all citations issued by NMFS or NOAA for violations of surfclam and ocean quahog regulations for each of the years 2010 through 2015.

3. All documents that constitute or quantify permit sanctions resulting from violations of federal surfclam and ocean quahog regulations, imposed on surfclam and ocean quahog ITQ permit holders, for each of the years 2010 through 2015.

4. All documents that constitute or quantify the total amount of fines resulting from violations of federal surfclam and ocean quahog regulations, assessed on surfclam and ocean quahog ITQ permit holders or operators, for each of the years 2010 through 2015."

Documents were located in two geographically separate locations, and are currently being processed at those locations. Once the documents are processed locally, they will be forwarded to my office for review and final disposition.

If you have any questions, I am available via email, lorna.martin-gross@noaa.gov, or phone, 301-427-8244.

Kind regards,

Ms. Lorna Martin-Gross
DOC/NOAA/NMFS/OLE
1315 East-West Highway
SSMC3, Suite 3301
Silver Spring, MD 20910
Phone: 301-427-8244

July 2016: Letter from NOAA to Client Group Regarding Information Request

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

JUL 1 1 2016

Thomas Alspach
295 Bay Street, Suite 1
P.O. Box 1358
Easton, MD 21601

Dear Mr. Alspach:

Thank you for your letter dated May 18, 2016, regarding the Marine Stewardship Council (MSC) review of the Atlantic surfclam and ocean quahog fisheries. You letter explained the work being done by MSC-contracted reviewers to demonstrate and document that these fisheries are sustainable.

I understand the summary statistics about enforcement activities the MSC reviewers are looking for appear to be fairly straight forward. However, as you know from subsequent discussions with my staff, we do not routinely generate these types of summary reports so a document does not currently exist that contains the information the MSC reviewers appear to be looking for. As a result, the MSC reviewers were advised to use the Freedom of Information Act (FOIA) process to request source documents, which would allow them to generate their own summary statistics.

I understand that you and the MSC reviewers have already been in contact with NOAA's FOIA specialists, as well as FOIA specialists from NOAA's Office of Law Enforcement (OLE) and NOAA's Office of General Counsel, and the request is moving through the regular process for compiling and reviewing the responsive documents. I encourage you to continue working with these individuals to obtain the documents you need.

If there is anything else that the GARFO may assist with, please contact Doug Potts from our Sustainable Fisheries Division.

Sincerely,

for John K. Bullard
Regional Administrator

Cc:
Mark Graff, NOAA FOIA Officer
Tim Donovan, Acting Assistant Director OLE Northeast Division
Amanda Patterson, GARFO FOIA Coordinator

July 2016: Letter from NOAA Providing FOIA Records

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

Mr. Richard B. Allen
145 High Street, Apt. A
Westerly, RI 02891

JUL 21 2016

Re: FOIA Request No. DOC-NOAA-2016-000889

Dear Mr. Allen,

This letter is in response to your Freedom of Information Act (FOIA) request which was received by our office on April 8, 2016, in which you requested:

> *1. All documents that constitute or quantify dockside inspections under the authority of NMFS of surfclam and ocean quahog landings for each of the years 2010 through 2015.*
> *2. All documents that constitute or quantify all citations issued by NMFS or NOAA for violations of surfclam and ocean quahog regulations for each of the years 2010 through 2015.*
> *3. All documents that constitute or quantify permit sanctions resulting from violations of federal surfclam and ocean quahog regulations, imposed on surfclam and ocean quahog ITQ permit holders, for each of the years 2010 through 2015.*
> *4. All documents that constitute or quantify the total amount of fines resulting from violations of federal surfclam and ocean quahog regulations, assessed on surfclam and ocean quahog ITQ permit holders or operators, for each of the years 2010 through 2015..*

We have located 210 pages of documents responsive to your request. 43 pages of these documents are being released to you in their entirety.

1 page of documents responsive to your request is exempt under the following:

- 5 U.S.C.552(B)(5), which, "protects inter-agency or intra-agency memorandums or letters which would not be available by law to a party other than an agency in litigation with the agency."
- 5 U.S.C.552(B)(6), which prohibits from disclosure of "personnel and medical files and similar files" when the disclosure of such information "would constitute a clearly unwarranted invasion of personal privacy."
- 5 U.S.C.552(B)(7)(C), which prohibits from disclosure personal information when disclosure "could reasonably be expected to constitute an unwarranted invasion of personal privacy."

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We are also releasing 166 pages of documents responsive to your request that are partially redacted under the following exemptions:

- 5 U.S.C.552(b)(3), which "allows the withholding of information prohibited from disclosure by another federal statute."
- 5 U.S.C.552(b)(4), which prohibits from disclosure "trade secrets and commercial or financial information obtained from a person [that is] privileged or confidential."
- 5 U.S.C.552(b)(5), which, "protects inter-agency or intra-agency memorandums or letters which would not be available by law to a party other than an agency in litigation with the agency."
- 5 U.S.C.552(b)(6), which prohibits from disclosure of "personnel and medical files and similar files" when the disclosure of such information "would constitute a clearly unwarranted invasion of personal privacy."
- 5 U.S.C.552(b)(7)(C), which prohibits from disclosure personal information when disclosure "could reasonably be expected to constitute an unwarranted invasion of personal privacy."

You have the right to file an administrative appeal if you are not satisfied with our response to your FOIA request. All appeals should include a statement of the reasons why you believe the FOIA response was not satisfactory. An appeal based on documents in this release must be received within 90 calendar days of the date of this response letter at the following address:

Assistant General Counsel for Litigation, Employment, and Oversight
U.S. Department of Commerce
Office of General Counsel
Room 5875
14th and Constitution Avenue, N.W.
Washington, D.C. 20230

An appeal may also be sent by e-mail to FOIAAppeals@doc.gov, by facsimile (fax) to 202-482-2552, or by FOIAonline at https://foiaonline.regulations.gov/foia/action/public/home#.

For your appeal to be complete, it must include the following items:

- a copy of the original request,
- our response to your request,
- a statement explaining why the withheld records should be made available, and why the denial of the records was in error.
- "Freedom of Information Act Appeal" must appear on your appeal letter. It should also be written on your envelope, e-mail subject line, or your fax cover sheet.

FOIA appeals posted to the e-mail box, fax machine, FOIAonline, or Office after normal business hours will be deemed received on the next business day. If the 30th calendar day for submitting an appeal falls on a Saturday, Sunday or legal public holiday, an appeal received by 5:00 p.m., Eastern Time, the next business day will be deemed timely.

FOIA grants requesters the right to challenge an agency's final action in federal court. Before doing so, an adjudication of an administrative appeal is ordinarily required.

The Office of Government Information Services (OGIS), an office created within the National Archives and Records Administration, offers free mediation services to FOIA requesters. They may be contacted in any of the following ways:

Office of Government Information Services
National Archives and Records Administration
Room 2510
8601 Adelphi Road
College Park, MD 20740-6001
Email: ogis@nara.gov

Phone: 301-837-1996
Fax: 301-837-0348
Toll-free: 1-877-684-6448

If you have questions regarding this correspondence, please contact Lorna Martin-Gross at lorna.martin-gross@noaa.gov or by phone at 301-427-8244.

Sincerely,

Samuel D. Rauch III,
Deputy Assistant Administrator
for Regulatory Programs

FOIA Records Summary

The following table provides a summary of the cases provided by NOAA OLE in response to the FOIA request. The records released included 210 pages pertaining to 10 incident reports, each of which ranged from 3-96 pages in length. All records provided took place 2010-2013.

Date	Case #	Location	Source	Violation	Penalty	Assessment Team Summary Comments
12/31/2010	l1100098	NY Bight	VMS	Contaminated Area	Written Warning	VMS technician reported boat fishing in closed area on 12/31/10; on 1/4/11 the vessel was referred to the Special Agent from Bellport, NY to follow up. SA contated the boat's attroney, requested attorney to contact client and locate the contaminated product and have it destroyed. Written warning sent through attorney who requested the name of the operator on the warning be changed and that was done.
1/12/2010	NE1004128	Nan Ltshp Closed Area	VMS (?)	Closed Area	$36,500	Area closed for environmental reasons. Penalty $12,500 plus proceeds from catch totalling $36,500
12/4/2013	l1400398	NJ	Inspection	None	NA	No location given. No info in report.
2/6/2013	l1300414	GB	VMS	PSP Closed Area	Written Warning	Mitigating circumstances.
6/20/2012	l1202006	Hyannis, MA	Inspection	None	NA	EO confirmed that captain "had tags to attach before offloading to Atlantic Capes Fisheries which had a truck waiting at the dock."
5/7/2010	l1001178	NY Bight	VMS	Contaminated Area	Written Warning	EO call to boat's attorney. Promise to have boat dump all clams before returning to port. Clams actually offloaded and trucked to processor, processed, and put in cold storage. Processor notified, pulled processed clams and sent to landfill.
10/2/2013	l1304582	Atl City	Inspection	None	NA	
6/5/2013	l1302795	Provincetown	Inspection	None	NA	
12/5/2011	l1105131	New Bedford	Inspection	None	NA	
2/3/2012	1200633	At Sea	Coast Guard	Fishing W/O Operator's Permit		Summary settlement of $250 offered by NMFS, apparently refused or ignored by defendant. NMFS proceeded with a full case and a fine of $2,000. Case cleared on 5/13/2015, but not clear if fine was paid or the collection was simply transferred to the Finance Office.